



# MATERIAL SAFETY DATA SHEET

## Off-Spec LPG Mix

VALERO MARKETING & SUPPLY COMPANY  
and Affiliates  
P.O. Box 696000  
San Antonio, TX 78269-6000

### Emergency Phone Numbers

24 Hour Emergency: 866-565-5220  
Chemtrec Emergency: 800-424-9300

### General Assistance

General Assistance: 210-345-4593

**BRAND NAMES:** Valero, Diamond Shamrock, Shamrock, Ultramar, Beacon, Total

## Section 1. Chemical Product and Company Identification

**Common / Trade name** : Off-Spec LPG Mix

**Synonym** : LPG, Propane-Butane Mixture, Raw LPG

SYNONYMS/Common Names: 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 product and are not reflected in this document. Consult specification sheets for technical information. This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Material uses** : This product is intended for use as a refinery feedstock, fuel, or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

**MSDS #** : 306a

## Section 2. Hazards Identification

Danger! Product May Contain or Release Hydrogen Sulfide. H<sub>2</sub>S is a highly toxic, highly flammable gas which can be fatal if inhaled at certain concentrations.

Danger! Contains Butadiene. Cancer Hazard. Butadiene has been shown to cause cancer in laboratory animals. Extremely Flammable. Compressed Gas. Narcotic and asphyxiant in high concentrations. Gas or vapor reduces oxygen available for breathing and may cause suffocation. Contact with liquid causes burns similar to frostbite. Wear insulated gloves if contact with liquid cooled equipment is expected. Avoid liquid, mist and vapor contact. Vapors may explode

**Physical state** : Gas. (COLORLESS, NONCORROSIVE, LIQUEFIED COMPRESSED GAS WITH A WEAK ODOR; MAY HAVE SKUNK ODOR ADDED.)

**Emergency overview** : Danger!  
CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.  
VAPORS MAY CATCH FIRE AND EXPLODE.  
MAY CATCH FIRE AND EXPLODE.  
FLAMMABLE GAS.  
CONTENTS UNDER PRESSURE.  
CAUSES SKIN IRRITATION.  
CAUSES DAMAGE TO THE FOLLOWING ORGANS: NERVOUS SYSTEM.  
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:  
HEART, CENTRAL NERVOUS SYSTEM, MUSCLE TISSUE.  
VAPOR MAY CAUSE FLASH FIRE.

Do not ingest. Avoid shock and friction. Extremely hazardous liquid and vapor under pressure. Do not puncture or incinerate container. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.

**Routes of entry** : Dermal contact. Eye contact. Inhalation. Ingestion.

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**Potential acute health effects**

- Eyes** : May cause severe irritation, redness, tearing, blurred vision and conjunctivitis. Contact with compressed liquid may cause permanent damage and frost burns.
- Skin** : Extreme overexposure to very high concentrations may cause mild skin irritation. Contact with compressed liquid may cause skin to freeze or frost burns.
- Inhalation** : Simple asphyxiant. 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 product may cause freeze burns to the mucous membranes. May cause harmful central nervous system effects, similar to those listed under "inhalation".
- Medical conditions aggravated by over-exposure** : Preexisting eye, skin, heart, central nervous system and respiratory system disorders may be aggravated by exposure to this product. Components have been shown to be weak cardiac sensitizers which can result in cardiac arrhythmia and ventricular fibrillation.
- Over-exposure signs/symptoms** : Simple asphyxiant. 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.

See toxicological information (section 11)

**Section 3. Composition, information on ingredients**

<u>Name</u>	<u>CAS number</u>	<u>Concentration ( % )</u>
Propane	74-98-6	0 - 25
iso-Butane	75-28-5	0 - 20
iso-Pentane	78-78-4	0 - 20
Propylene	115-07-1	0 - 15
Butane	106-97-8	0 - 15
Pentane	109-66-0	0 - 10
n-Hexane	110-54-3	0 - 5
1-Butene	106-98-9	0 - 5
iso-Butylene	115-11-7	0 - 5
trans-Butene-2	624-64-6	0 - 5
cis-Butene-2	590-18-1	0 - 5
1,3-Butadiene	106-99-0	0 - 0.3
Hydrogen Sulfide	7783-06-4	<0.05

**Section 4. First Aid Measures**

- Eye contact** : Remove the victim from the source of contamination. Open eyelids to let the product evaporate, then flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Seek medical advice if pain or redness continues. If the victim cannot tolerate light, protect his eyes with a bandage or handkerchief.
- Skin contact** : For exposure to liquid, slowly rewarm frostbitten part with lukewarm water. In case of massive exposure, remove clothing while showering with lukewarm water. Call a physician. Remove contaminated clothing promptly and launder before reuse.
- Inhalation** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
- Ingestion** : This product is a gas at normal temperatures and pressures. Never give anything by mouth to an unconscious person. DO NOT induce vomiting. Keep person warm and quiet. SEEK IMMEDIATE MEDICAL ATTENTION.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

## Section 5. Fire Fighting Measures

**Flammability of the product** : Flammable.

**Auto-ignition temperature** : 434.85°C (814.7°F)

**Flammable limits** : Lower: 1%  
Upper: 9.5%

**Products of combustion** : Combustion may produce carbon monoxide, carbon dioxide and reactive hydrocarbons (aldehydes, aromatics, etc.).

### Fire-fighting media and instructions

#### Extinguishing media

**Suitable** : Use an extinguishing agent suitable for the surrounding fire.

**Not suitable** : None known.

Extremely Flammable. Do not extinguish fire due to probable explosive reignition. Shut off source of flow, if possible. Use appropriate extinguishing media for any secondary fires. Small fires can be extinguished with dry chemical or carbon dioxide. Water can be used to cool fire-exposed containers, structures and to protect personnel. If a leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak. Do not flush down public sewers.

Risk of explosion by shock, friction, fire or other sources of ignition.

#### **Special protective equipment for fire-fighters**

: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Fire-fighters' protective clothing will only provide limited protection. Dangerous when exposed to heat or flame. Vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources (pilot lights, welding equipment, electrical equipment, etc.) and flash back. Vapors may accumulate in low areas. Vapors may concentrate in confined areas. Flowing product can be ignited by self generated static electricity. Use adequate bonding and grounding to prevent static buildup. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Irritating or toxic substances may be emitted upon thermal decomposition. For fires involving this material, do not enter any enclosed or confined space without proper protective equipment, which should include NIOSH approved self-contained breathing apparatus with full face mask. Clothing, rags or similar organic material contaminated with this product and stored in a closed space may undergo spontaneous combustion. Transfer to and from commonly bonded and grounded containers.

**Special remarks on fire hazards** : FLAMMABLE.

## Section 6. Accidental Release Measures

**Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Do not touch or walk through spilled material.

**Environmental precautions** : If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire Fighting Measures section before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other

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unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 800-424- 8802. For highway or railway spills, contact Chemtrec at 800-424-9300.

### Methods for cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.
- Large spill** : Gas or Liquefied Gas spills need to be contained and the source of the leak needs to be stopped if possible by trained emergency responders. Residual released material will vapor off quickly.

## Section 7. Handling and Storage

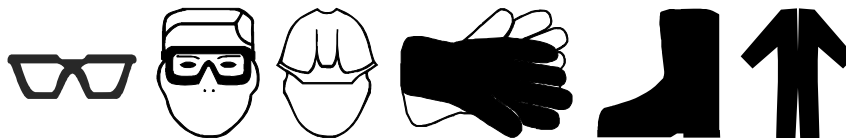
- Handling** : Do not ingest. Avoid shock and friction. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Extremely hazardous liquid and vapor under pressure. Do not puncture or incinerate container. Wash thoroughly after handling. Use good personal hygiene practices. After handling this product, wash hands before eating, drinking, or using toilet facilities.
- Storage** : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8. Exposure controls, personal protection

- Engineering measures** : 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.

### Personal protection

- Eyes** : 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 or dusts.
- Skin** : 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. Flame Retardant Clothing is recommended.
- Respiratory** : 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.
- Hands** : 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.
- Personal protective equipment (Pictograms)** : Consult your Supervisor or S.O.P. for special handling directions.



- Personal protection in case of a large spill** : Splash goggles. Full suit. Vapor respirator. Boots. Gloves. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.
- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

## Hygiene measures Environmental exposure controls

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. 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.
- : 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.

## Component

Component	Exposure limits
Propane	<p><b>ACGIH TLV (United States, 1/2004). Notes: ACGIH 2004 Adoption</b> TWA: 1000 ppm 8 hour(s). Form: All forms</p> <p><b>NIOSH REL (United States, 6/2001).</b> TWA: 1000 ppm 10 hour(s). Form: All forms</p>
iso-Butane	<p><b>ACGIH TLV (United States, 1/2004). Notes: ACGIH 2004 Adoption</b> TWA: 1000 ppm 8 hour(s). Form: All forms</p> <p><b>NIOSH REL (United States, 6/2001).</b> TWA: 800 ppm 10 hour(s). Form: All forms</p>
iso-Pentane	<p><b>ACGIH TLV (United States, 1/2005). Notes: 1998 Adoption.</b> TWA: 600 ppm 8 hour(s). Form: All forms</p>
Butane	<p><b>ACGIH TLV (United States, 1/2004). Notes: ACGIH 2004 Adoption</b> TWA: 1000 ppm 8 hour(s). Form: All forms</p> <p><b>NIOSH REL (United States, 6/2001).</b> TWA: 800 ppm 10 hour(s). Form: All forms</p>
Propylene	<p><b>ACGIH TLV (United States, 1/2004).</b> TWA: 500 ppm 8 hour(s).</p>
Pentane	<p><b>ACGIH TLV (United States, 9/2004). Notes: 1998 Adoption.</b> TWA: 600 ppm 8 hour(s). Form: All forms</p> <p><b>NIOSH REL (United States, 6/2001).</b> CELL: 610 ppm 15 minute(s). Form: All forms TWA: 120 ppm 10 hour(s). Form: All forms</p>
n-Hexane	<p><b>OSHA PEL (United States, 6/1993).</b> TWA: 1000 ppm 8 hour(s). Form: All forms</p> <p><b>OSHA PEL (United States, 6/1993).</b> TWA: 500 ppm 8 hour(s). Form: All forms</p> <p><b>ACGIH TLV (United States, 9/2004). Skin</b> TWA: 50 ppm 8 hour(s). Form: All forms</p> <p><b>NIOSH REL (United States, 6/2001).</b> TWA: 50 ppm 10 hour(s). Form: All forms</p>
1,3-Butadiene	<p><b>ACGIH TLV (United States, 9/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1994-1995 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens.</b> TWA: 2 ppm 8 hour(s). Form: All forms</p> <p><b>OSHA PEL (United States, 6/1993).</b> STEL: 5 ppm 15 minute(s). Form: All forms TWA: 1 ppm 8 hour(s). Form: All forms</p>
Hydrogen Sulfide	<p><b>ACGIH TLV (United States, 9/2004).</b> TWA: 10 ppm 8 hour(s). Form: All forms STEL: 15 ppm 15 minute(s). Form: All forms</p> <p><b>NIOSH REL (United States, 12/2001).</b> CELL: 10 ppm 10 minute(s). Form: All forms</p> <p><b>OSHA PEL Z2 (United States, 8/1997).</b> CELL: 20 ppm Form: All forms AMP: 50 ppm 10 minute(s). Form: All forms</p>

Consult local authorities for acceptable exposure limits.

## Section 9. Physical and Chemical Properties

<b>Physical state</b>	: Gas. (COLORLESS, NONCORROSIVE, LIQUEFIED COMPRESSED GAS WITH A WEAK ODOR; MAY HAVE SKUNK ODOR ADDED.)
<b>Color</b>	: Colorless.
<b>Odor</b>	: MILD, BUT COMMERCIAL LPG HAS A SKUNK-LIKE ODERANT ADDED AS A WARNING
<b>Molecular formula</b>	: Mixture
<b>Boiling point</b>	: >-42.22°C (-44°F)
<b>Specific gravity</b>	: 0.51 (Water = 1)
<b>Vapor density</b>	: 1.5 (Air = 1)
<b>Volatility</b>	: Essentially 100%
<b>VOC</b>	: 100 (%)
<b>Solubility</b>	: N/A

## Section 10. Stability and reactivity data

<b>Stability</b>	: The product is stable.
<b>Hazardous polymerization</b>	: Will not occur.
<b>Conditions to avoid</b>	: 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. Avoid exposure - obtain special instructions before use.
<b>Materials to avoid</b>	: No specific data.
<b>Hazardous decomposition products</b>	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological Information

### Toxicity data

**LIQUIFIED PETROLEUM GAS** acts as a simple asphyxiant, but may also cause central nervous system depression. Concentrations of 100,000 ppm may be tolerated, but cause dizziness within a few minutes. No chronic systemic effect has been reported from occupational exposure to LPG.

**BUTADIENE** is a suspected human carcinogen, and can affect the body if it is inhaled or if the liquid comes in contact with the eyes or skin. The vapor is a narcotic at very high concentrations, with mild irritant properties. Deep anesthesia was induced in rabbits in 8 to 10 minutes at 200,000 to 250,000 ppm, and death occurred in 23 minutes at 250,000 ppm. Recovery from brief periods of anesthesia occurred within 2 minutes of terminating the exposure. No tissue changes were detectable microscopically after daily induction of anesthesia as many as 34 times. Daily exposure of various small animal species at 6700 ppm over 8 months resulted in no significant chronic effects. Human subjects tolerated 8000 ppm for 8 hours without apparent effect, other than slight irritation of the eyes and upper respiratory tract. No case of serious illness arising from its industrial use have been reported.

**n-HEXANE** can affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed. Hexane vapor is a narcotic and a mild upper respiratory irritant. Polyneuropathy (peripheral nerve damage) has been reported to occur in workers exposed to hexane vapors, characterized by progressive weakness and numbness in the extremities, loss of deep tendon reflexes and reduction of motor nerve conduction velocity. Recovery ranges from no recovery to complete recovery depending upon the duration of exposure and severity of nerve damage. Concentrations of 30,000 ppm produced narcosis in mice within 30 to 60 minutes, convulsions and death occurred at 35,000 to 40,000 ppm, and at 64,000 ppm respiratory arrest was produced in 2.5 to 4.5 minutes from the start of exposure. Concentrations up to 8000 ppm produced no anesthesia. In human subjects, 2000 ppm for 10 minutes produced no effects, but 5000 ppm resulted in dizziness and a sensation of giddiness. Other investigators reported slight nausea, headache and irritation of the eyes and throat at 1400 to 1500 ppm. In industrial practice, mild narcotic symptoms such as dizziness have been observed when concentrations exceeded 1000 ppm, but not below 500 ppm.

**PENTANE** can affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed. The chief effects of inhalation are narcosis and irritation of the respiratory passages. Exposures of 90,000 to 120,000 ppm resulted in narcosis in animals in 5 to 6 minutes, 130,000 ppm was fatal with respiratory arrest occurring within 5 minutes of exposure. Pentane injected subcutaneously in rats produced temporary impairment of liver function and moderate neutropenia. While other aliphatic hydrocarbons produce drowsiness and mild irritation of the eyes and nose in human subjects, no symptoms resulted from exposure to pentane vapor for 10 minutes at 5000 ppm. Chronic exposure to high concentrations may lead to polyneuropathy (peripheral nerve damage), characterized by progressive weakness and numbness in the extremities, loss of deep tendon reflexes and reduction of motor nerve conduction velocity.

### Acute toxicity

Product/ingredient name	Result	Species	Dose
n-Hexane	LD50 Oral	Rat	25 g/kg
	LDLo Intraperitoneal	Rat	9100 mg/kg
	TDLo Oral	Rat	20000 mg/kg
Pentane	LD50 Oral	Rat	>2000 mg/kg
1,3-Butadiene	LD50 Oral	Rat	5480 mg/kg

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**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Propylene	A4	3	-	-	-	-
1,3-Butadiene	A2	2A	-	+	Proven.	-

### Mutagenicity

**Conclusion/Summary** : Not available.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

**IDLH** : 2000 ppm

**Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified 1 (Proven for humans.) by European Union [iso-Butane]. Classified 1 (Proven for humans.) by European Union [Butane]. Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Propylene]. Classified 1 (Known to be human carcinogens.) by NTP, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union [1,3-Butadiene]. Classified A2 (Suspected for humans.) by ACGIH, 2A (Probable for human.) by IARC [1,3-Butadiene].

**MUTAGENIC EFFECTS:** Classified 2 by European Union [iso-Butane]. Classified 2 by European Union [Butane]. Classified 2 by European Union [1,3-Butadiene].

Contains material which may cause damage to the following organs: lungs, the nervous system, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

**Other toxic effects on humans** : Hazardous by the following route of exposure: of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

### Specific effects

**Carcinogenic effects** : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

**Target organs** : Contains material which may cause damage to the following organs: lungs, the nervous system, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

## Section 12. Ecological Information

### Ecotoxicity data

Product/ingredient name	Result	Species	Exposure
n-Hexane	Acute LC50 113000 ug/L Fresh water	Fish - Mozambique tilapia - Tilapia mossambica	96 hours
	Acute LC50 2500 to 2980 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours

**Conclusion/Summary** : Not available.

### Biodegradability

**Conclusion/Summary** : Not available.

### Biodegradability

**Conclusion/Summary** : Not available.

**Products of degradation** : carbon oxides (CO, CO<sub>2</sub>) and water



**Toxicity of the products of biodegradation** : The products of biodegradation are less toxic than the original product.

## Section 13. Disposal Considerations

**Waste disposal** : Do not puncture or incinerate container. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Consult your local or regional authorities.

## Section 14. Transport Information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1075	PETROLEUM GASES, LIQUEFIED	2.1	Not available.		<b>Limited quantity</b> Yes.  <b>Packaging instruction</b> Passenger aircraft Quantity limitation: Forbidden.  Cargo aircraft Quantity limitation: 150 kg  <b>Special provisions</b> T50
<b>TDG Classification</b>	UN1075	PETROLEUM GASES, LIQUEFIED	2.1	Not available.		<b>Special provisions</b> 29, 42

## Section 15. Regulatory Information

### United States

**HCS Classification** : Flammable gas  
Compressed gas  
Irritating material  
Carcinogen  
Target organ effects

**U.S. Federal regulations** : TSCA 4(a) final test rules: Pentane; n-Hexane  
TSCA 8(a) PAIR: Pentane

**United States inventory (TSCA 8b):** All components are listed or exempted.

TSCA 12(b) one-time export: Pentane

TSCA 12(b) annual export notification: n-Hexane

**SARA 302/304/311/312 extremely hazardous substances:** No products were found.

**SARA 302/304 emergency planning and notification:** No products were found.

**SARA 302/304/311/312 hazardous chemicals:** Propylene; Propane; iso-Butane; Butane; Pentane; iso-Pentane; n-Hexane; iso-Butylene

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification:**

Propylene: Fire hazard, Sudden release of pressure; Propane: Fire hazard, Sudden release of pressure; iso-Butane: Fire hazard, Sudden release of pressure; Butane: Fire hazard, Sudden release of pressure; Pentane: Fire hazard, Immediate (acute) health hazard; iso-Pentane: Fire hazard; n-Hexane: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; iso-Butylene: Fire hazard, Sudden release of

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pressure

**Clean Water Act (CWA) 307:** No products were found.

**Clean Water Act (CWA) 311:** No products were found.

**Clean Air Act (CAA) 112 accidental release prevention:** Propylene; Propane; iso-Butane; Butane; 1,3-Butadiene; Pentane; iso-Pentane; 1-Butene; trans-Butene-2; cis-Butene-2; Hydrogen Sulfide

**Clean Air Act (CAA) 112 regulated flammable substances:** Propylene; Propane; iso-Butane; Butane; 1,3-Butadiene; Pentane; iso-Pentane; 1-Butene; trans-Butene-2; cis-Butene-2

**Clean Air Act (CAA) 112 regulated toxic substances:** Hydrogen Sulfide

### SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: Propylene	115-07-1	0 - 15
	n-Hexane	110-54-3	0 - 5
	1,3-Butadiene	106-99-0	0 - 0.3
<b>Supplier notification</b>	: Propylene	115-07-1	0 - 15
	n-Hexane	110-54-3	0 - 5
	1,3-Butadiene	106-99-0	0 - 0.3

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

<b>State regulations</b>	: <b>Connecticut Carcinogen Reporting:</b> None of the components are listed. <b>Connecticut Hazardous Material Survey:</b> None of the components are listed. <b>Florida substances:</b> None of the components are listed. <b>Illinois Chemical Safety Act:</b> None of the components are listed. <b>Illinois Toxic Substances Disclosure to Employee Act:</b> None of the components are listed. <b>Louisiana Reporting:</b> None of the components are listed. <b>Louisiana Spill:</b> None of the components are listed. <b>Massachusetts Spill:</b> None of the components are listed. <b>Massachusetts Substances:</b> The following components are listed: LIQUIFIED PETROLEUM GAS (L.P.G.); PROPANE; ISOBUTANE; ISOPENTANE; BUTANE; PROPYLENE (PROPENE); PENTANE; HEXANE; 2-BUTENE-TRANS; 1-BUTENE; 2-BUTENE-CIS <b>Michigan Critical Material:</b> None of the components are listed. <b>Minnesota Hazardous Substances:</b> None of the components are listed. <b>New Jersey Hazardous Substances:</b> The following components are listed: LIQUEFIED PETROLEUM GAS; PROPANE; Isobutane; ISOPENTANE; BUTANE; PROPYLENE; PENTANE; n-HEXANE; 1,3-BUTADIENE <b>New Jersey Spill:</b> None of the components are listed. <b>New Jersey Toxic Catastrophe Prevention Act:</b> None of the components are listed. <b>New York Acutely Hazardous Substances:</b> The following components are listed: Hexane <b>New York Toxic Chemical Release Reporting:</b> None of the components are listed. <b>Pennsylvania RTK Hazardous Substances:</b> The following components are listed: PETROLEUM GASES, LIQUEFIED; PROPANE; PROPANE, 2-METHYL-; BUTANE, 2-METHYL-; BUTANE; 1-PROPENE; PENTANE; HEXANE; 2-BUTENE, (E)-; 1-BUTENE; 2-BUTENE, (Z)-; 1,3-BUTADIENE <b>Rhode Island Hazardous Substances:</b> None of the components are listed.
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### California Prop. 65

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

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
1,3-Butadiene	Yes.	Yes.	Yes.	No.

### Canada

**WHMIS (Canada)** : Class A: Compressed gas.  
 Class B-1: Flammable gas.  
 Class D-2A: Material causing other toxic effects (Very toxic).  
 CEPA DSL & NDSL: All materials are either listed or exempt

**EU regulations****Hazard symbol or symbols****Risk phrases**

: R45- May cause cancer.  
 R46- May cause heritable genetic damage.  
 R20- Also harmful by inhalation.  
 R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety phrases**

: S53- Avoid exposure - obtain special instructions before use.  
 S2- Keep out of the reach of children.  
 S46- If swallowed, seek medical advice immediately and show this container or label.

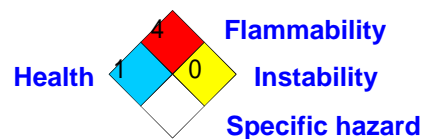
## Section 16. Other Information

**Label requirements**

: CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.  
 VAPORS MAY CATCH FIRE AND EXPLODE.  
 MAY CATCH FIRE AND EXPLODE.  
 FLAMMABLE GAS.  
 CONTENTS UNDER PRESSURE.  
 CAUSES SKIN IRRITATION.  
 CAUSES DAMAGE TO THE FOLLOWING ORGANS: NERVOUS SYSTEM.  
 CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:  
 HEART, CENTRAL NERVOUS SYSTEM, MUSCLE TISSUE.  
 VAPOR MAY CAUSE FLASH FIRE.

**Hazardous Material Information System (U.S.A.)**

Health	1
Fire hazard	4
Physical Hazard	0
Personal protection	

**National Fire Protection Association (U.S.A.)**

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**Disclaimer**

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## Definitions of Material Safety Data Sheet Terminology

### GOVERNMENT AGENCIES AND PRIVATE ASSOCIATIONS

**ACGIH** - American Conference of Governmental Industrial Hygienists, (private association)  
**DOT** - United States Department of Transportation  
**EPA** - United States Environmental Protection Agency  
**IARC** - International Agency for Research on Cancer, (private association)  
**NFPA** - National Fire Protection Association, (private association)  
**MSHA** - Mine Safety and Health Administration, U.S. Department of Labor  
**NIOSH** - National Institute of Occupational Safety and Health, U.S. Department of Health and Human Services  
**NTP** - National Toxicology Program, (private association)  
**OSHA** - Occupational Safety and Health Administration, U.S. Department of Labor  
**WHMIS** - Workplace Hazardous Material Information System  
**CSA** - Canadian Standards Association

### HAZARD AND EXPOSURE INFORMATION

**Acute Hazard** - An adverse health effect which occurs rapidly as a result of short term exposure.  
**CAS #** - American Chemical Society's Chemical Abstract service registry number which identifies the product and/or ingredients.  
**Ceiling** - The concentration that should not be exceeded during any part of the working exposure  
**Chronic Hazard** - An adverse health effect which generally occurs as a result of long term exposure or short term exposure with delayed health effects and is of long duration  
**Fire Hazard** - A material that poses a physical hazard by being flammable, combustible, pyrophoric or an oxidizer as defined by 29 CFR 1910.1200  
**Hazard Class** - DOT hazard classification  
**Hazardous Ingredients** - Names of ingredients which have been identified as health hazards  
**IDLH** - Immediately Dangerous to Life and Health, the airborne concentration below which a person can escape without respiratory protection and exposure up to 30 minutes, and not suffer debilitating or irreversible health effects. Established by NIOSH.  
**mg/m<sup>3</sup>** - Milligrams of contaminant per cubic meter of air, a mass to volume ratio  
**N/A** - Not available or no relevant information found  
**NA** - Not applicable  
**PEL** - OSHA permissible exposure limit; an action level of one half this value may be applicable  
**ppm** - Part per million (one volume of vapor or gas in one million volumes of air)  
**Pressure Hazard** - A material that poses a physical hazard due to the potential of a sudden release of pressure such as explosive or a compressed gas as defined by 29 CFR 1910.1200  
**Reactive Hazard** - A material that poses a physical hazard due to the potential to become unstable reactive, water reactive or that is an organic peroxide as defined by 29 CFR 1910.1200.  
**STEL** - The ACGIH Short-Term Exposure Limit, a 15-minute Time-Weighted Average exposure which should not be exceeded at any time during a workday, even if the 8-hour TWA is less than the TLV.  
**TLV** - ACGIH Threshold Limit Value, represented herein as an 8-hour TWA concentration.  
**8-hour TWA** - The time weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.  
**LD<sub>50</sub>** - Single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of the defined animal population.  
**LC<sub>50</sub>** - The concentration of a substance in air that, when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.