



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	Butane
Revision date	01-06-2012
Version #	01
CAS #	106-97-8
MSDS Number	303
Product use	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.
Synonym(s)	Butane, Normal Butane, n-Butane, Commercial Butane, Mixed Butane, Natural Butane.
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	Gas. Compressed liquefied gas.
Emergency overview	DANGER Extremely flammable gas. High pressure gas. Gas reduces oxygen available for breathing. 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. Contains 1,3-butadiene. 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. 1,3-Butadiene: Human Epidemiology studies suggest an association between exposure to 1,3-butadiene and development of cancer in humans. Several studies have indicated conflicting results regarding adverse reproductive and developmental effects in laboratory animals. While the overall evidence does not support a causal relationship for adverse reproductive effects in humans, these studies indicate that minimizing exposure to 1,3-butadiene would be an appropriate precaution.
Potential environmental effects	Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Butane	106-97-8	94 - 100
Isobutane	75-28-5	0 - 6
Butylene	25167-67-3	0 - 1
1,3-butadiene	106-99-0	0 - 0.1

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

When high-pressure isobutane liquid is placed under reduced lower pressure, isobutane vaporizes to be cooled. Thus, skin contact with isobutane may cause frostbite. 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**

Material	Type	Value
Butane (106-97-8)	TWA	1000 ppm
Components	Type	Value
1,3-butadiene (106-99-0)	TWA	2 ppm
Butane (106-97-8)	TWA	1000 ppm
Butylene (25167-67-3)	TWA	250 ppm
Isobutane (75-28-5)	TWA	1000 ppm

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

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

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

Material	Type	Value
Butane (106-97-8)	TWA	1000 ppm
Components	Type	Value
1,3-butadiene (106-99-0)	TWA	4.4 mg/m3
		2 ppm
Butane (106-97-8)	TWA	1000 ppm

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

Material	Type	Value
Butane (106-97-8)	STEL	750 ppm
	TWA	600 ppm
Components	Type	Value
1,3-butadiene (106-99-0)	TWA	2 ppm
Butane (106-97-8)	STEL	750 ppm
	TWA	600 ppm
Butylene (25167-67-3)	TWA	250 ppm
Isobutane (75-28-5)	TWA	1000 ppm

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

Components	Type	Value
1,3-butadiene (106-99-0)	TWA	2 ppm
Butane (106-97-8)	TWA	800 ppm
Butylene (25167-67-3)	TWA	250 ppm
Isobutane (75-28-5)	TWA	800 ppm

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

Material	Type	Value
Butane (106-97-8)	TWA	1900 mg/m3
		800 ppm
Components	Type	Value
1,3-butadiene (106-99-0)	TWA	4.4 mg/m3
		2 ppm
Butane (106-97-8)	TWA	1900 mg/m3
		800 ppm

Mexico. Occupational Exposure Limit Values

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

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Butane (106-97-8)	TWA	2200 mg/m ³
		1000 ppm
	TWA	1900 mg/m ³
		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	Gas. Compressed liquefied gas.
Color	Colorless
Odor	Gasoline-like.
Odor threshold	Not available.
Physical state	Gas.
Form	Not available.
pH	Not available.
Melting point	Not available.
Freezing point	-266.4 °F (-165.75 °C) Weighted average
Boiling point	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	Not available.
Vapor density	2 Air = 1
Specific gravity	0.57 (water=1) Weighted average
Solubility (water)	Insoluble in the cold water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
VOC	100 %
Percent volatile	Essentially 100%
Molecular formula	Mixture, not applicable

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. Alkalies.
Hazardous decomposition products	None known.

Possibility of hazardous reactions Polymerization will not occur.

11. Toxicological Information

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. 1,3-Butadiene: Human Epidemiology studies suggest an association between exposure to 1,3-butadiene and development of cancer in humans. Several studies have indicated conflicting results regarding adverse reproductive and developmental effects in laboratory animals. While the overall evidence does not support a causal relationship for adverse reproductive effects in humans, these studies indicate that minimizing exposure to 1,3-butadiene would be an appropriate precaution.

Carcinogenicity

ACGIH Carcinogens

1,3-butadiene (CAS 106-99-0) A2 Suspected human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

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

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

Epidemiology 1,3-Butadiene: Human Epidemiology studies suggest an association between exposure to 1,3-butadiene and development of cancer in humans. Several studies have indicated conflicting results regarding adverse reproductive and developmental effects in laboratory animals. While the overall evidence does not support a causal relationship for adverse reproductive effects in humans, these studies indicate that minimizing exposure to 1,3-butadiene would be an appropriate precaution.

Further information BUTANES: Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol-% in air) may cause cardiac arrhythmias (irregular heartbeats) which be serious or fatal.

12. Ecological Information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Persistence and degradability Not available.

Bioaccumulation / Accumulation No data available.

Partition coefficient (n-octanol/water) Not available.

Mobility in environmental media No data available.

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 UN1011
Proper shipping name Butane
Hazard class 2.1
Labels required 2.1

Additional information:

Special provisions 19, T50
Packaging exceptions 306
Packaging non bulk 304

Packaging bulk 314, 315
ERG number 115

IATA

Basic shipping requirements:

UN number UN1011
Proper shipping name Butane
Hazard class 2.1
Labels required 2.1

Additional information:

Packaging exceptions 306
Packaging non bulk 304
Packaging bulk 314, 315

IMDG

Basic shipping requirements:

UN number UN1011
Proper shipping name Butane
Hazard class 2.1
Labels required 2.1

Additional information:

Packaging exceptions 306

TDG

Basic shipping requirements:

Proper shipping name Butane
Hazard class 2.1
UN number UN1011

Additional information:

Special provisions 19, T50

Basic shipping requirements:

Labels required 2.1
Additional information:
Packaging exceptions 306
Packaging non bulk 304
Packaging bulk 314, 315

15. Regulatory Information

US federal regulations This product is hazardous according to OSHA 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.

US 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 %

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

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

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

Butane: 100
Isobutane: 100
1,3-butadiene: 10

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance (40 CFR 355, Appendix A) No
Section 311/312 (40 CFR 370) Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled

Canadian regulations This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS status Controlled

WHMIS classification A - Compressed Gas
B1 - Flammable/Combustible
D2A - Other Toxic Effects-VERY 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 that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations WARNING: This product contains chemicals 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.

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 - Massachusetts RTK - Substance: Listed substance

1,3-butadiene (CAS 106-99-0) Listed.
Butane (CAS 106-97-8) Listed.
Isobutane (CAS 75-28-5) Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

1,3-butadiene (CAS 106-99-0) 500 LBS
Butane (CAS 106-97-8) 500 LBS

Isobutane (CAS 75-28-5) 500 LBS

US - New Jersey RTK - Substances: Listed substance

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

Isobutane (CAS 75-28-5) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

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

Butane (CAS 106-97-8) Listed.

Isobutane (CAS 75-28-5) Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard

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

16. Other Information

HMIS® ratings

Health: 1
Flammability: 4
Physical hazard: 0

NFPA ratings

Health: 1
Flammability: 4
Instability: 0

Issue date

01-06-2012