

SAFETY DATA SHEET

Butylene

Section 1. Identification

Product name : Butylene
Product code : Not available.
Synonyms : Aliphatic Hydrocarbon

Relevant identified uses of the substance or mixture and uses advised against

Product use : Intermediate.
Area of application : Industrial applications.

Manufacturer : HollyFrontier Refining & Marketing LLC
2828 North Harwood
Suite 1300
Dallas, Texas 75201
USA
Customer Service: (888) 286-8836

Emergency telephone number : CHEMTREC® (800) 424-9300
CCN 201319

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : H220 FLAMMABLE GASES - Category 1
H280 GASES UNDER PRESSURE - Compressed gas
SIMPLE ASPHYXIANTS
H340 GERM CELL MUTAGENICITY - Category 1
H350 CARCINOGENICITY - Category 1A
Percentage of the mixture consisting of ingredient(s) of unknown acute oral toxicity: 47.5%
Percentage of the mixture consisting of ingredient(s) of unknown acute dermal toxicity: 100%
Percentage of the mixture consisting of ingredient(s) of unknown acute inhalation toxicity: 1%

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
No code - May displace oxygen and cause rapid suffocation.
H340 - May cause genetic defects.
H350 - May cause cancer.

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

- Response** : IF exposed or concerned: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
- Storage** : Protect from sunlight. Store in a well-ventilated place.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Supplemental label elements** : Keep container tightly closed. Use only with adequate ventilation. Avoid contact with skin and clothing. Wash thoroughly after handling. Do not enter storage areas and confined spaces unless adequately ventilated.
- Hazards not otherwise classified** : Contact with rapidly expanding gas may cause burns or frostbite.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	Other names	%	CAS number
1,3-butadiene	-	45 - 50	106-99-0
Isobutane	-	32 - 40	75-28-5
Butane	-	8 - 15	106-97-8
pentane	-	2.5	109-66-0
isopentane	-	2.5	78-78-4
Propane	-	1 - 1.5	74-98-6

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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

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

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention. Continue to rinse for at least 15 minutes.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Continue to rinse for at least 15 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Mixture contains materials that are irritants, CNS depressants and cause irregular heartbeats/cardiac sensitization.

- Skin contact** : Defatting to the skin. May cause skin dryness and irritation. Contact with rapidly expanding gas may cause burns or frostbite.
- Ingestion** : As this product is a gas, refer to the inhalation section.
- Over-exposure signs/symptoms**
- Eye contact** : No specific data.
- Inhalation** : No specific data.
- Skin contact** : irritation; dryness; cracking
- Ingestion** : No specific data.

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

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of medical responders** : 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.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use flooding quantities of water as fog or spray. Use dry chemical or carbon dioxide to extinguish flames.
- Unsuitable extinguishing media** : Do not use water jet.

Specific hazards arising from the chemical

- : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products

- : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
irritating aldehydes and ketones

Special protective actions for fire-fighters

- : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters

- : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

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

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
1,3-butadiene	ACGIH TLV (United States, 3/2018). TWA: 2 ppm 8 hours. TWA: 4.4 mg/m ³ 8 hours. OSHA PEL (United States, 5/2018). TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.
pentane	NIOSH REL (United States, 10/2016). TWA: 120 ppm 10 hours. TWA: 350 mg/m ³ 10 hours. CEIL: 610 ppm 15 minutes. CEIL: 1800 mg/m ³ 15 minutes. ACGIH TLV (United States, 3/2018).

isopentane	<p>TWA: 1000 ppm 8 hours. OSHA PEL (United States, 5/2018). TWA: 1000 ppm 8 hours. TWA: 2950 mg/m³ 8 hours. ACGIH TLV (United States, 3/2018). TWA: 1000 ppm 8 hours.</p>
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Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment. Exposure limit for total product is as a simple asphyxiant, i.e. has poor warning properties and can displace air causing an oxygen deficiency. Maintain 19.5% oxygen in confined spaces.

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

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking 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.

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

Skin protection

Hand protection : Wear gloves resistant to chemicals and petroleum distillates. Gloves should also be insulated if contact with sub cooled liquid product is expected.

Body protection : Protective clothing such as coveralls or lab coats should be worn. Launder or dry clean when soiled.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : The gas can cause asphyxiation without warning by replacing the oxygen in the air. Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. 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.

Section 9. Physical and chemical properties

Appearance

Physical state	: Gas.
Color	: Colorless.
Odor	: Odorless.
Odor threshold	: Not available.
pH	: Not applicable.
Melting point	: Not available.
Boiling point	: -1.1111°C (30°F)

Flash point	: Closed cup: -60°C (-76°F)
Evaporation rate	: Not available.
Flammability (solid, gas)	: Flammable
Lower and upper explosive (flammable) limits	: Lower: 3% Upper: 30%
Vapor pressure	: 2896 mm Hg (56 psi) [37.8°C (100°F)]
Vapor density	: 2 [Air = 1]
Specific gravity	: 0.6
Density	: Not available.
Solubility	: Very slightly soluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: 287.78°C (550°F)
Decomposition temperature	: Not available.
Viscosity	: Not available.
Flow time (ISO 2431)	: Not available.
Molecular weight	: Not applicable.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow gas to accumulate in low or confined areas.
Incompatible materials	: Strong oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
1,3-butadiene	LC50 Inhalation Gas.	Rat	128000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	285 g/m ³	4 hours
	LD50 Oral	Rat	5480 mg/kg	-
pentane	LC50 Inhalation Vapor	Rat	364 g/m ³	4 hours
	LD50 Oral	Rat - Male, Female	>2000 mg/kg	-
isopentane	LC50 Inhalation Vapor	Rat	280000 mg/m ³	4 hours
	LD50 Oral	Rat - Male, Female	>2000 mg/kg	-

Irritation/Corrosion

Not available.

Carcinogenicity

Product/ingredient name	OSHA	IARC	NTP
1,3-butadiene	-	1	Known to be a human carcinogen.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
pentane	Category 3	Not applicable.	Narcotic effects
isopentane	Category 3	Not applicable.	Narcotic effects

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Name	Result
pentane	ASPIRATION HAZARD - Category 1
isopentane	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : May cause genetic defects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	27500 mg/kg

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
isopentane	Acute EC50 2.3 mg/l Acute LC50 3.1 mg/l	Daphnia - Daphnia magna Fish - Oncorhynchus mykiss	48 hours 96 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
pentane	OECD 301F Ready Biodegradability - Manometric Respirometry Test	87 % - Readily - 28 days	-	-
isopentane	OECD 301F Ready Biodegradability - Manometric Respirometry Test	71.43 % - Readily - 28 days	25 to 33 mg/l	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
pentane	-	-	Readily
isopentane	-	-	Readily

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
1,3-butadiene	1.99	-	low
pentane	3.45	171	low
isopentane	3	171	low

Mobility in soil




Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	UN1964	UN1964	UN1964
UN proper shipping name	Hydrocarbon gas mixture, compressed, n.o.s.	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O. S. (1,3-butadiene, Isobutane)	Hydrocarbon gas mixture, compressed, n.o.s. (1,3-butadiene, Isobutane)
Transport hazard class(es)	2.1 	2.1 	2.1 
Packing group	-	-	-
Environmental hazards	No.	No.	No.

Additional information

DOT Classification

: **Reportable quantity** 20 lbs / 9.08 kg. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

Limited quantity Yes.

Packaging instruction Exceptions: 306. Non-bulk: 302. Bulk: 314, 315.

Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.

IMDG

: **Emergency schedules** F-D, S-U

Special provisions 274

IATA

: **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Packaging instructions: Forbidden. Cargo Aircraft Only: 150 kg. Packaging instructions: 200. Limited Quantities - Passenger Aircraft: Forbidden. Packaging instructions: Forbidden.

Special provisions A1

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations

: **TSCA 8(a) PAIR:** pentane

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

Clean Air Act (CAA) 112 regulated flammable substances: butane; isopentane; pentane; Isobutane; 1,3-butadiene; propane

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ

: Not applicable.

SARA 311/312

Classification : FLAMMABLE GASES - Category 1
 GASES UNDER PRESSURE - Compressed gas
 SIMPLE ASPHYXIANTS
 GERM CELL MUTAGENICITY - Category 1
 CARCINOGENICITY - Category 1A
 HNOC - Defatting irritant

Composition/information on ingredients

Name	%	Classification
1,3-butadiene	50	FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1A
Isobutane	34	FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS
butane	12.5	FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS
pentane	2.5	FLAMMABLE LIQUIDS - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
isopentane	2.5	HNOC - Static-accumulating flammable liquid FLAMMABLE LIQUIDS - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
propane	1	HNOC - Static-accumulating flammable liquid FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS

SARA 313


	Product name	CAS number	%
Form R - Reporting requirements	propene	115-07-1	0 - 5
	1,3-butadiene	106-99-0	0 - 0.3
Supplier notification	propene	115-07-1	0 - 5
	1,3-butadiene	106-99-0	0 - 0.3

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

State regulations

- Massachusetts** : The following components are listed: BUTANE; ISOPENTANE; PENTANE; ISOBUTANE; 1,3-BUTADIENE; BUTADIENE; PROPANE
- New York** : None of the components are listed.
- New Jersey** : The following components are listed: BUTANE; ISOPENTANE; BUTANE, 2-METHYL-; PENTANE; Isobutane; PROPANE, 2-METHYL-; 1,3-BUTADIENE; BIETHYLENE; PROPANE
- Pennsylvania** : The following components are listed: BUTANE; BUTANE, 2-METHYL-; PENTANE; PROPANE, 2-METHYL-; 1,3-BUTADIENE; PROPANE

California Prop. 65

 **WARNING:** This product can expose you to 1,3-Butadiene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
1,3-Butadiene	Yes.	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Other information

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



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Procedure used to derive the classification

Classification	Justification
Flam. Gas 1, H220 Press. Gas (Comp.), H280 Simple Asphyx. Muta. 1, H340 Carc. 1A, H350	On basis of test data On basis of test data Expert judgment Calculation method Calculation method

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Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations

📌 Indicates information that has changed from previously issued version.

Notice to reader

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

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