

## Chemical Safety Data Sheet MSDS / SDS

## 1,3-Butadiene

Revision Date:2025-02-01 Revision Number:1

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

## Product identifier

Product name : 1,3-Butadiene  
CBnumber : CB2733269  
CAS : 106-99-0  
EINECS Number : 203-450-8  
Synonyms : 1,3-Butadiene,butadiene

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

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.  
Uses advised against : none

## Company Identification

Company : Chemicalbook  
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing  
Telephone : 400-158-6606

## SECTION 2: Hazards identification

## Classification of the substance or mixture

Gases under pressure: Compressed gas  
Flammable gases, Category 1A, Flammable gas  
Germ cell mutagenicity, Category 1B  
Carcinogenicity, Category 1A

## Label elements

## Pictogram(s)

Signal word : Danger

## Hazard statement(s)

H220 Extremely flammable gas  
H225 Highly Flammable liquid and vapour  
H280 Contains gas under pressure; may explode if heated  
H304 May be fatal if swallowed and enters airways  
H315 Causes skin irritation

H336 May cause drowsiness or dizziness

H340 May cause genetic defects

H350 May cause cancer

H373 May cause damage to organs through prolonged or repeated exposure

H411 Toxic to aquatic life with long lasting effects

#### **Precautionary statement(s)**

P201 Obtain special instructions before use.

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P273 Avoid release to the environment.

P331 Do NOT induce vomiting.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P308+P313 IF exposed or concerned: Get medical advice/attention.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

#### **Prevention**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P203 Obtain, read and follow all safety instructions before use.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

#### **Response**

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 In case of leakage, eliminate all ignition sources.

P318 IF exposed or concerned, get medical advice.

#### **Storage**

P410+P403 Protect from sunlight. Store in a well-ventilated place.

P403 Store in a well-ventilated place.

P405 Store locked up.

#### **Disposal**

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

#### **Other hazards**

no data available

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## SECTION 3: Composition/information on ingredients

### **Substance**

Product name	: 1,3-Butadiene
Synonyms	: 1,3-Butadiene, butadiene
CAS	: 106-99-0
EC number	: 203-450-8
MF	: C <sub>4</sub> H <sub>6</sub>
MW	: 54.09

## SECTION 4: First aid measures

### Description of first aid measures

#### If inhaled

Fresh air, rest. Refer for medical attention.

#### Following skin contact

ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .

#### Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

#### Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

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

Slight anesthetic effect at high concentrations; causes ``frostbite" from skin contact; slight irritation to eyes and nose at high concentrations. (USCG, 1999)

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

no data available

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## SECTION 5: Firefighting measures

### Extinguishing media

Excerpt from ERG Guide 116P [Gases - Flammable (Unstable)]: DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED. SMALL FIRE: Dry chemical or CO2. LARGE FIRE: 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 this is impossible, withdraw from area and let fire burn. (ERG, 2016)

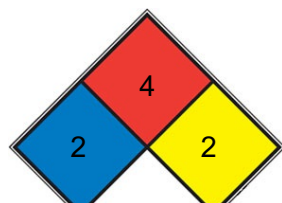
### Specific Hazards Arising from the Chemical

Behavior in Fire: Vapors heavier than air and may travel a considerable distance to a source of ignition and flashback. Containers may explode in a fire due to polymerization. (USCG, 1999)

### Advice for firefighters

Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with water spray, powder, carbon dioxide, foam. In case of fire: keep cylinder cool by spraying with water.

### NFPA 704





<input checked="" type="checkbox"/> HEALTH	2	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. <a href="#">diethyl ether</a> , ammonium phosphate, iodine)
<input checked="" type="checkbox"/> FIRE	4	Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Includes pyrophoric substances. Flash point below room temperature at 22.8 °C (73 °F). (e.g. acetylene, propane, <a href="#">hydrogen gas</a> )
<input checked="" type="checkbox"/> REACT	2	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water (e.g. white phosphorus, <a href="#">potassium</a> , <a href="#">sodium</a> )
<input type="checkbox"/> SPEC.		
<input type="checkbox"/> HAZ.		

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## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: self-contained breathing apparatus. Shut off cylinder if possible. Isolate the area until the gas has dispersed. NEVER direct water jet on liquid.

### Environmental precautions

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Ventilation. NEVER direct water jet on liquid.

### Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

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## SECTION 7: Handling and storage

### Precautions for safe handling

NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### Conditions for safe storage, including any incompatibilities

Fireproof. Cool. Separated from food and feedstuffs.

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## SECTION 8: Exposure controls/personal protection

### Control parameters

### Occupational Exposure limit values

TLV: 2 ppm as TWA; A2 (suspected human carcinogen).EU-OEL: 2.2 mg/m<sup>3</sup>, 1 ppm as TWA.MAK: carcinogen category: 1; germ cell mutagen group: 2

### Biological limit values

no data available

### Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures

#### Eye/face protection

Wear face shield.

#### Skin protection

Cold-insulating gloves.

#### Respiratory protection

Use closed system and ventilation.

#### Thermal hazards

no data available

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## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

Physical state	Colorless gas
Colour	no data available
Odour	no data available
Melting point/freezing point	176°C(lit.)
Boiling point or initial boiling point and boiling range	?4.5°C(lit.)
Flammability	Flammable Gas
Lower and upper explosion limit/flammability limit	12%
Flash point	-75°C
Auto-ignition temperature	788°F
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	water: soluble0.5g/L at 20°C
Partition coefficient n-octanol/water	1.99
Vapour pressure	1863 mm Hg ( 21 °C)
Density and/or relative density	0.62g/mLat 20°C(lit.)
Relative vapour density	1.9 (15 °C, vs air)

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## SECTION 10: Stability and reactivity

### Reactivity

The substance can form peroxides on exposure to air, initiating explosive polymerization. The substance may polymerize due to warming. This generates fire or explosion hazard. Mixtures with copper and its alloys are shock-sensitive. See Notes. Decomposes explosively on rapid heating under pressure. Reacts vigorously with oxidants and many other substances. This generates fire and explosion hazard.

### Chemical stability

no data available

### Possibility of hazardous reactions

The gas is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated. Vapours are uninhibited and may polymerize, causing blockage of vents. A colorless gas, it can react with oxidizing reagents. Upon long exposure to air it forms explosive peroxides. They are sensitive to heat or shock; sudden polymerization may occur [Scott, D. A., Chem. Eng. News, 1940, 18, p.404]. Butadiene polyperoxides are insoluble in liquefied butadiene (m. p. -113° C, b. p. -2.6° C) and progressively separate leading to local concentration build up. Self-heating from a spontaneous decomposition will lead to explosion [Hendry, D. G. et al., Ind. Eng. Chem., 1968, 7, p. 136, 1145]. Explodes on contact with aluminum tetrahydroborate, potentially explosive reaction with chlorine dioxide (peroxide) and crotonaldehyde (above 180° C). Reaction with sodium nitrite forms a spontaneously flammable product [Sax, 9th ed., 1996, p. 539].

### Conditions to avoid

no data available

### Incompatible materials

**AIR AND WATER REACTIONS:** In contact with air, butadiene may form violently explosive peroxides, which can be exploded by mild heat or shock. Solid butadiene absorbs enough oxygen at subatmospheric pressures to make it explode violently when heated just above its melting point (Ind. Eng. Chem. 51:733 1959). **CHEMICAL PROFILE:** A colorless gas, it can react with oxidizing reagents. Upon long exposure to air it forms explosive peroxides. They are sensitive to heat or shock; sudden polymerization may occur [Scott, D. A., Chem. Eng. News, 1940, 18, p.404]. Butadiene polyperoxides are insoluble in liquified butadiene (m. p. -113 C, b. p. -2.6 C) and progressively separate leading to local concentration build up. Self-heating from a spontaneous decomposition will lead to explosion [Hendry, D. G. et al., Ind. Eng. Chem., 1968, 7, p. 136, 1145]. Explodes on contact with aluminum tetrahydroborate, potentially explosive reaction with chlorine dioxide (peroxide) and crotonaldehyde (above 180 C). Reaction with sodium nitrite forms a spontaneously flammable product [Sax, 9th ed., 1996, p. 539]. (REACTIVITY, 1999)

### Hazardous decomposition products

When heated to decomposition it emits acrid smoke and irritating fumes.

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## SECTION 11: Toxicological information

### Acute toxicity

- Oral: no data available

- Inhalation: no data available
- Dermal: no data available

#### **Skin corrosion/irritation**

no data available

#### **Serious eye damage/irritation**

no data available

#### **Respiratory or skin sensitization**

no data available

#### **Germ cell mutagenicity**

no data available

#### **Carcinogenicity**

NTP: Known to be a human carcinogen

#### **Reproductive toxicity**

No information is available on reproductive or developmental effects of 1,3-butadiene in humans. Animal studies using mice have reported developmental effects, such as skeletal abnormalities and decreased fetal weights, and reproductive effects, including an increased incidence of ovarian atrophy and testicular atrophy from inhalation exposure to 1,3-butadiene.

#### **STOT-single exposure**

The substance at very high concentrations is irritating to the eyes and respiratory tract. Rapid evaporation of the liquid may cause frostbite. Inhalation of high concentrations may cause depression of the central nervous system.

#### **STOT-repeated exposure**

The substance may have effects on the bone marrow. This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells.

#### **Aspiration hazard**

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

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## **SECTION 12: Ecological information**

#### **Toxicity**

Toxicity to fish: no data available

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

#### **Persistence and degradability**

no data available

### **Bioaccumulative potential**

no data available

### **Mobility in soil**

no data available

### **Toxics Screening Level**

The Initial Threshold Screening Level (ITSL) for 1,3-butadiene (BD) is 33 µg/m<sup>3</sup> with annual averaging time (AT).

### **Other adverse effects**

no data available

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## **SECTION 13: Disposal considerations**

### **Disposal methods**

#### **Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

#### **Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

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## **SECTION 14: Transport information**

### **UN Number**

ADR/RID: UN1010 (For reference only, please check.)

IMDG: UN1010 (For reference only, please check.)

IATA: UN1010 (For reference only, please check.)

### **UN Proper Shipping Name**

ADR/RID: BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes (For reference only, please check.)

IMDG: BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes (For reference only, please check.)

IATA: BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes (For reference only, please check.)

### **Transport hazard class(es)**

ADR/RID: 2.1 (For reference only, please check.)

IMDG: 2.1 (For reference only, please check.)

IATA: 2.1 (For reference only, please check.)

**Packing group, if applicable**

ADR/RID: (For reference only, please check.)

IMDG: (For reference only, please check.)

IATA: (For reference only, please check.)

**Environmental hazards**

ADR/RID: No

IMDG: No

IATA: No

**Special precautions for user**

no data available

**Transport in bulk according to IMO instruments**

no data available

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## SECTION 15: Regulatory information

**Safety, health and environmental regulations specific for the product in question****European Inventory of Existing Commercial Chemical Substances (EINECS)**

Listed.

**EC Inventory**

Listed.

**United States Toxic Substances Control Act (TSCA) Inventory**

Listed.

**China Catalog of Hazardous chemicals 2015**

Listed.

**New Zealand Inventory of Chemicals (NZIoC)**

Listed.

**PICCS**

Listed.

**Vietnam National Chemical Inventory**

Listed.

**IECSC**

Listed.

**Korea Existing Chemicals List (KECL)**

Listed.

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## SECTION 16: Other information

**Abbreviations and acronyms**

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

## References

IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>

HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)

CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>

Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

## Other Information

The odour warning when the exposure limit value is exceeded is insufficient. Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

### Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.