MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**Liquified Petroleum Gas**
Version #	05
Issue date	06-10-2011
Revision date	11-13-2012
Supersedes date	09-28-2012
CAS #	68476-85-7
MSDS Number	306
Product use	Refinery feedstock.
Synonym(s)	LPG, Propane-Butane Mixture, Raw LPG See section 16 for complete information.
Manufacturer/Supplier	Valero Marketing & Supply Company and Affiliates P.O. Box 696000 San Antonio, TX 78269-6000
General Assistance	210-345-4593
Emergency	24 Hour Emergency 866-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state	Gas.
Appearance	Colorless liquefied gas.
Emergency overview	DANGER Extremely flammable gas. High pressure gas. Gas reduces oxygen available for breathing. Harmful if inhaled, absorbed through skin, or swallowed. Contains 1,3-butadiene. Cancer hazard. Mutagen. May cause heritable genetic damage. May cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Prolonged exposure may cause chronic effects. Contact with liquefied gas might cause frostbites, in some cases with tissue damage. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).
OSHA regulatory status	This product is hazardous according to OSHA 29 CFR 1910.1200.
Potential health effects	
Routes of exposure	Inhalation. Eyes. Skin.
Eyes	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Skin	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Inhalation	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest and sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm.
Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Target organs	Respiratory tract. Eyes. Central nervous system.
Chronic effects	May cause central nervous system effects. Components have been shown to be weak cardiac sensitizers which can result in cardiac arrhythmia and ventricular fibrillation.
Potential environmental effects	Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Propane	74-98-6	10 - 100
Isobutane	75-28-5	10 - 70
Butane	106-97-8	0 - 70
1-Butene	25167-67-3	1 - 30
Ethane	74-84-0	0 - 10
Ethylene	74-85-1	0 - 10
Methane	74-82-8	0 - 10
Propylene	115-07-1	0 - 5
1,3-butadiene	106-99-0	0 - 0.3

4. First Aid Measures

First aid procedures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact Wash frost-bitten areas with plenty of water. Do not remove clothing. Get medical attention immediately.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician or poison control center immediately.

Ingestion Ingestion is not a typical route of exposure for gases or liquefied gases.

Notes to physician Treat symptomatically.

5. Fire Fighting Measures

Flammable properties Extremely flammable gas. Gas forms mixtures with air which can catch fire and burn with explosive violence. Vapors are heavier than air and invisible mixture spreads easily and may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable extinguishing media Dry chemical, CO2, water spray, fog, or foam.

Fire fighting equipment/instructions Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Move container from fire area if it can be done without risk.

Do not extinguish fires unless gas flow can be stopped safely; explosive re-ignition may occur. Promptly isolate the scene by removing all persons from the vicinity of the incident. No action shall be taken involving any personal risk or without suitable training. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus. Stop flow of material. Use water to keep fire exposed containers cool and to protect personnel effecting shutoff. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop leak. Prevent runoff from fire control or dilution from entering streams, sewers or drinking water supply.

Hazardous combustion products Carbon oxides.

6. Accidental Release Measures

Personal precautions Evacuate the area promptly. No action shall be taken involving any personal risk or without suitable training. Keep unnecessary personnel away.

Ensure adequate ventilation. In case of inadequate ventilation, use respiratory protection. Wear appropriate personal protective equipment (See Section 8).

Environmental precautions Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent from entering into soil, ditches, sanitary sewers, waterways and/or groundwater.

Methods for cleaning up Ventilate well, stop flow of gas or liquid if possible. Immediately contact emergency personnel.

7. Handling and Storage

Handling

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Wear appropriate personal protective equipment (See Section 8). Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored, and processed. Do not breathe gas. Do not get in eyes, on skin, on clothing. Use only with adequate ventilation.

Storage

Store in accordance with local, regional, national, and international regulations. Secure cylinders in an upright position at all times, close all valves when not in use. Store in a cool, dry, well-ventilated place. Keep container tightly closed and sealed until ready for use. Protect cylinders from damage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	TWA	2 ppm
1-Butene (CAS 25167-67-3)	TWA	250 ppm
Ethane (CAS 74-84-0)	TWA	1000 ppm
Ethylene (CAS 74-85-1)	TWA	200 ppm
Isobutane (CAS 75-28-5)	TWA	1000 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm
Propylene (CAS 115-07-1)	TWA	500 ppm

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	STEL	5 ppm
	TWA	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Propane (CAS 74-98-6)	PEL	1800 mg/m3
		1000 ppm

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	TWA	4.4 mg/m3
		2 ppm
Butane (CAS 106-97-8)	TWA	1000 ppm
Ethane (CAS 74-84-0)	TWA	1000 ppm
Ethylene (CAS 74-85-1)	TWA	229 mg/m3
		200 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm
Propylene (CAS 115-07-1)	TWA	860 mg/m3
		500 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	TWA	2 ppm
Butane (CAS 106-97-8)	STEL	750 ppm
	TWA	1000 ppm
Ethane (CAS 74-84-0)	TWA	1000 ppm
Ethylene (CAS 74-85-1)	TWA	200 ppm
Isobutane (CAS 75-28-5)	TWA	1000 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
Propane (CAS 74-98-6)	TWA	1000 ppm
Propylene (CAS 115-07-1)	TWA	500 ppm

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	TWA	2 ppm
1-Butene (CAS 25167-67-3)	TWA	250 ppm
Butane (CAS 106-97-8)	TWA	800 ppm
Ethane (CAS 74-84-0)	TWA	1000 ppm
Ethylene (CAS 74-85-1)	TWA	200 ppm
Isobutane (CAS 75-28-5)	TWA	800 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm
Propylene (CAS 115-07-1)	TWA	500 ppm

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	TWA	4.4 mg/m3
		2 ppm
Butane (CAS 106-97-8)	TWA	1900 mg/m3
		800 ppm
Propane (CAS 74-98-6)	TWA	1800 mg/m3
		1000 ppm

Mexico. Occupational Exposure Limit Values

Components	Type	Value
1,3-butadiene (CAS 106-99-0)	STEL	2750 mg/m3
		1250 ppm
	TWA	2200 mg/m3
		1000 ppm
Butane (CAS 106-97-8)	TWA	1900 mg/m3
		800 ppm

Engineering controls Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. The engineering controls also need to keep gas, vapor, or dust concentrations below any lower explosive limits.

Personal protective equipment

Eye / face protection Wear approved safety glasses or goggles.

Skin protection Wear protective clothing appropriate for the risk of exposure.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

General hygiene considerations Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practices.

9. Physical & Chemical Properties

Appearance Colorless liquefied gas.

Physical state Gas.

Form Compressed liquefied gas.

Color Colorless

Odor Faint.

Odor threshold Not available.

pH	Not available.
Vapor pressure	Not available.
Vapor density	1.5
Boiling point	> -44.4 °F (> -42.44 °C)
Melting point/Freezing point	-285 °F (-176.11 °C) Weighted average
Solubility (water)	Insoluble.
Specific gravity	0.51
Flash point	-212.5 °F (-135.85 °C) Closed Cup (Methane)
Flammability limits in air, upper, % by volume	9.5 %
Flammability limits in air, lower, % by volume	1 %
Auto-ignition temperature	> 724.73 °F (> 384.85 °C) (Butylene)
VOC	100 %
Molecular weight	44.1 (Propane)
Molecular formula	C3-H8 (Propane)

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal temperature conditions and recommended use.
Conditions to avoid	In a fire or if heated, a pressure increase will occur and the container may burst or explode.
Incompatible materials	Oxidizing agents. Reducing agents. Acids. Alkalis.
Hazardous decomposition products	None known.
Possibility of hazardous reactions	Polymerization will not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
1,3-butadiene (CAS 106-99-0)		
Acute		
Inhalation		
LC50	Rat	285 mg/l, 4 Hours
Oral		
LD50	Rat	5.48 g/kg
Butane (CAS 106-97-8)		
Acute		
Inhalation		
LC50	Mouse	680 mg/l, 2 Hours
	Rat	658 mg/l, 4 Hours
Ethylene (CAS 74-85-1)		
Acute		
Oral		
LD50	Mouse	1093 mg/l
Methane (CAS 74-82-8)		
Acute		
Inhalation		
LC50	Mouse	326 mg/m3, 2 hours
Propane (CAS 74-98-6)		
Acute		
Inhalation		
LC50	Rat	> 1442.847 mg/l, 15 Minutes

Components	Species	Test Results
Propylene (CAS 115-07-1)		
Acute		
Inhalation		
LC50	Mouse	680 mg/l, 2 Hours
	Rat	658 mg/l, 4 Hours

Sensitization Not available.

Acute effects Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").

Chronic effects May cause central nervous system effects.

Carcinogenicity

ACGIH Carcinogens

1,3-butadiene (CAS 106-99-0)	A2 Suspected human carcinogen.
Ethylene (CAS 74-85-1)	A4 Not classifiable as a human carcinogen.
Propylene (CAS 115-07-1)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

1,3-butadiene (CAS 106-99-0)	1 Carcinogenic to humans.
Ethylene (CAS 74-85-1)	3 Not classifiable as to carcinogenicity to humans.
Propylene (CAS 115-07-1)	3 Not classifiable as to carcinogenicity to humans.

US NTP Report on Carcinogens: Known carcinogen

1,3-butadiene (CAS 106-99-0)	Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

1,3-butadiene (CAS 106-99-0)	Cancer hazard.

12. Ecological Information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Persistence and degradability Not available.

Bioaccumulation / Accumulation Not available.

Partition coefficient

Methane	1.09
Ethylene	1.13
Propylene	1.77
Ethane	1.81
1,3-butadiene	1.99
Propane	2.36
Isobutane	2.76
Butane	2.89

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 °F

Disposal instructions Dispose in accordance with all applicable regulations. Empty containers may contain product residues. Do not puncture or incinerate even when empty. This material and/or its container must be disposed of as hazardous waste. Return the empty cylinder to the supplier.

14. Transport Information

DOT

Basic shipping requirements:

UN number	UN1075
Proper shipping name	Petroleum gases, liquefied
Hazard class	2.1
Additional information:	
Special provisions	T50
Packaging exceptions	306

Packaging non bulk	304
Packaging bulk	314, 315
Reportable quantity	100

IATA

UN number	UN1075
UN proper shipping name	Petroleum gases, liquefied
Transport hazard class(es)	2.1
ERG code	10L

IMDG

UN number	UN1075
UN proper shipping name	PETROLEUM GASES, LIQUEFIED
Transport hazard class(es)	2.1
EmS	F-D*, S-U

TDG

Proper shipping name	PETROLEUM GASES, LIQUEFIED
Hazard class	2.1
UN number	UN1075

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

1,3-butadiene (CAS 106-99-0)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

1,3-butadiene (CAS 106-99-0)	0.1 %
Ethylene (CAS 74-85-1)	1.0 %
Propylene (CAS 115-07-1)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

1,3-butadiene (CAS 106-99-0)	Listed.
Ethylene (CAS 74-85-1)	Listed.
Propylene (CAS 115-07-1)	Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

Propane: 100
Isobutane: 100
Butane: 100
Ethane: 100
Ethylene: 100
Methane: 100
1,3-butadiene: 10

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - Yes Reactivity Hazard - No
Section 302 extremely hazardous substance (40 CFR 355, Appendix A)	Yes
Section 311/312 (40 CFR 370)	Yes
Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)	Hazardous substance
Drug Enforcement Administration (DEA) (21 CFR 1308.11-15)	Not controlled

Canadian 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 status Controlled

WHMIS classification A - Compressed Gas
B1 - Flammable Gases
D2A - Other Toxic Effects-VERY TOXIC
D2B - Other Toxic Effects-TOXIC

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

State regulations US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

WARNING: Byproducts of the combustion of propane contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

California requires all "persons in the course of doing business" whose products are sold in California to comply with Proposition 65 (Cal. Health and Safety Code Sections 25249.6 et seq.). Accordingly, resellers of this product in California shall comply with Proposition 65, including the provision of any necessary warnings for exposure to chemicals listed by the State of California: http://oehha.ca.gov/prop65/prop65_list/files/P65single111811.pdf

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

1,3-butadiene (CAS 106-99-0) Listed.
Butane (CAS 106-97-8) Listed.
Propylene (CAS 115-07-1) Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

1,3-butadiene (CAS 106-99-0) Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

1,3-butadiene (CAS 106-99-0) Listed: April 1, 1988 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

1,3-butadiene (CAS 106-99-0) Listed: April 16, 2004 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

1,3-butadiene (CAS 106-99-0) Listed: April 16, 2004 Female reproductive toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

1,3-butadiene (CAS 106-99-0) Listed: April 16, 2004 Male reproductive toxin.

US - New Jersey RTK - Substances: Listed substance

1,3-butadiene (CAS 106-99-0) Listed.
Butane (CAS 106-97-8) Listed.
Ethane (CAS 74-84-0) Listed.

Ethylene (CAS 74-85-1)	Listed.
Isobutane (CAS 75-28-5)	Listed.
Methane (CAS 74-82-8)	Listed.
Propane (CAS 74-98-6)	Listed.
Propylene (CAS 115-07-1)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard

1,3-butadiene (CAS 106-99-0)	Special hazard.

US. Massachusetts RTK - Substance List

1,3-butadiene (CAS 106-99-0)	Listed.
Butane (CAS 106-97-8)	Listed.
Ethane (CAS 74-84-0)	Listed.
Ethylene (CAS 74-85-1)	Listed.
Isobutane (CAS 75-28-5)	Listed.
Methane (CAS 74-82-8)	Listed.
Propane (CAS 74-98-6)	Listed.
Propylene (CAS 115-07-1)	Listed.

US. New Jersey Worker and Community Right-to-Know Act

1,3-butadiene (CAS 106-99-0)	500 LBS
Butane (CAS 106-97-8)	500 LBS
Ethane (CAS 74-84-0)	500 LBS
Ethylene (CAS 74-85-1)	500 LBS
Isobutane (CAS 75-28-5)	500 LBS
Methane (CAS 74-82-8)	500 LBS
Propane (CAS 74-98-6)	500 LBS
Propylene (CAS 115-07-1)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

1,3-butadiene (CAS 106-99-0)	Listed.
Butane (CAS 106-97-8)	Listed.
Ethane (CAS 74-84-0)	Listed.
Ethylene (CAS 74-85-1)	Listed.
Isobutane (CAS 75-28-5)	Listed.
Methane (CAS 74-82-8)	Listed.
Propane (CAS 74-98-6)	Listed.
Propylene (CAS 115-07-1)	Listed.

Mexico regulations This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000).

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.

Other information Note: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.

HMIS® ratings
Health: 1*
Flammability: 4
Physical hazard: 0

NFPA ratings
Health: 2
Flammability: 4
Instability: 0

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