



# 1-Butene

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830  
Date of issue: 4 Nov 2016 Revision date: 15 may 2017 Supersedes: 4 Nov 2016 Version: 6.0

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product form : Substance  
Trade name : 1-Butene  
IUPAC name : but-1-ene  
EC index no : 601-012-00-4  
EC no : 203-449-2  
CAS No : 106-98-9  
REACH registration No : 01-2119456615-34  
Product code : P420 / P529  
Formula : C<sub>4</sub>H<sub>8</sub>  
Synonyms : 1-Butylene; Ethylethylene

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

##### 1.2.1. Relevant identified uses

Industrial/Professional use spec : Industrial

##### 1.2.2. Uses advised against

No additional information available

#### 1.3. Details of the supplier of the safety data sheet

Supplier (Only Representative):  
Braskem Netherland BV  
Weena 238-240, 9th Floor, Tower C  
NL - 3012 NJ – Rotterdam

Manufacturer:  
BRASKEM S/A UNIB1 - BA  
Rua Eteno, 1561 - Polo Petroquímico de Camacari - Bahia/BA  
Brazil – Cep: 42810-000

BRASKEM S/A UNIB2 - RS  
BR 386-Rodovia Tabai/Canos - km 419 - Triunfo/RS  
Brazil – Cep: 95853-000

productsafety@braskem.com

#### 1.4. Emergency telephone number

Emergency number : +31 10 205 2945 (business hours)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable gases, Category 1 H220

Gases under pressure : Compressed gas H280

Full text of hazard classes and H-statements : see section 16

##### Adverse physicochemical, human health and environmental effects

Asphyxiant in high concentrations. Central nervous system depression. Extremely flammable gas. Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: H220 - Extremely flammable gas  
H280 - Contains gas under pressure; may explode if heated

Precautionary statements (CLP)

: P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so  
P403 - Store in a well-ventilated place  
P410+P403 - Protect from sunlight. Store in a well-ventilated place  
P243 - Take precautionary measures against static discharge

### 2.3. Other hazards

other hazards which do not result in classification

: When mixed with air and exposed to ignition source, can burn in open air or explode if confined. Can cause frostbite.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name : 1-Butene  
CAS No : 106-98-9  
EC no : 203-449-2  
EC index no : 601-012-00-4

Name	Product identifier	%
2-methylpropene (Impurity)	(CAS No) 115-11-7 (EC no) 204-066-3 (EC index no) 601-012-00-4	0.2
Butene (Impurity)	(CAS No) 25167-67-3 (EC no) 246-689-3 (EC index no) 601-012-00-4	0.15
isobutane (Impurity)	(CAS No) 75-28-5 (EC no) 200-857-2 (EC index no) 601-004-00-0 (REACH-no) Not available	0.1

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : No direct artificial respiration to be given by first aider. Do not rub the skin and eyes after direct contact with the product.

First-aid measures after inhalation : Remove casualty to fresh air and keep warm and at rest. In case of irregular breathing or respiratory arrest provide artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

First-aid measures after skin contact : Can cause frostbite. Remove the victim away from contaminated area. Remove clothing and jewellery that can restrict circulation. Rinse immediately with plenty of water for 15 minutes. Seek medical attention immediately.

First-aid measures after eye contact : Can cause frostbite. Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention immediately.

First-aid measures after ingestion : not applicable.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Asphyxiant in high concentrations. Dizziness. Heartinfarct/cardiac arrest. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness. Death.

Symptoms/injuries after skin contact : Can cause frostbite.

Symptoms/injuries after eye contact : Can cause frostbite.

Symptoms/injuries after ingestion : not applicable.

### 4.3. Indication of any immediate medical attention and special treatment needed

Symptomatic treatment should include, above all, measured of support as correction of hydro electrolytic and metabolic disturbances and respiratory failure.

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- Suitable extinguishing media : carbon dioxide (CO<sub>2</sub>), dry chemical powder, foam. For large fire: Use water spray/fog for cooling.
- Unsuitable extinguishing media : Do not use water jet. Do not extinguish flame due to possibility of explosive reignition. Do not aim water directly at point where compressed gas is escaping, as the water may freeze.

#### 5.2. Special hazards arising from the substance or mixture

- Fire hazard : Extremely flammable gas. Explosive when mixed with oxidizing substances. Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode. Fight fire with normal precautions from a reasonable distance. Prolonged exposure to fire may cause containers to rupture/explode. Heavier than air, vapours may travel long distances along ground, ignite and flash back to source. Can cause frostbite. Asphyxiant in high concentrations. Hazardous combustion products. On combustion forms: Carbon dioxide. Carbon monoxide.
- Explosion hazard : May form flammable/explosive vapour-air mixture. In closed containers, pressure build up could result in distortion, blowing and in extreme cases bursting of the container.

#### 5.3. Advice for firefighters

- Firefighting instructions : Cool closed containers exposed to fire with water spray.
- Protective equipment for firefighters : In case of fire: Wear self-contained breathing apparatus. Full protective flameproof clothing.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### 6.1.1. For non-emergency personnel

- Protective equipment : Use personal protective equipment as required. Refer to chapter 8.
- Emergency procedures : Eliminate ignition sources. Do not smoke. Evacuate and limit access.

##### 6.1.2. For emergency responders

- Protective equipment : Complete protective clothing. Self contained breathing apparatus. Refer to chapter 8.
- Emergency procedures : Eliminate ignition sources. Do not smoke. Evacuate and limit access.

#### 6.2. Environmental precautions

Avoid release to the environment. Use water spray jet to minimise or disperse vapours.

#### 6.3. Methods and material for containment and cleaning up

- For containment : Stop leak if safe to do so. May be vented to atmosphere. Ventilate affected area.
- Methods for cleaning up : May be vented to atmosphere. Ventilate affected area.

#### 6.4. Reference to other sections

No additional information available

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- Precautions for safe handling : Avoid contact with skin, eyes and clothes. Avoid inhalation of product. Wear recommended personal protective equipment. If leak continues, evacuate area and avoiding sources of ignition and minimising personal risk, move the leaking cylinder to a safe outside area. Handle in accordance with good industrial hygiene and safety procedures.

#### 7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Proper grounding procedures to avoid static electricity should be followed. Keep away from open flames, hot surfaces and sources of ignition. Use explosion-proof electrical equipment. Use only antistatically equipped (spark-free) tools. Keep fire-fighting equipment nearby.
- Storage conditions : Store in dry, cool, well-ventilated area. Avoid ignition sources.
- Incompatible products : Oxidizing agent. Chlorates. Perchlorates. Nitrates. Peroxides. Permanganates. Aluminium tris-tetrahydroborate.
- Storage area : Store in dry, cool, well-ventilated area. Keep away from sources of ignition. Keep the container tightly closed. Provide earthing of containers, equipment, pumps and ventilation facilities. Ensure cylinder valve is closed and not leaking. Containers which are opened should be properly resealed and kept upright to prevent leakage. Correctly labelled.
- Packaging materials : Carbon steel. stainless steel. Cylinders. This material may attack some forms of plastics, rubbers and coatings.

#### 7.3. Specific end use(s)

No additional information available

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

1-Butene (106-98-9)		
USA - ACGIH	ACGIH TWA (ppm)	250 ppm
2-methylpropene (115-11-7)		
Lithuania	IPRV (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
USA - ACGIH	ACGIH TWA (ppm)	250 ppm
USA - ACGIH	Remark (ACGIH)	URT irr; body weight eff
isobutane (75-28-5)		
Austria	MAK (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Austria	MAK (ppm)	800 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	800 ppm
Finland	HTP-arvo (15 min)	2400 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min) (ppm)	1000 ppm
France	VME (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
France	VME (ppm)	800 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	2400 mg/m <sup>3</sup>
Germany	TRGS 900 Occupational exposure limit value (ppm)	1000 ppm
USA - ACGIH	ACGIH TWA (ppm)	1000 ppm
USA - ACGIH	ACGIH STEL (ppm)	1000 ppm
Butene (25167-67-3)		
Belgium	Limit value (mg/m <sup>3</sup> )	583 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	250 ppm
USA - ACGIH	ACGIH TWA (ppm)	250 ppm

#### 8.2. Exposure controls

##### Appropriate engineering controls:

Provide local exhaust or general room ventilation to minimize vapour concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

##### Personal protective equipment:

Safety glasses. Gloves. Protective clothing. If excessive exposure exists, use only approved air-purifying or supplied air respirator operated in a positive pressure mode.

##### Materials for protective clothing:

PVC (Polyvinyl chloride)

##### Hand protection:

Protective gloves made of PVC

##### Eye protection:

Safety glasses with side shields. Contact lenses should not be worn

##### Skin and body protection:

Boots made of PVC. PVC apron covering the tops of the boots

##### Respiratory protection:

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

##### Environmental exposure controls:

Avoid release to the environment. Do not allow into drains or water courses. Use water spray jet to minimise or disperse vapours.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colourless gas.
Molecular mass	: 56 g/mol
Colour	: Colourless

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Odour	: gasoline-like.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -185.3 °C
Freezing point	: No data available
Boiling point	: -6.47 °C
Flash point	: -80 °C (estimated)
Auto-ignition temperature	: 385 °C
Decomposition temperature	: Not available
Flammability (solid, gas)	: Flammable
Vapour pressure	: 2,253 x 10 <sup>3</sup> mmHg at 25°C
Relative vapour density at 20 °C	: 1,93
Relative density	: No data available
Solubility	: Insoluble in water. Soluble in benzene. Soluble in ether. Solubility in ethanol.
Log Pow	: 2,4
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: 1,6 - 10 vol %

### 9.2. Other information

Gas group	: Liquefied gas
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## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

The product is stable at normal handling and storage conditions.

### 10.3. Possibility of hazardous reactions

Danger of explosion on contact with : Oxygen. No polymerization.

### 10.4. Conditions to avoid

No flames, no sparks. Eliminate all sources of ignition. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

### 10.5. Incompatible materials

Oxygen. Strong oxidizing agents. Aluminium tris-tetrahydroborate.

### 10.6. Hazardous decomposition products

During a fire: Carbon monoxide. carbon dioxide (CO<sub>2</sub>).

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity	: Not classified
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Butene (25167-67-3)	
LC50 inhalation rat (mg/l)	658 mg/l/4h

Skin corrosion/irritation	: Not classified pH: Not applicable
Serious eye damage/irritation	: Not classified pH: Not applicable
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Potential Adverse human health effects and symptoms : Asphyxia by lack of oxygen: risk of death. Central nervous system depression. Fatigue, euphoria, headache, excitation, desorientation, drowsiness, anesthesia, insomnia, mental confusion and convulsions. Can cause frostbite. nausea, vomiting.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - air : Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.

#### 12.2. Persistence and degradability

##### 1-Butene (106-98-9)

Persistence and degradability	Rapidly degradable.
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#### 12.3. Bioaccumulative potential

##### 1-Butene (106-98-9)

Log Pow	2.4
Bioaccumulative potential	Low bioaccumulation potential.

##### Butene (25167-67-3)

Log Pow	<= 2.8
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#### 12.4. Mobility in soil

No additional information available

#### 12.5. Results of PBT and vPvB assessment

##### 1-Butene (106-98-9)

Results of PBT assessment	substance is not considered a PBT/vPvB
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#### 12.6. Other adverse effects

No additional information available

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste treatment methods : Can be deposited in landfills, sent to an incineration or other appropriate means of disposal provided they meet the requirements of local laws. Keep the product residues in their original containers and properly sealed inside metallic drums according to legislation.

### SECTION 14: Transport information

#### Classification for ROAD and RAIL transport: ADR / RID

14.1 UN Number	: UN1012
14.2 Proper shipping name	: BUTYLENE
14.3 Class / Division	: 2.1
14.4 Packing group	: Not applicable
14.5 Environmental hazards	: Product is not considered environmentally hazardous based on available data
14.6 Special precautions for user	: Hazard Identification Number: 23

#### Classification for SEA transport: IMO - IMDG

14.1 UN Number	: UN1012
14.2 Proper shipping name	: BUTYLENE
14.3 Class / Division	: 2.1
14.4 Packing group	: Not applicable
14.5 Environmental hazards	: Not considered marine pollutant based on available data
14.6 Special precautions for user	: No additional information
14.7 Transport according to IGC Code:	

Product name : Butylenes

#### Classification for AIR transport: IATA - ICAO

14.1 UN Number	: UN1012
14.2 Proper shipping name	: Butylene
14.3 Class / Division	: 2.1
14.4 Packing group	: Not applicable
14.5 Environmental hazards	: Not considered environmentally hazardous based on available data
14.6 Special precautions for user	: No additional information

# 1-Butene

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product therefore it cannot be considered exhaustive. See guidelines of ADR, RID, IMDG and IATA regulations before transporting the product. The transportation organization is responsible for compliance with laws, regulations and rules for the transport of the material.

### SECTION 15: Regulatory information

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

##### 15.1.1. EU-Regulations

No REACH Annex XVII restrictions

1-Butene is not on the REACH Candidate List

1-Butene is not on the REACH Annex XIV List

##### 15.1.2. National regulations

###### Germany

VwVwS Annex reference : Water hazard class (WGK) nwg, Non-hazardous to water (Classification according to VwVwS, Annex 1 or 2; ID No. 792)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

###### Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

###### Denmark

Class for fire hazard : Class I-1

Store unit : 1 liter

Classification remarks : F+ <Flam. Gas 1; Compressed gas>; Emergency management guidelines for the storage of flammable liquids must be followed

Recommendations Danish Regulation : Young people below the age of 18 years are not allowed to use the product

#### 15.2. Chemical safety assessment

No additional information available

### SECTION 16: Other information

Indication of changes:

8	Exposure controls / Personal protection equipment	Modified	
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Full text of H- and EUH-statements:

Compressed gas	Gases under pressure : Compressed gas
Flam. Gas 1	Flammable gases, Category 1
Liquefied gas	Gases under pressure : Liquefied gas
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated

Braskem - SDS\_Europe (modified 161020)

*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.*