

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

#### 1.1. Product identifier

Product form : Substance  
 Substance name : 2-Butene, trans-  
 Chemical name : 2-Butene, trans-  
 CAS No : 624-64-6  
 Product code : SG-1001-00769

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

Use of the substance/mixture : Polymer production.

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

Air Liquide America Specialty Gases  
 6141 Easton Rd  
 Plumsteadville, PA 18949 - USA  
 T 1.800.217.2688  
[www.airliquide.com](http://www.airliquide.com)

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

### SECTION 2: Hazards identification

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

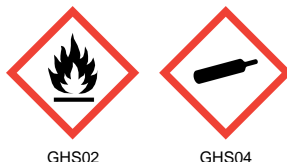
##### Classification (GHS-US)

Flam. Gas 1 H220  
 Liquefied gas H280

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H220 - Extremely flammable gas  
 H280 - Contains gas under pressure; may explode if heated  
 OSHA-H01 - May displace oxygen and cause rapid suffocation  
 CGA-HG01 - May cause frostbite  
 CGA-HG04 - May form explosive mixtures with air

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood  
 P210 - Keep away from open flames, sparks, hot surfaces. - No smoking  
 P271 - Use only outdoors or in a well-ventilated area  
 P302 - IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area, Get immediate medical advice/attention  
 P304 - IF INHALED: Remove person to fresh air and keep comfortable for breathing, 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  
 P403 - Store in a well-ventilated place  
 CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)  
 CGA-PG05 - Use a back flow preventive device in the piping  
 CGA-PG06 - Close valve after each use and when empty

#### 2.3. Other hazards

No additional information available

#### 2.4. Unknown acute toxicity (GHS-US)

No data available

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### SECTION 3: Composition/information on ingredients

#### 3.1. Substance

Name : 2-Butene, trans-  
CAS No : 624-64-6

Name	Product identifier	%	Classification (GHS-US)
Butene trans-	(CAS No)624-64-6		Flam. Gas 1, H220 Liquefied gas, H280

#### 3.2. Mixture

Not applicable

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.  
First-aid measures after skin contact : Contact with the liquefied gas may cause frostbite. Thaw frosted parts with lukewarm water. Do no rub affected area.  
First-aid measures after eye contact : Adverse effects not expected from this product.  
First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

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

Symptoms/injuries : Symptoms similar to those listed under inhalation and skin contact.  
Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation. If you feel unwell, seek medical advice.  
Symptoms/injuries after skin contact : Contact with the liquefied gas may cause frostbite.  
Symptoms/injuries after eye contact : Adverse effects not expected from this product.  
Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.  
Symptoms/injuries upon intravenous administration : Not known.  
Chronic symptoms : None known.

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

No additional information available

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.  
Unsuitable extinguishing media : Do not use water jet to extinguish.

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

Fire hazard : This product is flammable. Extremely flammable gas.  
Explosion hazard : May form flammable/explosive vapor-air mixture. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.  
Reactivity : None known.

#### 5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.  
Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

### SECTION 6: Accidental release measures

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

General measures : Ensure adequate ventilation.

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

Protective equipment : Wear protective equipment consistent with the site emergency plan.  
Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

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### 6.1.2. For emergency responders

- Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
- Emergency procedures : Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

### 6.2. Environmental precautions

Try to stop release if safe to do so.

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

- For containment : Try to stop release if safe to do so.
- Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

### 6.4. Reference to other sections

See also Sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Handle empty containers with care because residual vapors are flammable. Use equipment rated for cylinder pressure. In use, may form flammable vapor-air mixture. Close valve after each use and when empty.
- Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools. Use only outdoors or in a well-ventilated area.
- Hygiene measures : Do not eat, drink or smoke when using this product.

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

- Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.
- Storage conditions : Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage.
- Incompatible products : None known.
- Incompatible materials : Oxidizing materials. Air.

### 7.3. Specific end use(s)

See Section 1.2 Specific end use(s).

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Butene trans- (624-64-6)		
USA ACGIH	ACGIH TWA (ppm)	250 ppm

### 8.2. Exposure controls

- Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits. Oxygen detectors should be used when asphyxiating gases may be released. Consider work permit system e.g. for maintenance activities.
- Hand protection : Wear working gloves when handling gas containers. 29CFR 1910.138: Hand Protection.
- Eye protection : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.
- Skin and body protection : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.
- Respiratory protection : None necessary during normal and routine operations.
- Thermal hazard protection : None necessary during normal and routine operations.
- Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.
- Other information : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

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### SECTION 9: Physical and chemical properties

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

Physical state	: Gas
Appearance	: Clear, colorless gas.
Molecular mass	: 56.11 g/mol
Color	: Colorless
Odor	: Slightly aromatic
Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: > 1
Melting point	: -105 °C
Freezing point	: No data available
Boiling point	: 0.9 °C
Flash point	: -72 °C
Critical temperature	: 155 °C
Auto-ignition temperature	: 324 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 2 bar
Relative vapor density at 20 °C	: 2
Relative density	: No data available
Relative gas density	: Lighter or similar to air.
Solubility	: Water: Solubility in water of component(s) of the mixture : • : Insoluble
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Without adequate ventilation formation of explosive mixtures may be possible.
Oxidizing properties	: None.
Explosive limits	: 1.5 - 9.7 vol %

#### 9.2. Other information

Additional information : None.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

None known.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

Can form explosive mixture with air.

#### 10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

#### 10.5. Incompatible materials

Air. Oxidizing materials.

#### 10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

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### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

Butene trans- (624-64-6)	
LC50 inhalation rat (ppm)	300000 ppm/4h
ATE US (gases)	300000.00000000 ppmV/4h

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation. If you feel unwell, seek medical advice.

Symptoms/injuries after skin contact : Contact with the liquefied gas may cause frostbite.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

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

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : None known.

### SECTION 12: Ecological information

#### 12.1. Toxicity

No additional information available

#### 12.2. Persistence and degradability

Butene trans- (624-64-6)	
Persistence and degradability	No data available.

#### 12.3. Bioaccumulative potential

Butene trans- (624-64-6)	
Log Pow	2.32
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

#### 12.4. Mobility in soil

Butene trans- (624-64-6)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

#### 12.5. Other adverse effects

Effect on ozone layer : No additional information available

Effect on the global warming : No known ecological damage caused by this product.

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### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste treatment methods	: Contact supplier if guidance is required. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Waste disposal recommendations	: Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at <a href="http://www.cganet.com">www.cganet.com</a> for more guidance on suitable disposal methods.
Additional information	: None.

### SECTION 14: Transport information

In accordance with DOT

Transport document description	: UN1012 Butylene, 2.1
UN-No.(DOT)	: 1012
DOT NA no.	: UN1012
Proper Shipping Name (DOT)	: Butylene
Department of Transportation (DOT) Hazard Classes	: 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
Hazard labels (DOT)	: 2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102)	: 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information. 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	: E - 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, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	: 40 - Stow "clear of living quarters"

#### Additional information

Other information	: No supplementary information available.
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#### ADR


Transport document description	: UN 1012 TRANS-2-BUTYLENE, 2.1, (B/D)
Class (ADR)	: 2 - Gases
Hazard identification number (Kemler No.)	: 23
Classification code (ADR)	: 2F
Hazard labels (ADR)	: 2.1 - Flammable gases



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Orange plates : 

Tunnel restriction code (ADR) : B/D

LQ : 0

Excepted quantities (ADR) : E0

### Transport by sea

UN-No. (IMDG) : 1012

Class (IMDG) : 2.1 - Flammable gases

### Air transport

UN-No.(IATA) : 1012

Class (IATA) : 2

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

No additional information available

### 15.2. International regulations

#### CANADA

No additional information available

#### EU-Regulations

No additional information available

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

Not classified

#### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

#### 15.2.2. National regulations

No additional information available

### 15.3. US State regulations

### Butene trans- (624-64-6)

U.S. - Massachusetts - Right To Know List

U.S. - New Jersey - Right to Know Hazardous Substance List

U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases: see section 16:

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

SDS US (GHS HazCom 2012)

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*This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.*