


# SAFETY DATA SHEET

## 1. Identification of the chemical and of the business entity

Chemical name	: 1,3-butadiene
Product code	: P056
CAS-No.	: 106-99-0
Other Names	: -
Recommended use	: Manufacture of rubber products
Restrictions on use	: No known restricted use
Names, addresses, and phone numbers of manufacturer, importer or supplier Braskem S.A. Rua Eteno, 1561, Polo Petroquímico de Camaçari Camaçari, BA, CEP: 42810-000, Brasil  Email: productsafety@braskem.com	
Emergency number	: +1 703-741-5970 00801-14-8954

## 2. Hazard(s) identification

<b>GHS classification (Taiwan)</b>	
Physical hazards	: Flammable Gases, Category 1  : Gases under pressure, Compressed gas
Health hazards	: Germ cells mutagenicity, Category 1B  : Carcinogenicity, Category 1A
<b>Label content</b>	
Hazard pictograms (GHS TW)	: 
Signal word (GHS TW)	: Danger
Hazard statements (GHS TW)	: (H220) Extremely flammable gas (H280) Contains gas under pressure; may explode if heated (H340) May cause genetic defects (H350) May cause cancer
Precautionary statements	: -
Prevention precautionary statements	: (P201) Obtain special instructions before use. (P202) Do not handle until all safety precautions have been read and understood. (P210) Keep away from heat/sparks/open flames/hot surfaces. No smoking.

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

Response Precautionary Statements	: (P280) Wear protective gloves/protective clothing/eye protection/face protection. (P308+P313) IF exposed or concerned: Get medical advice/attention. (P377) Leaking gas fire: Do not extinguish, unless leak can be stopped safely. (P381) Eliminate all ignition sources if safe to do so.
Storage precautionary statements	: (P403) Store in a well-ventilated place. (P405) Store locked up. (P410+P403) Protect from sunlight. Store in a well-ventilated place.
Disposal precautionary statements	: (P501) Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.
other hazards which do not result in classification	: May cause frostbite on contact with liquefied gas In high concentrations may cause asphyxiation

### 3. Composition/information on ingredients

<b>Substance:</b>		
Chinese and English name	: 1,3-butadiene	
Synonyms	: Polybutadiene	
CAS-No.	: 106-99-0	
Hazardous ingredients (% of the content)	: Not applicable	
Name	CAS-No.	Concentration
1,3-Butadiene (1,3-丁二烯) (Main constituent)	106-99-0	>=80
<b>Mixture:</b>		
Not applicable		

### 4. First-aid measures

<b>First aid measures for different exposure routes</b>	
First-aid measures general	: IF exposed or concerned: Get medical advice/attention.
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.
First-aid measures after ingestion	: Call a poison center or a doctor if you feel unwell
<b>Most Important Symptoms/Effects</b>	

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

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.
<b>Protection for the first aid staff</b>		
Personal Protection in First Aid and Measures	:	No additional information available
<b>Notes to physician</b>		
Note to physician :	:	Treat symptomatically

## 5. Firefighting measures

<b>Extinguishing media</b>		
Suitable extinguishing media	:	Carbon dioxide (CO2), dry chemical powder, foam, water spray
Unsuitable extinguishing media	:	None known
<b>Specific hazards arising from firefighting measures</b>		
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
General measures	:	Limit access only to the necessary cleaning personnel
Reactivity in case of fire	:	No additional information available
Hazardous decomposition products in case of fire	:	Toxic fumes may be released.
<b>Specific firefighting methods</b>		
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 - Eliminate all ignition sources if safe to do so.
<b>Special protective equipment and precautions for fire-fighters</b>		
Protective equipment for firefighters	:	Extra personal protection: complete protective clothing including self-contained breathing apparatus - For further information refer to section 8: "Exposure controls/personal protection" - Do not attempt to take action without suitable protective equipment - Self-contained breathing apparatus - Complete protective clothing
Personal protection (Emergency response)	:	No additional information available

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

## 6. Accidental release measures

<b>Personal precautions</b>	
General measures	: Limit access only to the necessary cleaning personnel
<b>For non-emergency personnel</b>	
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 No open flames, no sparks, and no smoking Only qualified personnel equipped with suitable protective equipment may intervene
<b>For emergency responders</b>	
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 without risks if possible Eliminate every possible source of ignition Ventilate area Use ventilation/water spray/fog to disperse vapours
<b>Environmental precautions</b>	
Environmental precautions	: Avoid release to the environment Notify authorities if product enters sewers or public waters
<b>Methods and material for containment and cleaning up</b>	
For containment	: Ventilate spillage area Stop leak without risks if possible
Methods for cleaning up	: Ventilate spillage area Use water spray to disperse the vapours Notify authorities if product enters sewers or public waters
Other information	: Dispose of materials or solid residues at an authorized site

## 7. Handling and storage

<b>Handling</b>	
Technical measures	: Closed system, ventilation, explosion-proof electrical equipment and lighting
Precautions for safe handling	: Ensure good ventilation of the work station 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. Eliminate all ignition sources if safe to do so. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take all necessary technical measures to avoid or minimize the release of the product on the workplace

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

Hygiene measures	: Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers Provide local exhaust or general room ventilation Wear personal protective equipment Floors, walls and other surfaces in the hazard area must be cleaned regularly
	: 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 Separate working clothes from town clothes. Launder separately Do not eat, drink or smoke when using this product. Always wash hands after handling the product
<b>Storage precautionary statements</b>	
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 Protect from sunlight. Store in a well-ventilated place. Store locked up. Keep cool.
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

## 8. Exposure controls/personal protection

<b>Appropriate engineering controls</b>	: Provide local exhaust or general room ventilation to minimize vapour concentrations Use only non-sparking tools. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure Ensure good ventilation of the work station
<b>Control parameters</b>	No additional information available
<b>Personal protective equipment</b>	
<b>General:</b>	No additional information available

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

<b>Respiratory protection:</b> Respiratory protection	: An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits. [In case of inadequate ventilation] wear respiratory protection.
<b>Hand protection:</b> 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
<b>Eye protection:</b> 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. Safety glasses
<b>Skin and body protection:</b> Skin and body protection	: Wear suitable protective clothing
<b>Hygiene measures</b>	: 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 Separate working clothes from town clothes. Launder separately Do not eat, drink or smoke when using this product. Always wash hands after handling the product

## 9. Physical and chemical properties

Appearance	: Colourless gas
Physical state	: Gas
Molecular mass	: 54.09 g/mol
Colour	: Colourless
Odour	: Faint aromatic, Gasoline
Odour threshold [ppm]	: No data available
pH	: No data available
Evaporation rate	: No data available
Melting point	: -108.9 °C
Boiling point	: -4.41 °C
Flash point	: -85 °C (Closed cup)
Critical temperature	: 152 °C
Auto-ignition temperature	: 420 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Extremely flammable gas.
Vapour pressure	: 248.9 kPa (21.1°C)
Relative vapour density at 20 °C	: 1.87 (15 °C)
Density	: 0.65 g/cm <sup>3</sup> (-6 °C)
Solubility	: Water: Slightly soluble
Partition coefficient n-octanol/water (Log Pow)	: 1.85 (23 °C)

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

Partition coefficient n-octanol/water (Log Kow)	: No data available
Explosive limits (vol %)	: No data available
Lower explosive limit (LEL)	: 1.4 vol %
Upper explosive limit (UEL)	: 11.5 vol %

## 10. Stability and reactivity

Reactivity	: At high temperatures : Polymerisation can occur. Extremely flammable gas.
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.
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
Conditions to avoid	: Keep away from open flames, hot surfaces and sources of ignition. Avoid static electricity discharges. Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition
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
Hazardous decomposition products	: Incomplete combustion releases dangerous carbon monoxide, carbon dioxide and other toxic gases

## 11. Toxicological information

<b>Routes of exposure</b>	
Likely routes of exposure	: Skin and eyes contact Inhalation
Other information	: Likely routes of exposure: inhalation, skin and eye.
<b>Symptoms</b>	
No additional information available	
<b>Acute toxicity</b>	
Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified
<b>1,3-butadiene (106-99-0)</b>	
LD50 oral rat	5480 mg/kg
<b>Skin corrosion/irritation</b>	
Skin corrosion/irritation	: Not classified
<b>Serious eye damage/irritation</b>	
Serious eye damage/irritation	: Not classified

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

<b>Respiratory or skin sensitisation</b>	
Respiratory or skin sensitisation	: Not classified
<b>Chronic toxicity or long-term toxicity</b>	
<b>Germ cell mutagenicity</b>	
Germ cell mutagenicity	: May cause genetic defects.
<b>Carcinogenicity</b>	
Carcinogenicity	: May cause cancer.
<b>Reproductive toxicity</b>	
Reproductive toxicity	: Not classified
<b>STOT-single exposure</b>	
STOT-single exposure	: Not classified
<b>STOT-repeated exposure</b>	
STOT-repeated exposure	: Not classified
<b>Aspiration hazard</b>	
Aspiration hazard	: Not classified
<b>1,3-butadiene (106-99-0)</b>	
Viscosity, kinematic	: No data available

## 12. Ecological information

<b>Ecotoxicity</b>	
Ecology - general	: The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
<b>Hazardous to the aquatic environment, short-term (acute)</b>	
Hazardous to the aquatic environment, short-term (acute)	: Not classified
<b>Hazardous to the aquatic environment, long-term (chronic)</b>	
Hazardous to the aquatic environment, long-term (chronic)	: Not classified
<b>Additional ecotoxicological information</b>	
No additional information available	
<b>Persistence and degradability</b>	
<b>1,3-butadiene (106-99-0)</b>	
Persistence and degradability	: not persistent.
<b>Bioaccumulative potential</b>	
<b>1,3-butadiene (106-99-0)</b>	
BCF - Fish [1]	13 – 19.1
Partition coefficient n-octanol/water (Log Pow)	1.85 (23 °C)
<b>Mobility in soil</b>	
<b>1,3-butadiene (106-99-0)</b>	
Partition coefficient n-octanol/water (Log Pow)	1.85 (23 °C)
<b>Other adverse effects</b>	
Ozone	: Not classified



## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22




Revision date: 2021/11/24

SDS ID: P2021111506

### 13. Disposal considerations

Waste treatment methods/ Sewage disposal recommendations	:	Dispose of contents/container in accordance with licensed collector's sorting instructions
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

### 14. Transport information

IMDG	IATA	UNRTDG
<b>UN number</b>		
1010	1010	1010
<b>Proper Shipping Name</b>		
BUTADIENES, STABILIZED	Butadienes, stabilized	BUTADIENES, STABILIZED
<b>Transport hazard class(es)</b>		
2.1	2.1	2.1
2 - Gases 	2 - Gases 	2 - Gases 
2.1 - Flammable gases	2.1 - Flammable gas	2.1 - Flammable gases
<b>Packing group</b>		
Not applicable	Not applicable	Not applicable
<b>Environmental hazards</b>		
Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No
Marine pollutant (text):No		
No supplementary information available		
<b>Specific transport measures and precautionary conditions</b>		
<b>UN RTDG</b>		
UN-No.(UN RTDG)	:	1010
<b>IMDG</b>		
UN-No. (IMDG)	:	1010
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
Properties and observations (IMDG)	:	Liquefied, flammable gas with an unpleasant odour. Explosive limits: 2% to 12% Heavier than air (1.84).
<b>IATA</b>		
UN-No. (IATA)	:	1010
PCA Excepted quantities (IATA)	:	E0

## 1,3-butadiene

According to Taiwan Ministry of Labour Lao-zhi Shou-tzu No. 10702052242, "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals"

Issue date: 2021/11/22

Revision date: 2021/11/24

SDS ID: P2021111506

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 provisions (IATA)	: A1
ERG code (IATA)	: 10L

## 15. Regulatory information

### Applicable regulations

1. Occupational Safety and Health Act
2. Toxic and Concerned Chemical Substances Control Act
3. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste
4. Traffic Safety Rule
5. Listed on the TCSI (Taiwan Chemical Substance Inventory)

## 16. Other information

<b>Organization that prepared the SDS</b>	Name :
	Braskem S.A.
	Address/Telephone :
	5100 Westheimer Rd - Suite 495 77056 Houston - USA 713 255 4747
Version	: 1.0
Issue date	: 2021/11/22
Revision date	: 2021/11/22

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.