

# Material Safety Data Sheet



2-Butene (Mixture of Cis and Trans)

## Section 1. Chemical product and company identification

**Product name** : 2-Butene (Mixture of Cis and Trans)  
**Supplier** : AIRGAS INC., on behalf of its subsidiaries  
259 North Radnor-Chester Road  
Suite 100  
Radnor, PA 19087-5283  
1-610-687-5253  
**Product use** : Synthetic/Analytical chemistry.  
**Synonym** : 2-butene; beta-butylene; pseudobutylene  
**MSDS #** : 001164  
**Date of Preparation/Revision** : 4/28/2010.  
**In case of emergency** : 1-866-734-3438

## Section 2. Hazards identification

**Physical state** : Gas. [Liquefied gas]  
**Emergency overview** : WARNING!  
FLAMMABLE GAS.  
MAY CAUSE FLASH FIRE.  
Keep away from heat, sparks and flame. Use only with adequate ventilation. Keep container closed.  
Contact with rapidly expanding gases can cause frostbite.  
**Routes of entry** : Inhalation  
**Potential acute health effects**  
**Eyes** : Liquid can cause burns similar to frostbite.  
**Skin** : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.  
**Inhalation** : Acts as a simple asphyxiant.  
**Ingestion** : Ingestion is not a normal route of exposure for gases  
**Potential chronic health effects** : **CARCINOGENIC EFFECTS:** Not available.  
**MUTAGENIC EFFECTS:** Not available.  
**TERATOGENIC EFFECTS:** Not available.  
**Medical conditions aggravated by over-exposure** : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological information (section 11)

## Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
2-Butene (Mixture of Cis and Trans)	107-01-7	100	<b>ACGIH TLV (United States, 1/2009).</b> TWA: 250 ppm 8 hour(s).

## Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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- Skin contact** : In case of contact with liquid, warm frozen tissues slowly with lukewarm water. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product rapidly becomes a gas when released, refer to the inhalation section.

## Section 5. Fire-fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : 313°C (595.4°F)
- Flammable limits** : Lower: 1.7% Upper: 9.36%
- Products of combustion** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
- Contains gas under pressure. 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.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## Section 7. Handling and storage

- Handling** : High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8. Exposure controls/personal protection

- 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.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

### Product name

butene, mixed-1-and-2-isomers

**ACGIH TLV (United States, 1/2009).**

TWA: 250 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

## Section 9. Physical and chemical properties

<b>Molecular weight</b>	: 56.12 g/mole
<b>Molecular formula</b>	: C <sub>4</sub> -H <sub>8</sub>
<b>Boiling/condensation point</b>	: 1.6667°C (35°F)
<b>Melting/freezing point</b>	: -140°C (-220°F)
<b>Critical temperature</b>	: 158.95°C (318.1°F)
<b>Vapor density</b>	: >1 (air = 1)
<b>Specific Volume (ft<sup>3</sup>/lb)</b>	: 6.6667
<b>Gas Density (lb/ft<sup>3</sup>)</b>	: 0.15

## Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with the following materials: oxidizing materials, metals and acids.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
butene, mixed-1-and-2-isomers	LC50 Inhalation Vapor	Rat	345000 mg/m <sup>3</sup>	4 hours
	LC50 Inhalation Gas.	Rat	690000 mg/m <sup>3</sup>	1 hours

- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material to humans.

### Specific effects

- Carcinogenic effects** : No known significant effects or critical hazards.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

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**Section 12. Ecological information**

**Aquatic ecotoxicity**

Not available.

**Products of degradation** : Products of degradation: carbon oxides (CO, CO<sub>2</sub>) and water.

**Environmental fate** : Not available.



**Environmental hazards** : No known significant effects or critical hazards.

**Toxicity to the environment** : Not available.

**Section 13. Disposal considerations**

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

**Section 14. Transport information**

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1012	Butylene (butene, mixed cis and trans isomers)	2.1	Not applicable (gas).		<b>Packaging instruction</b> <b>Passenger aircraft</b> Quantity limitation: Forbidden. <b>Cargo aircraft</b> Quantity limitation: Forbidden.
<b>TDG Classification</b>	UN1012	Butylene (butene, mixed cis and trans isomers)	2.1	Not applicable (gas).		<b>Explosive Limit and Limited Quantity Index</b> 0.125 <b>ERAP Index</b> 3000 <b>Passenger Carrying Ship Index</b> Forbidden <b>Passenger Carrying Road or Rail Index</b> Forbidden
<b>Mexico Classification</b>	UN1012	Butylene (butene, mixed cis and trans isomers)	2.1	Not applicable (gas).		-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

## Section 15. Regulatory information

### United States

- U.S. Federal regulations** :
- United States inventory (TSCA 8b):** This material is listed or exempted.
  - SARA 302/304/311/312 extremely hazardous substances:** No products were found.
  - SARA 302/304 emergency planning and notification:** No products were found.
  - SARA 302/304/311/312 hazardous chemicals:** butene, mixed-1-and-2-isomers
  - SARA 311/312 MSDS distribution - chemical inventory - hazard identification:** butene, mixed-1-and-2-isomers: Fire hazard
  - Clean Water Act (CWA) 307:** No products were found.
  - Clean Water Act (CWA) 311:** No products were found.
  - Clean Air Act (CAA) 112 accidental release prevention:** butene, mixed-1-and-2-isomers
  - Clean Air Act (CAA) 112 regulated flammable substances:** butene, mixed-1-and-2-isomers
  - Clean Air Act (CAA) 112 regulated toxic substances:** No products were found.

### State regulations

- :
- Connecticut Carcinogen Reporting:** This material is not listed.
  - Connecticut Hazardous Material Survey:** This material is not listed.
  - Florida substances:** This material is not listed.
  - Illinois Chemical Safety Act:** This material is not listed.
  - Illinois Toxic Substances Disclosure to Employee Act:** This material is not listed.
  - Louisiana Reporting:** This material is not listed.
  - Louisiana Spill:** This material is not listed.
  - Massachusetts Spill:** This material is not listed.
  - Massachusetts Substances:** This material is not listed.
  - Michigan Critical Material:** This material is not listed.
  - Minnesota Hazardous Substances:** This material is not listed.
  - New Jersey Hazardous Substances:** This material is listed.
  - New Jersey Spill:** This material is not listed.
  - New Jersey Toxic Catastrophe Prevention Act:** This material is not listed.
  - New York Acutely Hazardous Substances:** This material is not listed.
  - New York Toxic Chemical Release Reporting:** This material is not listed.
  - Pennsylvania RTK Hazardous Substances:** This material is listed.
  - Rhode Island Hazardous Substances:** This material is not listed.

### Canada

- WHMIS (Canada)** :
- Class A: Compressed gas.
  - Class B-1: Flammable gas.
  - CEPA Toxic substances:** This material is not listed.
  - Canadian ARET:** This material is not listed.
  - Canadian NPRI:** This material is listed.
  - Alberta Designated Substances:** This material is not listed.
  - Ontario Designated Substances:** This material is not listed.
  - Quebec Designated Substances:** This material is not listed.

## Section 16. Other information

### United States

- Label requirements** :
- FLAMMABLE GAS.
  - MAY CAUSE FLASH FIRE.

### Canada

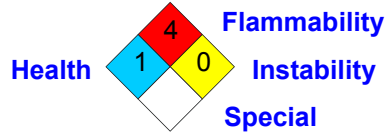
- Label requirements** :
- Class A: Compressed gas.
  - Class B-1: Flammable gas.

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**Hazardous Material  
Information System (U.S.A.)**

Health	1
Flammability	4
Physical hazards	0

**National Fire Protection  
Association (U.S.A.)**



**Notice to reader**

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.