

SDS of Butene-1 (B-1)

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1. Identification of the substance and of the supplier

1.1 Trade Name : BUTENE-1
1.2 Molecular Formula : C₄H₈
1.3 Manufacturer/Import : Bangkok synthetics Company Limited
1.4 Address : 5, I-7 Rd. Maptaphut Industrial Estate, Muang District, Rayong 21150
Phone number : (+66) 3869 8698
Fax : (+66) 3869 8699
Emergency Phone number : (+66) 3869 8601 (Mutual Aid Coordinator Center)
1.5 Relevant identified uses of the substance or mixture and uses advised against : Not available
1.6 Identified uses : Product of BST for use as an intermediate

2. Hazards Identification

2.1 Classification of the mixture according to Globally Harmonized System (GHS) standards (GHS hazard statements and category)

Physical Hazard :

Flammable gas Category 1
Gases under pressure

Health Hazard :

Not available

Environmental Hazard :

Not available

Others hazard :

Not available

2.2 GHS label elements

Hazard Pictogram :



Signal Word :

Danger

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Hazard Statement :

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

Precautionary Statement :

P203 Obtain, read and follow all safety instructions before use.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P222 Do not allow contact with air.

P280 Wear protective gloves/protective clothing/eye protection/face protection

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 In case of leakage, eliminate all ignition sources.

P403 Store in a well-ventilated place.

2.3 There hazards which do not result in classification : Not available

3. Composition/ Information on Ingredients

3.1 Chemical type (Substance/Mixture) : Substance

3.2 Chemical identity : BUTENE - 1, 1 - BUTENE

3.3 Common name and synonym : Butylene, Methylpropene

3.4 CAS number : 106-98-9

3.5 EC number : 203-449-2

3.6 Impurities and stabilizing additives : Not available

3.7 Ingredient :

Substances	CAS No.	EC No.	% by weight
Butene-1	106-98-9	203-449-2	99.0%

4. First Aid Measures

4.1 Description of first aid measures

Skin : In case frostbite, do not remove clothing. IMMEDIATELY wash affected areas gently with water for at least 20 minutes while removing and isolating all contaminated clothing. If symptoms such as inflammation or irritation develop, IMMEDIATELY go to a hospital for treatment.

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Eyes : Remove contact lenses if present. Flush with water or normal saline solution for 20 to 30 minutes. Do not put any ointments, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

Inhalation : IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital.

Ingestion : This compound is a gas, therefore inhalation is the first route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects : May act as an asphyxiant or slight anesthetic at high vapor concentrations. Vapor concentrations are not usually a hazard at room temperature except in enclosed spaces. It may also cause eye irritation.

Potential Chronic health effects : In some cases it affects the cardiac muscle by causing cardiac arrhythmia.

4.3 Indication of any immediate medical attention and special treatment needed Notes to :
Not available

5. Fire Fighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media : Use water spray, alcohol-resistant foam, dry chemical or Carbon Dioxide.

Unsuitable Extinguishing Media : Not available

5.2 Special Exposure Hazards :

Hazards from the Substance or Mixture : 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 De-Combustion Products : CO₂, CO and other organic matter from combustion

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5.3 Advice for Firefighters

Special Fire-Fighting Procedures :

- Stop leak if safe to do so.
- Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. • ALWAYS stay away from tanks in direct contact with flames.
- For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Special Protective Equipment for Firefighters : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

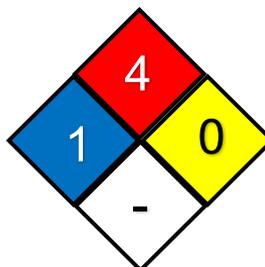
5.4 NFPA 704 Diamond

Health hazard (Blue) : 1

Fire hazard (Red) : 4

Reactivity (Yellow) : 0

Specific hazard (White) : -



5.5 Fire and explosion protection : Keep tank cool by spraying with water

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures :

- Evacuate area.
- Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Ensure adequate air ventilation.
- Eliminate ignition sources.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- All equipment used when handling the product must be grounded.

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6.2 Environmental precautions : Try to stop release. Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.

6.3 Methods and materials for containment and cleaning up : Not available

6.4 Spill Management : Ventilate area.

7. Handling and Storage

7.1 Precautions for safe handling : Keep cool, good ventilation and keep away from open flame and sparks, no smoking.

7.2 Conditions for safe storage, including any incompatibilities : Store only where temperature will not exceed 52°C (125°F). Post “No Smoking / No Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage, and keep it away from oxidizing materials.

8. Exposure Controls/ Personal Protection

8.1 Control parameters

TLV-TWA (ACGIH) : 250 ppm

8.2 Personal protective equipment

Respirators : Respiratory protection with organic cartridge.
Skin : Insulating Gloves
Eyes : Face Shield or combined eye and respiratory protection
Other Protection : Put on SCBA before fire fighting

8.3 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.

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9. Physical and chemical properties

9.1 General information Appearance

Physical State : Gas

Color : Colorless

9.2 Odor : Bitter odor gas and liquid under pressure

9.3 Odor threshold limit : Not available

9.4 pH : Not available

9.5 Melting point : -185 °C (1.3 °F)

9.6 Freezing point : -185 °C (1.3 °F)

9.7 Boiling point : -6.0 °C (21.2 °F)

9.8 Flash point : -80 °C

9.9 Evaporation rate : Not available

9.10 Flammability (solid, gas) : Flammable gas

9.11 Lower Flammability/Explosive limits (LFL/LEL) : 1.6%

9.12 Upper Flammability/Explosive limits (UFL/UEL) : 10%

9.13 Vapor pressure : 260 kPa at 20 °C

9.14 Vapor density : 0.59 g/cm³ at 20 °C

9.15 Relative density : 2

9.16 Solubility : Insoluble in water

9.17 Partition coefficient : n-octanol/water : Not available

9.18 Auto-ignition temperature : 384 °C

9.19 Decomposition temperature : Not available

9.20 Viscosity : Not available

9.21 Molecular Weight : 56.11 g/mol

9.22 Specific gravity : 0.59

9.23 Surface Tension : Not available

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10. Stability and reactivity

10.1 Reactivity : Stable

10.2 Chemical stability : Stable under normal storage conditions.

10.3 Possibility of hazardous reactions : May occur. Hazardous polymerization may occur if normal conditions are exceeded. This material is a flammable hydrocarbon and may explode in the presence of oxidizers.

10.4 Condition to avoids : Storage in poorly ventilated areas. Storage near a heat source.

10.5 Incompatible materials : Oxidizing agents, halogens, acids

10.6 Hazardous decomposition products : Toxic Carbon monoxide.

11. Toxicological information

11.1 Information on toxicological effects

Skin : Not available

Eyes : Not available

Inhalation : Not available

Ingestion : Not available

11.2 Potential Chronic health effects : In some cases it affects the cardiac muscle by causing cardiac arrhythmia.

11.3 Routes of Entry : Skin, Eyes, Inhalation, and Ingestion

11.4 Acute toxicity

11.4.1 LD50

Oral (mg/kg) : Not available

Dermal (mg/kg) : Not available

11.4.2 LC50

Inhalation (ppm, mg/m³) : Not available

11.5 Carcinogenicity/Germ cell mutagenicity (GHS or IARC) : Not available

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12. Ecological Information

- 12.1 Eco-Toxicity** : Not available
- 12.2 Persistence and Degradability** : Not available
- 12.3 Bioaccumulative potential** : Not available
- 12.4 Mobility in soil** : Not available
- 12.5 Other adverse effects** : Not available

13. Disposal considerations

- 13.1 Waste and safe handling information** : Not available
- 13.2 Waste treatment methods** : Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.
- 13.3 Contaminated containers/Packages** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. Transport information

- 14.1 UN number** : 1012
- 14.2 UN proper shipping name** : 1-Butene
- 14.3 Transport hazard class** : 2.1
- 14.4 Packing group** : Not available
- 14.5 Marine pollutant** : Not available
- 14.6 Transport in bulk according to annex II of MARPOL73/78 and the ICB code** : Not available
- 14.7 Special precautions** : Cylinders should be transported in a secure upright position in a well ventilated truck.
- 14.8 Further information** : Avoid transport on vehicle where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.



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15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1 Thailand Regulation

Ministry of Labour : Department of Labour Protection and Welfare Announcement
on the List of Hazardous Chemicals (December 20, 2013)

Ministry of Industry : Not available

Ministry of Public Health : Not available

Ministry of Natural Resources and Environment : Not available

Ministry of Transport : Not available

Further information : Not available

15.1.2 Federal and State Regulations (Foreign country)

OSHA : Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119
as highly hazardous chemical.

TSCA : Material is listed in TSCA inventory

EU REACH (EC Regulation 1907/2006)

**Restrictions relating to the product or contained substances pursuant to Annex XVII
to EC Regulation 1907/2006** : Material is not listed

Substances in Candidate List (Art. 59 REACH) : Material is not listed

Substances subject to authorization (Annex XIV REACH) : Material is not listed

16. Other information

16.1 Manufacturer's Recommendation : Users of the chemical shall conduct a comprehensive risk assessment of all production processes or activities involving the substance to identify and control potential hazards to personnel, property, and the environment. Appropriate preventive and control measures shall be implemented and maintained throughout all stages of handling, including transportation, storage, use, and final disposal.

16.2 References :

1. www.ecu.edu/oehs/LabSafety/IARCCarClass.htm
2. www.ilo.org/publi/english/protection/safework/

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3. www.americangasgroup.com/index.htm
4. www.scotecatalog.com/msds.nsf/
5. MSDS of Air liquide SA France
6. Scott Specialty Gas - MSDS Sheet SearchButene-1.htm
7. Safety data sheet (SDS) 1-butene from PCS
8. SDS 1-butene from PRAXAIR (Safety Data Sheet P-6214)
9. <https://pubchem.ncbi.nlm.nih.gov/compound/7844>
10. <https://cameochemicals.noaa.gov/chemical/18041>
11. <https://www.erg4thai.com/web/#/guide/search/23>

16.3 Key or legend to abbreviations and acronyms used in the safety data sheet :

- OSHA : Occupational Safety and Health Administration
TLV : Threshold Limit Value
TWA : Time - weighted average
TSCA : Toxic Substances Control Act
NFPA : National Fire Protection Association
CFR : Code of Federal Regulations

16.4 Further information : Ensure operators understand the flammability hazard. Ensure all nation/local regulations are observed. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.