

### Section 1: Identification

#### 1.1. Product identifier

Product form : Substance  
 Product Identifier(s) : 1,3-Butadiene  
 Butadiene  
 Buta-1,3-diene  
 BD  
 Vinyl ethylene  
 Butadiene (Inhibited)  
 CAS-No. : 106-99-0

#### 1.2. Recommended use of the chemical and restrictions on use

Use of the substance/mixture : Industrial use resulting in manufacture of another substance (use of intermediates)

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

TotalEnergies Petrochemicals & Refining USA, Inc.  
 P O Box 674411  
 Houston, TX 77267-4411

For non-emergency product information:  
 Phone: 713-483-5000  
 Email: product.stewardship@totalenergies.com

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (Toll Free USA & Canada) / 703-527-3887 (Multiple languages)  
 TotalEnergies Petrochemicals & Refining USA, Inc.: 1-800-322-3462 (Language: English only)

### Section 2: Hazards identification

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

##### Classification (GHS-US)

Simple Asphyxiant  
 Flammable gases Category 1  
 Gases under pressure Liquefied gas  
 Germ cell mutagenicity Category 1B  
 Carcinogenicity Category 1A  
 Specific target organ toxicity (single exposure) Category 3 - Respiratory irritation  
 Specific target organ toxicity (repeated exposure) Category 2

#### 2.2. Label elements

##### GHS US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS US) :

Danger

Hazard statements (GHS-US) :

**Extremely flammable gas**  
**Contains gas under pressure; may explode if heated**  
**May cause respiratory irritation**  
**May cause genetic defects (inhalation)**  
**May cause cancer (inhalation)**  
**May cause damage to organs (blood forming organs, blood) through prolonged or repeated exposure (inhalation)**  
**May displace oxygen and cause rapid suffocation**

Precautionary statements (GHS-US) :

Obtain special instructions before use.  
 Do not handle until all safety precautions have been read and understood.



# 1,3-Butadiene

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Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
Do not breathe gas, mist, spray, vapors.  
Use only outdoors or in a well-ventilated area.  
Wear flame retardant protective clothing, protective gloves, eye protection, Approved respirator.  
If inhaled: Remove person to fresh air and keep comfortable for breathing.  
Get medical advice/attention if you feel unwell.  
If exposed or concerned: Get medical advice/attention.  
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
Eliminate all ignition sources if safe to do so.  
Store in a well-ventilated place. Keep container tightly closed.  
Store locked up.  
Protect from sunlight. Store in a well-ventilated place.  
Dispose of contents and container in accordance with all local, regional, national and international regulations.

### 2.3. Hazards not otherwise classified

Other hazards which do not result in classification : Elevated temperatures can cause hazardous polymerization. If the polymerization takes place in a container, there is a possibility of violent rupture of the container.

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

Not applicable

### 2.5. Additional information

Based on conditions common to industrial workplace use of this product : Contact with the liquefied gas may cause frostbite

Based on professional judgment, inconclusive testing, or sensitive individuals : May cause mild eye irritation.

## Section 3: Composition/Information on ingredients

### 3.1. Substance

Name : 1,3-Butadiene  
CAS-No. : 106-99-0  
Synonyms : Butadiene / Buta-1,3-diene / BD / Vinyl ethylene / Butadiene (Inhibited)  
Concentration : > 99.5 % (Volume Percent)

### 3.2. Mixture

Not applicable

## Section 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).  
First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center/doctor/physician if you feel unwell.  
First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.  
First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if irritation persists.  
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/effects after inhalation : May cause cancer by inhalation. May cause respiratory irritation. Significant inhalation may cause symptoms similar to oxygen deprivation.  
Symptoms/effects after skin contact : May cause mild skin irritation. Contact with the liquefied gas may cause frostbite.  
Symptoms/effects after eye contact : May cause mild eye irritation.  
Symptoms/effects after ingestion : Not expected to be a primary route of exposure.  
Chronic symptoms : May cause cancer. May cause genetic defects (Inhalation).

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

No additional information available



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### Section 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray.  
Unsuitable extinguishing media : Do not use a heavy water stream.

#### 5.2. Special hazards arising from the chemical

Fire hazard : Extremely flammable gas.  
Explosion hazard : May form flammable/explosive vapor-air mixture. Risk of explosion if heated under confinement. The vapors are denser than air and may travel along the ground. Distance ignition possible.  
Hazardous decomposition products in case of fire : Carbon oxides (CO, CO<sub>2</sub>). Toxic fumes. Hydrocarbons.

#### 5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.  
Protection during firefighting : 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

Emergency procedures for non-emergency personnel : Evacuate unnecessary personnel.  
Emergency procedures for emergency responders : Ventilate area.

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

For containment : Stop leak if safe to do so.  
Methods for cleaning up : Store away from other materials.

#### 6.3. Reference to other sections

See section 8. Exposure controls/personal protection.

### Section 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : When product is stored or shipped, it should be inhibited. Flammable gas. Handle empty containers with care because residual vapors are flammable.  
Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No bare lights. No smoking. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Eliminate all ignition sources if safe to do so. Avoid breathing gas, mist, spray, vapors. Use only outdoors or in a well-ventilated area.

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

Technical measures : Proper grounding procedures to avoid static electricity should be followed. Keep storage containers clean, dry, and free of oxygen. Polymerization inhibitors protect only liquefied butadiene. Oxygen intrusion into the storage vessel headspace may support formation of peroxides and promote polymerization. Polymer may plug safety venting devices, plug lines, and foul equipment. Polymer formation may build sufficient mechanical force to rupture equipment. Inhibitor, tertiary-butylcatechol (TBC), is added to prevent formation of peroxides and polymer. Monitor inhibitor content to maintain concentration. Periodically, inspect equipment to assure there is no build-up of solids. Store in tightly closed containers segregated from oxidizers and other combustible material.  
Storage conditions : Keep only in the original container in a cool, well ventilated place away from : flames, heat sources, Direct sunlight, sparks. Keep in fireproof place. Keep container tightly closed.  
Incompatible products : Strong bases. Strong acids. Oxidizing agent. Phenol. chlorine dioxide. copper. crotonaldehyde. Air. May form explosive peroxides upon exposure to air.  
Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.  
Storage area : Store in a well-ventilated place. Store away from heat.

### Section 8: Exposure controls/personal protection

#### 8.1. Occupational Exposure Limits

The following constituents are the only constituents of the product which have a PEL, TLV, or other recommended exposure limit. At this time, the other constituents have no known exposure limits.



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1,3-Butadiene (106-99-0)		
USA ACGIH	ACGIH OEL TWA [ppm]	2 ppm
USA ACGIH	Remark (ACGIH)	Cancer
USA OSHA	OSHA PEL (TWA) [2]	1 ppm
USA OSHA	OSHA PEL (STEL) [2]	5 ppm
USA OSHA	Remark (OSHA)	OSHA Action Level 0.5 ppm - see OSHA Butadiene Standard 29 CFR 1910.1051

### 8.2. Exposure controls

Appropriate engineering controls	: Ensure adequate ventilation.
Personal protective equipment	: Avoid all unnecessary exposure.
Hand protection	: Wear protective gloves.
Eye protection	: Chemical goggles or safety glasses.
Skin and body protection	: Wear fire/flamm resistant/retardant clothing.
Respiratory protection	: An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits.
Other information	: Do not eat, drink or smoke during use.

## Section 9: Physical and chemical properties

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

Physical state	: Gas
Appearance	: Clear, colorless gas.
Color	: Colorless.
Odor	: Mildly aromatic.
Odor threshold	: 0.45 ppm
pH	: Not applicable
Relative evaporation rate (butyl acetate=1)	: Not available
Melting point	: -108.91 °C
Freezing point	: No data available
Boiling point	: -4.4 °C
Flash point	: -76 °C Closed cup
Auto-ignition temperature	: 420 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Vapor pressure	: 2100 mm Hg @ 25°C
Relative vapor density at 20 °C	: No data available
Relative density	: 0.62
Density	: 0.61 g/cm <sup>3</sup> (at 25 °C)
Solubility	: Water: 0.7 g/l (at 20 °C)
Partition coefficient n-octanol/water (Log Kow)	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosion limits	: 2 – 12 vol %

### 9.2. Other information

VOC content	: 100 %
Additional information	: Liquid under pressure

## Section 10: Stability and reactivity

### 10.1. Reactivity

Hazardous polymerization may occur on depletion of inhibitor.

### 10.2. Chemical stability

Extremely flammable gas.



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### 10.3. Possibility of hazardous reactions

Solid butadiene at below -113 deg C will absorb enough oxygen at subatmospheric pressure to explode violently when allowed to melt. Upon exposure to air it forms explosive peroxides sensitive to heat, shock, or heating above 27°C. Explodes on contact with aluminum tetrahydroborate. Potentially explosive reaction with /nitrogen oxides/ NOx + O2, ethanol + iodine + mercury oxide (at 35°C), ClO2 /chlorine dioxide/, crotonaldehyde (above 180 °C), buten-3-yne (with heat & pressure).

### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks.

### 10.5. Incompatible materials

Strong acids. Strong bases. Phenol. chlorine dioxide. copper. crotonaldehyde. Air. May form explosive peroxides upon exposure to air.

### 10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes.

## Section 11: Toxicological information

### 11.1. Information on toxicological effects

Likely routes of exposure : Inhalation. Skin and eye contact.

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

Combustion of hydrocarbon substances, like this product, produces potentially toxic gases which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur. Exposure to carbon monoxide gas decreases the ability of the blood to carry oxygen to the body and may be potentially fatal. NIOSH lists the Immediately Dangerous to Life or Health Concentration (IDLH) for carbon monoxide gas as 1200 ppm.

1,3-Butadiene (106-99-0)	
LD50 oral rat	Not applicable (gas)
LC50 Inhalation - Rat [ppm]	129000 ppm/4h
ATE US (gases)	129000 ppmV/4h

Skin corrosion/irritation : Not classified  
May cause mild skin irritation.

Serious eye damage/irritation : Not classified  
May cause mild eye irritation.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : May cause genetic defects (inhalation).

Carcinogenicity : May cause cancer (inhalation).  
Butadiene is suspected of causing cancers of the lymphatic and hematopoietic (blood-forming) organs.

1,3-Butadiene (106-99-0)	
IARC group	1 - Carcinogenic to humans
National Toxicology Program (NTP) Status	Evidence of Carcinogenicity, Known Human Carcinogens
OSHA Carcinogen Status	In OSHA Specifically Regulated Carcinogen list

Reproductive toxicity : Not classified  
Animal studies provide no indication of fertility impairment or developmental toxic effects at doses of butadiene which did not produce maternal toxicity. However, effects on fetuses, primarily in the form of retarded development, were observed in rodents at maternally toxic exposure levels.

STOT-single exposure : May cause respiratory irritation.

STOT-repeated exposure : May cause damage to organs (blood forming organs, blood) through prolonged or repeated exposure (inhalation).

Aspiration hazard : Not classified



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### Section 12: Ecological information

#### 12.1. Toxicity

No additional information available

#### 12.2. Persistence and degradability

No additional information available

#### 12.3. Bioaccumulative potential

No additional information available

#### 12.4. Mobility in soil

#### 1,3-Butadiene (106-99-0)

Ecology - soil	The product evaporates readily.
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#### 12.5. Other adverse effects

Other adverse effects : Ozone precursor in the lower atmosphere.

Other information : Avoid release to the environment.

### Section 13: Disposal considerations

#### 13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents and container in accordance with all local, regional, national and international regulations.

Additional information : Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials : Avoid release to the environment.

### Section 14: Transport information

#### US Transport (DOT) for Bulk Shipments (Non-Bulk Shipments May Differ)

Transport document description (DOT) : UN1010, Butadienes, stabilized, 2.1

UN or NA Number : UN1010

Proper Shipping Name : Butadienes, stabilized

Primary Hazard Class : 2.1 - Flammable gas

Reportable Quantities (RQ)\* : 1,3-Butadiene 10 lbs (4.54 kg)

\*It is the shipper's responsibility to determine whether an RQ must be reported for each individual shipment.

Hazard labels :



Emergency Response Guide (ERG) Number : 116

#### Transport by sea (IMDG)

Transport document description (IMDG) : UN 1010 BUTADIENES, STABILIZED, 2.1

UN Number : UN1010

Proper Shipping Name : BUTADIENES, STABILIZED

Primary Hazard Class : 2.1 - Flammable gases

Hazard labels (IMDG) :



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

#### MARPOL and US Coast Guard Regulations

Cargo name listed in 46 CFR 151.05, Table 151.05 : Butadiene



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### Air transport (IATA)

Transportation is forbidden on passenger aircraft.

Transport document description (IATA) : UN 1010 BUTADIENES, STABILIZED, 2.1

UN Number : UN1010

Proper Shipping Name : BUTADIENES, STABILIZED

Primary Hazard Class : 2 - Gases

Hazard labels (IATA) :



## Section 15: Regulatory information

### 15.1. US Federal regulations

#### EPA TSCA Status

All components of this product are listed or exempt from listing on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) Active inventory. This product has no special requirements under TSCA, such as significant new use rules (SNUR), consent orders, test rules, or sections 4, 5, 6, 8(a), 8(d), 12(b) requirements.

#### SARA Section 313 Supplier Notification

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372:

CAS number	Chemical name	Concentration
106-99-0	1,3-Butadiene	≥ 99.9%

This information must be included in all Safety Data Sheets that are copied and distributed for this product. For additional information, see 40 CFR §372.45 Notification About Toxic Chemicals.

#### SARA Section 311/312 Hazard Classes

Physical hazard - Flammable (gases, aerosols, liquids, or solids)  
Physical hazard - Gas under pressure  
Health hazard - Carcinogenicity  
Health hazard - Germ cell mutagenicity  
Health hazard - Specific target organ toxicity (single or repeated exposure)  
Health hazard - Simple asphyxiant

### 15.2. International regulations

#### CANADA

No additional information available

#### National inventories

##### 1,3-Butadiene (106-99-0)

Listed on or exempt from listing on the AICS (Australian Inventory of Chemical Substances)  
Listed on or exempt from listing on the Canadian DSL (Domestic Substances List)  
Listed on or exempt from listing on the China Inventory of Existing Chemical Substances (IECSC)  
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)  
Listed on or exempt from listing on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on or exempt from listing on the Korean ECL (Existing Chemicals List)  
Listed on or exempt from listing on NZIoC (New Zealand Inventory of Chemicals)  
Listed on or exempt from listing on the Philippines Inventory of Chemicals and Chemical Substances (PICCS)

### 15.3. US State regulations

California Proposition 65 - This substance is known to the state of California to cause cancer and/or reproductive toxicity.

## Section 16: Other information

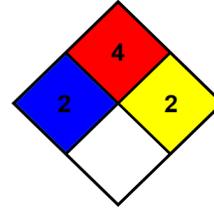


# 1,3-Butadiene

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### NFPA (National Fire Protection Association)

NFPA health hazard : 2  
NFPA fire hazard : 4  
NFPA reactivity : 2



### Hazard System Rating

Health : 2\*  
Flammability : 4  
Physical Hazard : 2  
Personal protection : See section 8 of SDS

US OSHA LABEL as specified under 29 CFR §1910.1200 (f). The label shown may include supplemental information in addition to required elements.

## 1,3-Butadiene

TotalEnergies Petrochemicals & Refining USA, Inc.  
PO Box 674411  
Houston, TX 77267-4411 USA  
Tel. 713-483-5000



### Danger

#### Extremely flammable gas

Contains gas under pressure; may explode if heated

May cause respiratory irritation

May cause genetic defects (inhalation)

May cause cancer (inhalation)

May cause damage to organs (blood forming organs, blood) through prolonged or repeated exposure (inhalation)

May displace oxygen and cause rapid suffocation

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Do not breathe gas, mist, spray, vapors.

Use only outdoors or in a well-ventilated area.

Wear flame retardant protective clothing, protective gloves, eye protection, Approved respirator.

If inhaled: Remove person to fresh air and keep comfortable for breathing.

Get medical advice/attention if you feel unwell.

If exposed or concerned: Get medical advice/attention.

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Eliminate all ignition sources if safe to do so.

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

Dispose of contents and container in accordance with all local, regional, national and international regulations.

### Supplemental Information

Elevated temperatures can cause hazardous polymerization. If the polymerization takes place in a container, there is a possibility of violent rupture of the container.

### US SDS Version: 5.1

Issue date: August 7, 2021

SDS ID: BUTADIENE

SDS REFERENCE NUMBER: BC0001

SDS Template - TotalEnergies SDS US TEPRI Version 20.00



# 1,3-Butadiene

## Safety Data Sheet

*The information contained in this Safety Data Sheet (SDS) is believed by TotalEnergies Petrochemicals & Refining USA, Inc. (TEPRI) to be accurate on the date issued. However, materials may present unknown hazards and should be used with caution. Final determination of suitability and use of any material is the sole responsibility of the user. Neither TEPRI nor any of its subsidiaries or affiliated companies assumes any liability whatsoever for the accuracy or completeness of the information contained herein or reliance thereto. If the material is repackaged, the user is responsible and must ensure that proper health, safety and other necessary information is included with the material and/or on the container. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING THE MATERIALS OR THE INFORMATION CONTAINED IN THIS SDS. ALTERATION OF THIS DOCUMENT IS STRICTLY PROHIBITED.*

