

SECTION 1: Identification

1.1. Identification

Product form	: Substance
Trade name	: 1,3-butadiene
Chemical name	: 1,3-butadiene
CAS-No.	: 106-99-0
Product code	: P056
Formula	: C ₄ H ₆

1.2. Recommended use and restrictions on use

Use of the substance/mixture	: Polybutadiene, SBR (Styrene Butadiene Rubber) used for production of tires, shoe soles and Crawler; SSBR Solution, NBR, Acrylonitrile Butadiene Rubber (Aeronautical Material, Hoses, Fuel medical gloves), TR (TPR) Thermoplastic Rubber (Soles, Sandals)
Recommended use	: Manufacture of rubber products

1.3. Supplier

Braskem America, Inc.
1735 Market Street
Philadelphia, PA 19103-7583
Tel: (800) 396 – 5252
productsafety@braskem.com

1.4. Emergency telephone number

Emergency number	: CHEMTREC: +1-703-527-3887 (INTERNATIONAL) 1-800-424-9300 (NORTH AMERICA)
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SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable gases Category 1	Extremely flammable gas
Gases under pressure Liquefied gas	Contains gas under pressure; may explode if heated
Germ cell mutagenicity Category 1B	May cause genetic defects
Carcinogenicity Category 1A	May cause cancer
Simple Asphyxiant	May displace oxygen and cause rapid suffocation

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US)

: Danger

Hazard statements (GHS US)

: Extremely flammable gas
Contains gas under pressure; may explode if heated
May cause genetic defects
May cause cancer
May displace oxygen and cause rapid suffocation

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

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If exposed or concerned: Get medical advice/attention.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
Store in a well-ventilated place.
Store locked up.
Protect from sunlight. Store in a well-ventilated place.
Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards which do not result in classification

Other hazards which do not result in classification : May cause frostbite on contact the liquefied gas.

2.4. Unknown acute toxicity (GHS US)

No additional information available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name	Product identifier	%	GHS US classification
1,3-Butadiene (Main constituent)	CAS-No.: 106-99-0	≥ 99	Flam. Gas 1, H220 Press. Gas (Liq.), H280 Muta. 1B, H340 Carc. 1A, H350 Simple Asphy, SIAS

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

First-aid measures after skin contact : Remove contaminated clothing and shoes. Rinse immediately with plenty of water (for at least 15 minutes). Do not remove clothing adhering to the skin. Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately rinse with water for a prolonged period while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May cause irritation to the respiratory tract. irritation of mucous membranes. Asphyxiant in high concentrations. Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness.

Symptoms/effects after skin contact : Repeated exposure may cause skin dryness or cracking. Skin rash/inflammation. Contact with the product may cause cold burns or frostbite.

Symptoms/effects after eye contact : Contact with the liquid may cause frostbite and serious damage to eyes.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Chronic symptoms : May cause cancer. May cause genetic defects.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

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SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : carbon dioxide (CO₂), dry chemical powder, foam. Water.
Unsuitable extinguishing media : None known.

5.2. Specific hazards arising from the chemical

Fire hazard : Extremely flammable gas. The gas mixes well with air, explosive mixtures are easily formed. On combustion forms: Carbon dioxide. Carbon monoxide.
Explosion hazard : Explosive. Prolonged exposure to fire may cause containers to rupture/explode.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Cool closed containers exposed to fire with water spray. Keep upwind.
Protection during firefighting : Extra personal protection: complete protective clothing including self-contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Limit access only to the necessary cleaning personnel.

6.1.1. For non-emergency personnel

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures : Evacuate unnecessary personnel. No flames, no sparks. Eliminate all sources of ignition.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures : Stop leak, if possible without risk. Eliminate every possible source of ignition. Ventilate area. Use ventilation/water spray/fog to disperse vapors.

6.2. Environmental precautions

Avoid discharge to the environment.

6.3. Methods and material for containment and cleaning up

For containment : Ventilate spillage area. Stop leak, if possible without risk.
Methods for cleaning up : Ventilate spillage area. Use water spray to disperse the vapors.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of residues refer to section 13: "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Use only non-sparking tools. Use grounded electrical/mechanical equipment. Ground/bond container and receiving equipment. Do not use compressed air to transfer, discharge or transport the product. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Hygiene measures : Remove contaminated clothes. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink or smoke in areas where product is used.

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7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Use only non-sparking tools. Use only explosion-proof equipment. Provide adequate ventilation. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Storage conditions	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Store only in a limited quantity. Store in dry, cool, well-ventilated area. Keep the cylinders at vertical position, fixed to the wall or other solid structure. Keep container closed when not in use.
Incompatible materials	: air or oxygen. Strong oxidizing agents. copper. Monel alloy, aluminum tetrahydroborate, vinylacetylene, chrome-aldehyde, boron trifluoride, phenol, concentrated solutions of sodium nitrite(5%), halogen.
Packaging materials	: Carbon steel. Stainless steel.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

1,3-butadiene (106-99-0)	
USA - ACGIH - Occupational Exposure Limits	
Local name	1,3-Butadiene
ACGIH OEL TWA	2 ppm
Remark (ACGIH)	TLV® Basis: Cancer. Notations: A2 (Suspected Human Carcinogen)
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	1,3-Butadiene
BEI	2.5 mg/l Parameter: 1,2 Dihydroxy-4-(N-acetylcystenyl)-butane - Medium: urine - Sampling time: End of shift - Notations: B, Sq 2.5 pmol/g hemoglobin Parameter: Mixture of N-1 and N-2-(Hydroxybutenyl) valine hemoglobin (Hb) adductus - Medium: blood - Sampling time: Not critical - Notations: Sq
Regulatory reference	ACGIH 2024
USA - OSHA - Occupational Exposure Limits	
Local name	Butadiene (1,3-Butadiene); See 29 CFR 1910.1051; 29 CFR 1910.19(1)
OSHA PEL TWA	1 ppm
OSHA PEL STEL	5 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

8.2. Appropriate engineering controls

Appropriate engineering controls	: Provide local exhaust or general room ventilation to minimize vapor concentrations. Use only non-sparking tools. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
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8.3. Individual protection measures/Personal protective equipment

Hand protection:
Protective gloves made of PVC. It is recommended that the glove supplier be consulted to ensure the protective gloves are resistant to chemicals in this product

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Eye protection:

Contact lenses should not be worn. Safety glasses with side guards should be worn to prevent injury from airborne particles and/or other eye contact with this product

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits

Thermal hazard protection:

Wear cold insulating gloves and either face shield or eye protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Color	: Colourless
Odor	: Faint aromatic Gasoline
Odor threshold	: No data available
pH	: No data available
Melting point	: -108.9 °C
Freezing point	: No data available
Boiling point	: -4,5 °C
Critical temperature	: 152 °C
Flash point	: -76 °C
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 273,6 kPa (21.1°C)
Relative vapor density at 20°C	: 1.87 (15 °C)
Relative density	: 0,6
Density	: 0,6149 g/cm³ (25 °C)
Molecular mass	: 54.09 g/mol
Solubility	: Water: mg/l Slightly soluble
Partition coefficient n-octanol/water (Log Pow)	: 1,724 – 2,132
Auto-ignition temperature	: 420 °C
Decomposition temperature	: No data available
Viscosity, kinematic	: 0,33 cP (-40 °C); Liquid
Viscosity, dynamic	: No data available
Explosion limits	: Lower explosion limit: 1.4 vol % Upper explosion limit: 16,3 vol. %
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

At high temperatures : Polymerization can occur.

10.2. Chemical stability

Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

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10.3. Possibility of hazardous reactions

Extreme risk of explosion by shock, friction, fire or other sources of ignition. Hazardous polymerization may occur if exposed to high temperature.

10.4. Conditions to avoid

Keep away from open flames, hot surfaces and sources of ignition. Avoid static electricity discharges.

10.5. Incompatible materials

air or oxygen. Strong oxidizing agents. Copper (Cu). Monel alloy, aluminum tetrahydroborate, vinylacetylene, chrome-aldehyde, boron trifluoride, phenol, concentrated solutions of sodium nitrite(5%), halogen.

10.6. Hazardous decomposition products

Incomplete combustion releases dangerous carbon monoxide, carbon dioxide and other toxic gases.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	: Not classified (Based on available data, the classification criteria are not met)

1,3-butadiene (106-99-0)	
LD50 oral rat	5480 mg/kg (Source: NLM_CIP)
Skin corrosion/irritation	: Not classified (Based on available data, the classification criteria are not met)
Serious eye damage/irritation	: Not classified (Based on available data, the classification criteria are not met)
Respiratory or skin sensitization	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: May cause genetic defects.
Carcinogenicity	: May cause cancer.

1,3-butadiene (106-99-0)	
IARC group	1 - Carcinogenic to humans
National Toxicity Program (NTP) Status	Known Human Carcinogens
Reproductive toxicity	: Not classified (Based on available data, the classification criteria are not met)
STOT-single exposure	: Not classified (Based on available data, the classification criteria are not met)
STOT-repeated exposure	: Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard	: Not applicable (Based on available data, the classification criteria are not met)
Viscosity, kinematic	: No data available
Likely routes of exposure	: Skin and eye contact. Inhalation.
Symptoms/effects after inhalation	: May cause irritation to the respiratory tract. irritation of mucous membranes. Asphyxiant in high concentrations. Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness.
Symptoms/effects after skin contact	: Repeated exposure may cause skin dryness or cracking. Skin rash/inflammation. Contact with the product may cause cold burns or frostbite.
Symptoms/effects after eye contact	: Contact with the liquid may cause frostbite and serious damage to eyes.
Symptoms/effects after ingestion	: Ingestion is not considered a potential route of exposure.
Chronic symptoms	: May cause cancer. May cause genetic defects.
Other information	: Likely routes of exposure: inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

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12.2. Persistence and degradability

1,3-butadiene (106-99-0)

Persistence and degradability	not persistent.
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12.3. Bioaccumulative potential

1,3-butadiene (106-99-0)

BCF - Fish [1]	13 – 19.1
Partition coefficient n-octanol/water (Log Pow)	1,724 – 2,132

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available





SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste)	: Disposal must be done according to official regulations. Consult an expert on waste disposal or treatment.
Product/Packaging disposal recommendations	: Dispose of this material and its container at hazardous or special waste collection point.
Additional information	: Do not re-use empty containers. Container remains hazardous when empty. Continue to observe all precautions.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA
14.1. UN number			
1010	UN1010	1010	1010
14.2. Proper Shipping Name			
Butadienes, stabilized	BUTADIENES, STABILIZED	BUTADIENES, STABILIZED	Butadienes, stabilized
14.3. Transport hazard class(es)			
2.1	2.1	2.1	2.1
			
14.4. Packing group			
Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards			
Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available			

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14.6. Special precautions for user

DOT

UN-No.(DOT)	: UN1010
DOT Special Provisions (49 CFR 172.102)	: 387 - When materials are stabilized by temperature control, the provisions of §173.21(f) of this subchapter apply. When chemical stabilization is employed, the person offering the material for transport shall ensure that the level of stabilization is sufficient to prevent the material as packaged from dangerous polymerization at 50 °C (122 °F). If chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required and is forbidden by aircraft. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging and the effect of any insulation present, the temperature of the material when offered for transport, the duration of the journey, and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (e.g.requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors. The provisions of this special provision will be effective until January 2, 2019, unless we terminate them earlier or extend them beyond that date by notice of a final rule in the Federal Register. T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	: 306
DOT Packaging Non Bulk (49 CFR 173.xxx)	: 304
DOT Packaging Bulk (49 CFR 173.xxx)	: 314, 315
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	: 150 kg
DOT Vessel Stowage Location	: B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
DOT Vessel Stowage Other	: 25 - Protected from sources of heat, 40 - Stow "clear of living quarters"

TDG

UN-No. (TDG)	: UN1010
TDG Special Provisions	: 155 - (1) If these dangerous goods are stabilized by temperature control, they must be offered for transport, handled and transported in accordance with section 7.1.6 of the UN Recommendations. (2) If chemical stabilization is employed, the person offering the means of containment for transport must ensure that the level of stabilization will prevent a dangerous polymerization of the dangerous goods at a bulk mean temperature of 50°C in the case of a small means of containment or an intermediate bulk container (IBC) or, in the case of a large means of containment that is not an IBC, at a bulk mean temperature of 45°C. (3) If chemical stabilization may become ineffective at lower temperatures within the anticipated duration of transport, temperature control is required. In determining whether chemical stabilization may become ineffective at lower temperatures, the person offering the means of containment for transport must take at least the following factors into consideration: (a) the capacity and geometry of the means of containment and the effect of any insulation; (b) the temperature of the dangerous goods when offered for transport; (c) the duration of the transport and the seasonal ambient temperature conditions typically encountered during transport; and (d) the effectiveness and other physical or chemical properties of the stabilizer employed.
ERAP Index	: 3000
Explosive Limit and Limited Quantity Index	: 0.125 L
Excepted quantities (TDG)	: E0

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Passenger Carrying Road Vehicle or Passenger	: Forbidden
Carrying Railway Vehicle Index	
Emergency Response Guide (ERG) Number	: 116P

IMDG	
Special provision (IMDG)	: 386
Limited quantities (IMDG)	: 0
Excepted quantities (IMDG)	: E0
Packing instructions (IMDG)	: P200
Tank instructions (IMDG)	: T50
EmS-No. (Fire)	: F-D - FIRE SCHEDULE Delta - FLAMMABLE GASES
EmS-No. (Spillage)	: S-U - SPILLAGE SCHEDULE Uniform - GASES (FLAMMABLE, TOXIC OR CORROSIVE)
Stowage category (IMDG)	: B
Stowage and handling (IMDG)	: SW1, SW2
Properties and observations (IMDG)	: Liquefied, flammable gas with an unpleasant odour. Explosive limits: 2% to 12%. Heavier than air (1.84).

IATA	
PCA Excepted quantities (IATA)	: E0
PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: Forbidden
PCA max net quantity (IATA)	: Forbidden
CAO packing instructions (IATA)	: 200
CAO max net quantity (IATA)	: 150kg
Special provision (IATA)	: A1, A209
ERG code (IATA)	: 10L

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

1,3-butadiene (106-99-0)	
Subject to reporting requirements of United States SARA Section 313 Listed on EPA Hazardous Air Pollutant (HAPS)	
CERCLA RQ	10 lb

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.		
1,3-Butadiene	CAS-No. 106-99-0	100%

15.2. International regulations

1,3-butadiene (106-99-0)	
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program) Listed on the NCI (Vietnam - National Chemical Inventory) Listed on Thailand Existing Chemicals Inventory (DIW)	

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15.3. US State regulations

1,3-butadiene (106-99-0)

U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Yes
No significant risk level (NSRL)	0.4 µg/day
State or local regulations	U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Minnesota - Hazardous Substance List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Maine - Chemicals of Concern



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.

SECTION 16: Other information

according to US HazCom 2012

Revision date : 28 May 2024
Other information : None.

Safety Data Sheet (SDS), USA - Braskem

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.