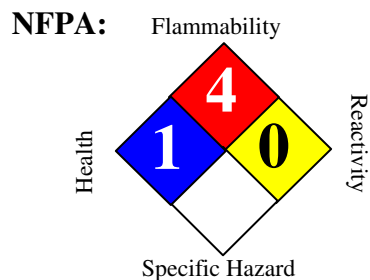


Material Safety Data Sheet

Butane, Normal Commercial Grade



HMIS III:

HEALTH	1
FLAMMABILITY	4
PHYSICAL	0

0 = Insignificant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	: Butane, Normal Commercial Grade
Synonyms	: Butane, Commercial Butane, Liquefied Petroleum Gas, LPG, Normal Butane, N-Butane, Stenched Butane, Normal Butane, 888100004786
MSDS Number	: 888100004786 Version : 1.3
Product Use Description	: Fuel gas, LIQUEFIED PETROLEUM GAS (LPG)
Company	: For: Tesoro Refining & Marketing Co. 300 Concord Plaza Drive, San Antonio, TX 78216-6999
Tesoro Call Center	: (877) 783-7676 Chemtrec (Emergency Contact) : (800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Regulatory status	: This material is considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200).
Signal Word	: DANGER
Hazard Summary	: High concentrations may exclude oxygen and cause dizziness and suffocation. Contact with liquid or cold vapor may cause frostbite or freeze burn. Simple asphyxiant. Reduces oxygen available for breathing. Exposure to concentrations above 10% of the LEL may cause a general central nervous system (CNS) depression typical of anesthetic gases or intoxicants. Aliphatic hydrocarbon gases may build up in confined spaces and may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in narcosis, unconsciousness, and possibly lead to death.

Potential Health Effects

Physical and chemical hazards	: Flammable Gas. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite Material can accumulate static charges which may cause an incendiary electrical discharge.
Eyes	: May cause mild, short-lasting discomfort to eyes. Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.
Skin	: Negligible irritation to skin at ambient temperatures. Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin,

eye) due to evaporative cooling.

Chronic Exposure

: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at 21 percent by volume.

Target Organs

: Skin, Eyes

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Butane	106-97-8	95 - 100%
Isobutane	75-28-5	2 - 3%
Propane	74-98-6	2 - 3%
Ethanethiol; Ethyl mercaptan	75-08-1	0.01 - 0.75%

SECTION 4. FIRST AID MEASURES

Inhalation : Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Give oxygen.

Skin contact : For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Obtain medical attention.

Eye contact : Immediately flush eyes thoroughly with warm water for at least 15 minutes. Remove contact lenses. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Seek medical attention immediately.

Ingestion : Ingestion is considered unlikely. If accidentally swallowed obtain immediate medical attention.

Notes to physician : Symptoms: Dizziness, Headache, Nausea, Frostbite, Vomiting, Discomfort
 Hazards: This material may be a cardiac sensitizer; avoid the use of epinephrine.
 Treatment: Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIRE-FIGHTING MEASURES

Form : Liquefied gas

Flash point : < -60 °C (< -76 °F)
 Method: ASTM D 92

- Auto Ignition temperature** : 287 °C (549 °F)
- Lower explosive limit** : 1.8 %(V)
- Upper explosive limit** : 8.5 %(V)
- Suitable extinguishing media** : Water spray, Dry chemical, Foam, Carbon dioxide (CO₂), Fire should not be extinguished unless flow of gas can be immediately stopped.
- Specific hazards during fire fighting** : Flammable Gas. Vapors are heavier than air and may travel long distances to a point of ignition and flash back.
- Special protective equipment for fire-fighters** : Firefighters should wear self-contained breathing apparatus and full protective clothing as need for protection from heat and airborne combustion products. Use water to cool equipment, surfaces and containers exposed to fire and excessive heat. For large fire the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure.
- Further information** : Allow the fire to burn under controlled conditions. Fire should not be extinguished unless flow of gas can be immediately stopped. Stop leak if you can do it without risk. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Use water to cool equipment, surfaces and containers exposed to fire and excessive heat. For large fire the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions** : Ventilate the area. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. Emergency eye wash capability should be available in the vicinity of any potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Consider disposal of contaminated clothing rather than laundering to prevent the formation of flammable vapors which could ignite via washer or dryer.
- Environmental precautions** : Prevent entry into waterways, sewers, basements or confined areas.
- Methods for cleaning up** : The product evaporates readily. Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. All equipment used when handling the product must be grounded. Do not direct water at spill or source of leak. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapors through sewers, ventilation systems and confined areas. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Allow liquid to evaporate from the surface.

CERCLA Hazardous substances and corresponding RQs :

Butane	106-97-8	100 lbs
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Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Ethanethiol; Ethyl mercaptan	75-08-1	100 lbs

SECTION 7. HANDLING AND STORAGE

- Handling** : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

- Advice on protection against fire and explosion** : Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:
 - (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
 - (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such gasoline or naphtha).
 - (3) Storage tank level floats must be effectively bonded.
 For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

- Dust explosion class** : Not applicable

- Requirements for storage areas and containers** : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

- Advice on common storage** : Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA Z1	Propane	74-98-6	PEL	1,000 ppm 1,800 mg/m3
	Ethanethiol; Ethyl mercaptan	75-08-1	Ceiling	10 ppm 25 mg/m3
ACGIH	Butane	106-97-8	TWA	1,000 ppm
	Isobutane	75-28-5	TWA	1,000 ppm

Propane	74-98-6	TWA	1,000 ppm
Ethaneethiol; Ethyl mercaptan	75-08-1	TWA	0.5 ppm

- Protective measures** : Avoid contact with skin. When using do not smoke. Keep out of reach of children. Keep away from heat and flame. Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for material is based upon intended, normal usage.
- Engineering measures** : Use only intrinsically safe electrical equipment approved for use in classified areas.
- Eye protection** : Goggles and face shield as needed to prevent eye and face contact.
- Hand protection** : Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. If product is hot, thermally protective gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.
- Skin and body protection** : Where contact with liquid may occur, wear apron and faceshield. Flame resistant clothing such as Nomex ® is recommended in areas where material is stored or handled.
- Respiratory protection** : Use a NIOSH/ MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.
- Work / Hygiene practices** : Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Form** : Liquefied gas
- Appearance** : Colorless gas. Cold vapor cloud may be white but the lack of visible gas cloud does not indicate absence of gas. A colorless liquid under pressure.
- Odor** : Faint, gasoline-like odor. Odor threshold for mercaptan additive is in the 40 part per billion range.
- Flash point** : < -60 °C (< -76 °F)
Method: ASTM D 92
- Auto Ignition temperature** : 287 °C (549 °F)
- Thermal decomposition** : Heating may cause a fire or explosion. Material does not decompose at ambient temperatures. Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke) are possible hazardous decomposition products.
- Lower explosive limit** : 1.8 % (V)

Upper explosive limit	: 8.5 % (V)
pH	: Not applicable
Freezing point	: -187 °C (-305 °F)
Boiling point	: -0.5 °C(31.1 °F) at 1,013.25 hPa
Vapor Pressure	: 2,399.8 hPa at 20 °C (68 °F)
Relative Vapor Density	: 2.007 at 21.1 °C (70.0 °F) (Air = 1.0)
Relative density	: 0.56 at 15 °C
Water solubility	: Negligible
Percent Volatiles	: 100 %
Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature)	Hydrocarbon liquids without static dissipater additive may have conductivity below 1 picoSiemens per meter (pS/m). The highest electro-static ignition risks are associated with "ultra-low conductivities" below 5 pS/m. See Section 7 for sources of information on defining safe loading and handling procedures for low conductivity products.

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	: Keep away from flame, sparks, excessive temperatures and open flame.
Materials to avoid	: Strong acids. Copper. Strong Oxidizers. Explosion hazard when exposed to nickel carbonyl/oxygen mixture.
Hazardous decomposition products	: Smoke. Carbon oxides.
Thermal decomposition	: Heating may cause a fire or explosion. Material does not decompose at ambient temperatures. Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke) are possible hazardous decomposition products.
Hazardous reactions	: Vapors may form explosive mixture with air. Hazardous polymerization does not occur. Note: Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Carcinogenicity

NTP	: No component of this product which is present at levels greater than or equal to 0.1 % is identified as a known or anticipated carcinogen by NTP.
IARC	: No component of this product which is present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	: No component of this product which is present at levels greater than or equal to 0.1 % is identified as a carcinogen or potential carcinogen by OSHA.
CA Prop 65	: This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.
Skin irritation	: Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.

- Eye irritation** : Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.
- Further information** : Chronic Effects And/Or Target Organ Data: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at normal atmospheric percentage (about 21 percent by volume).

Component:

Propane	74-98-6	<u>Skin irritation</u> : Classification: Irritating to skin. Result: Skin irritation
		<u>Eye irritation</u> : Classification: Irritating to eyes. Result: Mild eye irritation
Ethanethiol; Ethyl mercaptan	75-08-1	<u>Acute oral toxicity</u> : LD50 rat Dose: 682 mg/kg
		<u>Acute inhalation toxicity</u> : LC50 rat Dose: 11.4 mg/l Exposure time: 4 h
		<u>Skin irritation</u> : Classification: Irritating to skin. Result: Mild skin irritation
		<u>Eye irritation</u> : rabbit Classification: Irritating to eyes. Result: Mild eye irritation

SECTION 12. ECOLOGICAL INFORMATION

- Bioaccumulation** : Accumulation in aquatic organisms is unlikely.
- Toxicity to fish** : Not expected to be harmful to aquatic organisms.
- Additional ecological information** : Liquid release is only expected to cause localized, non-persistent environmental damage, such as freezing. Biodegradation of this product may occur in soil and water. Volatilization is expected to be the most important removal process in soil and water. This product is expected to exist entirely in the vapor phase in ambient air.

Component:

Ethanethiol; Ethyl mercaptan	75-08-1	<u>Acute and prolonged toxicity for aquatic invertebrates</u> : EC50 Species: Daphnia magna (Water flea) Dose: 0.38 mg/l Exposure time: 24 h
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SECTION 13. DISPOSAL CONSIDERATIONS

- Disposal** : Dispose of container and unused contents in accordance with federal, state and local requirements.

Propane 74-98-6

MASS RTK US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Components CAS-No.

Butane 106-97-8

Isobutane 75-28-5

Propane 74-98-6

NJ RTK US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Components CAS-No.

Butane 106-97-8

Isobutane 75-28-5

Propane 74-98-6

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16. OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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