



SAFETY DATA SHEET (SDS) 1-BUTENE

1. Identification

SDS Record Number	:	PCS 96003
Date of SDS	:	01 September 2023
Identity of the substance	:	1-Butene
Product Description	:	Alkene
Other names/synonyms	:	Butylene, Alpha Butylene, Ethylethylene, But-1-ene
Name of the supplier	:	PCS Pte. Ltd.
Recommended uses	:	Chemical Feedstock
Contact detail of the supplier	:	100 Ayer Merbau Road, Singapore 628277
	:	+65 68672102
24-Hour Emergency contact	:	Asia Pacific +65 3158 1074 (Singapore)
	:	China +86 10 5100 3039 (Beijing)
	:	Europe, Israel & Americas +44 (0) 1235 239 670 (UK)
	:	Middle East & Africa +44 (0) 1235 239 671 (UK)

2. Hazard Identification

GHS Classification

<u>Hazard Class</u>	<u>Hazard Category</u>
• Flammable Gas	1A
• Gases under pressure	Liquefied gas
• STOT (Single Exposure)	3 (narcotic effects)

Pictograms



Signal Word: Danger

Hazard Statements

- Extremely flammable gas
- Contains gas under pressure; may explode if heated
- May cause drowsiness or dizziness

Precautionary Statements

Prevention

- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Use only outdoors or in a well-ventilated area.



Response

- Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- In case of leakage, eliminate all ignition sources.
- If INHALED: Remove person to fresh air and keep comfortable for breathing.
- Call a POISON CENTER/doctor/physician if you feel unwell.

Storage

- Store in a well-ventilated place. Keep container tightly closed.
- Protect from sunlight. Store in well-ventilated place.
- Store locked up.

Disposal

- Dispose of the contents in accordance to the local mandatory rules and regulations

Other Hazards which do not result in classification:

- Exposure to rapidly expanding gases may cause frost burns to eyes and skin.

3. Composition/Information On Ingredients

Chemical identification : 1-Butene, C₄H₈
Common name(s) / synonym(s) : Butylene, Alpha Butylene, Ethylethylene, But-1-ene
CAS number / EC number : 106-98-9/203-449-2

Chemical Identification	CAS number	Concentration
1-Butene	106-98-9	≥ 99 wt%

4. First-Aid Measures

Swallowing:

This product is a gas at normal temperature and pressure.

Inhalation:

Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

Skin Contact:

For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 40°C). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

Eye Contact:

In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

Notes To Physician:

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

5. Fire-Fighting Measures

Extinguishing media

CO₂, dry chemical, water spray or fog.

**DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.****Small Fires**

- Dry chemical or CO₂.

Large Fires

- Water spray or fog.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders 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 engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if impossible, withdraw from area and let fire burn.

Specific hazards arising from the chemical:**Extremely Flammable.**

- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.
- Vapours from liquefied gas are initially heavier than air and spread along ground.
- Forms explosive mixtures with air and oxidizing agents.
- Container may rupture due to heat of fire.
- Do not extinguish flames due to possibility of explosive re-ignition.
- Flammable vapours may spread from spill. Explosive atmospheres may linger.
- Before entering area, especially confined areas, check atmosphere with approved device.
- No part of a container should be subjected to a temperature higher than 50°C (approximately 125°F).
- Vapours may travel to source of ignition and flash back.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

Sensitivity To Impact:

Avoid impact against container

Sensitivity To Static Discharge:

Possible

6. Accidental Release Measures

Spill Or Leak

- Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be earthed (grounded).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Use water spray to reduce vapours or divert vapour cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- Prevent spreading of vapours through sewers, ventilation systems and confined areas.
- Isolate area until gas has dispersed.
- Immediately evacuate all personnel from danger area.
- Use self-contained breathing apparatus where needed.
- Remove all sources of ignition if without risk.
- Reduce vapours with fog or fine water spray. Shut off leak if without risk.



- Ventilate area of leak or move leaking container to well-ventilated area.
- Before entering area, especially confined areas, check atmosphere with appropriate device.

Warning: Forms explosive mixtures with air.

7. Handling And Storage

Warning:

Flammable, liquefied gas under pressure.

Use piping and equipment adequately designed to withstand pressures to be encountered.

Keep away from heat, sparks and flame. Store and use with adequate ventilation at all times.

Earth (ground) all equipment. Only use spark-proof tools and explosion-proof equipment.

Use only in a closed system. Close valve when not in use and when empty.

When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards.

Obtain and evaluate the safety information for each component before you produce the mixture.

Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product.

Remember, gases and liquids have properties which can cause serious injury or death.

Be sure to read and understand all labels and other instructions supplied with all containers of this product.

Note:

Compatibility with plastics should be confirmed prior to use. To have basic knowledge on general handling of compressed gas cylinders.

Other Handling And Storage Conditions:

Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

Keep away from oxidizing agents.

8. Exposure Controls/Personal Protection

Control Parameters/ Exposure Limits

- 1-Butene (CAS: 106-98-9)
TLV: 250 ppm as TWA; (ACGIH)

Appropriate Engineering Controls

- The use of local exhaust ventilation is recommended to control emissions near the source.
- Laboratory samples should be handled in a fume hood.
- Provide mechanical ventilation of confined spaces.
- Use explosion-proof ventilation equipment.

Personal Protective Equipment (PPE)

- Use appropriate respirators approved by NIOSH and MSHA.
 - Protective gloves: Neoprene.
 - Uses appropriate Eye Protection.
 - Others: Safety shoes for cylinder handling. Protective clothing where needed.
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9. Physical and chemical properties

Property	Value, Description
Appearance (physical state, colour etc);	Colourless gas at normal temperature and pressure
Odour	Slightly aromatic odour
Odour threshold	Not available
pH	Not available
Melting/freezing point	-185.35°C
Initial boiling point and boiling range	-6.25°C
Flash point	-80°C
Evaporation rate	High (BUTYL ACETATE = 1)
Flammability	Extremely flammable, can form explosive mixtures with air
Upper/lower explosive limits/ flammability limit	1.6 to 10 % by volume
Vapour pressure	263 kPa (23.5 psig) at 20°C
Relative vapour density	1.9368 at 21°C
Density and/or Relative density	Relative Density: 0.595 at 20°C/4°C
Solubility	Negligible
Partition coefficient: n-octanol/water (log value)	Not available
Auto-ignition temperature	384°C
Decomposition temperature	Not available
Kinematic Viscosity @ 50 °C (cSt)	Not available
Particle characteristics	Not applicable

10. Stability And Reactivity

Reactivity/Chemical stability: Stable

Conditions Of Chemical Instability:
Not Available

Conditions Of Reactivity:
Elevated temperatures and pressures and/or presence of a catalyst.

Possibility of hazardous reactions:
Hazardous Polymerization:
May occur

Conditions To Avoid:
Incompatible materials: Oxidizing agents, halogens, acids

Hazardous Decomposition Products: Thermal decomposition or burning may produce CO/CO₂.

11. Toxicological Information

LD50 (Species & Routes): Not applicable
LC50 (Rat, 4 hrs.): Not available



Route Of Exposure:

Swallowing, inhalation, skin contact, eye contact

Effects Of Single (Acute) Overexposure:

Swallowing:

A highly unlikely route of exposure, but frostbite of the lips and mouth may result from contact with the liquid. This product is a gas at normal temperature and pressure.

Skin Absorption:

No evidence of adverse effects from available information.

Inhalation:

Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness.

Skin Contact:

No harmful effect expected from vapour. Liquid may cause frostbite.

Eye Contact:

No harmful effect expected from vapour. Liquid may cause frostbite.

Effects Of Repeated (Chronic) Overexposure:

No evidence of adverse effects from available information.

Other Effects Of Overexposure:

This product is an asphyxiant. Lack of oxygen can cause death.

Medical Conditions Aggravated By Overexposure:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

Significant Laboratory Data With Possible Relevance To Human Health Hazard Evaluation:

None currently known.

12. Ecological Information

No data on possible ecological toxicity.

13. Disposal Considerations

Waste Disposal Methods

This product (as presently constituted) has the RCRA characteristics of ignitability, and, if discarded in its present form, would have the hazardous waste number of D001. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may change the classification to non-hazardous, or hazardous for reasons other than, or in addition to ignitability.

Remarks: Do not allow to enter drains or sewers. Can cause explosion.

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal and local regulations. Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to



determine the proper waste classification and disposal methods in compliance with applicable regulations.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. Transport Information

Land (ADR)

UN Number: 1012

UN proper shipping name: 1-BUTYLENE

Class: 2

Packing Group: Not assigned

Labels: 2.1

Hazard Identification Number: 23

Air (IATA)

UN Number: 1012

UN proper shipping name: 1-BUTYLENE

Class: 2

Packing Group: Not assigned

Labels: 2.1

Sea (IMDG)

UN Number: 1012

UN proper shipping name: PROPYLENE

Class: 2

Packing Group: Not assigned

Labels: 2.1

Marine pollutant: No

Transport in Bulk (Annex II of MARPOL 73/78 and the IBC code)

Not applicable

15. Regulatory Information

Workplace Safety and Health Act & Workplace Safety and Health (General Provisions) Regulations:
This product is subject to the SDS, labelling and PEL and other requirements in the Act/Regulations.

Fire Safety Act and Fire Safety (Petroleum and Flammable Materials) Regulations:
This product is subject to the requirements of this Regulations.

Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations:
This product is subject to the requirements of this Regulations.

Chemical inventory status:

Australia, AIC: Yes

China, IECSC: Yes

Japan, ENCS: Yes

USA, TSCA: Yes

16. Other Information

Prepared By: Material Safety Committee

SDS Prepared on: 1/10/2010

Reviewed 1 on: 1/10/2013



Revised 2 on: 1/9/2018
Revised 3 on: 1/9/2023

Revision (2) Notes	
1	Sect. 2: Corrected "Gases under Pressure" from "Compressed Gas" to "Liquefied Gas"
Revision (3) Notes	
1	Revised according to SS 586-3:2022
2	Sect. 2: Revised Flammable Gas hazard to Cat 1A, according to SS 586-2:2022
3	Sect. 12: Updated ecological information
4	Sect. 14: Added relevant transport information
5	Sect. 15: Included applicable national regulations (Singapore)

CAUTION: The information given above ("**the Information**") relates only to the substance or mixture listed herein. The Information may not be valid when used in combination with any other substance or mixture or in any process. If the substance or mixture is to be used for a purpose other than that stated herein or under conditions other than specified herein, the Information cannot be relied upon as being complete or accurate, and the user is advised to consult the supplier before using the substance or mixture for such other purpose or under such other conditions. The Information is given based on information available at the indicated date of preparation and no representation or warranty is given that it will be correct as of any time after the indicated date of preparation.

GHS Label

1-Butene



DANGER

Hazard Statements

- Extremely flammable gas
- Contains gas under pressure; may explode if heated
- May cause drowsiness or dizziness

Precautionary Statements

- Keep away from heat, sparks, open flames and other ignition sources. No smoking.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Use only outdoors or in well-ventilated area.

For further information on this product, refer to Manufacturer's Safety Data Sheet

Contact detail of the supplier : 100 Ayer Merbau Road, Singapore 628277

Emergency contact : +65 68672102