Safety Data Sheet(SDS)

Revision date : 01-06-2026

1. Identification

1) Product identifier : BD_BUTADIENE

2) Relevant identified uses of the substance or mixture and uses advised against

○ Relevant identified uses

1.Raw materials and intermediates

○ Restrictions on use

Use for recommended use only
Do not use it for weapons manufacturing and related purposes.

3) Supplier information

○ Seller

Company name : Lotte Daesan Petrochem Corporation
Address : 82 Dokgot 1-ro, Daesan-eup, Seosan-si, Chungcheongnam-do
Telephone number : +82-41-689-5114
Emergency phone number : (Control Room) +82-41-689-5119
Fax number : +82-41-689-5985

2. Hazards identification

1) Hazard classification

- Flammable gases Category 1
- Gases under pressure Liquefied gas
- Carcinogenicity Category 1A
- Germ cell mutagenicity Category 1B

2) Allocation label elements

Hazard pictograms

Signal word

- DANGER

Hazard statements

H220 Extremely flammable gas
H280 Contains gas under pressure; may explode if heated
H340 May cause genetic defects.
H350 May cause cancer.

Precautionary statements

- Prevention

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

- Response

P308+P313 If exposed or concerned: Get medical advice/attention.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.

- Storage

P403 Store in a wellventilated place.
P405 Store locked up.
P410+P403 Protect from sunlight. Store in a wellventilated place.

- Disposal

P501 Discard the contents/containers in accordance with the laws and laws related to waste.

3) Other hazards:

According to experience and information provided, this product does not affect harmful effects when using and handling it as a regulation.

3. Composition/Information on ingredients

Chemical name	Common name	CAS No.	Content(wt%)
1,3-Butadiene	buta-1,3-diene	106-99-0	100

4. First-aid measures

1) Following eye contact
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Seek immediate medical assistance.

2) Following skin contact
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Seek immediate medical assistance.

3) Following inhalation
- Administer oxygen if breathing is difficult.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Give artificial respiration if victim is not breathing.
- Keep victim warm and quiet.
- Move to fresh air.
- Seek immediate medical assistance.

4) Following ingestion
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Seek immediate medical assistance.

5) Delayed and immediate effects and also chronic effects from short and long term exposure
- May cause cancer
- May cause genetic defects

6) Advice to physician
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Exposures require specialized first aid with contact and medical follow-up .

5. Fire-Fighting measures

1) Suitable (and unsuitable) extinguishing media

○ Suitable extinguishing media
- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- CO2.
- Use dry sand or earth to smother fire.

- Dry chemical.
- Water spray.

○ Unsuitable extinguishing media

- Direct water.

2) Special hazards arising from the substance or mixture

○ Pyrolytic product

- Can decompose at high temperatures forming toxic gases.

○ Risk of fire and explosion

- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.
- Containers may explode when heated.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- May violently polymerize and result in fire and explosion.
- Extremely flammable.
- Silane will ignite spontaneously in air.
- Some may burn but none ignite readily.
- Vapors may travel to source of ignition and flash back.
- Some of these materials, if spilled, may evaporate leaving a flammable residue.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

○ Other

- Some may be irritating if inhaled at high concentrations.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Vapors may cause dizziness or asphyxiation without warning.
- Fire may produce irritating, corrosive and/or toxic gases.

3) Special protective equipment for firefighters

- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Move containers from fire area if you can do it without risk.
- Rescuers should put on appropriate protective gear.
- Ruptured cylinders may rocket.
- Substance may be transported in a molten form.
- Use extinguishing agent suitable for type of surrounding fire.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Damaged cylinders should be handled only by specialists.
- Dike fire-control water for later disposal; do not scatter the material.
- DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
- Evacuate area and fight fire from a safe distance.
- Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
- Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks: Do not direct water at source of leak or safety devices; icing may occur.
- Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. Accident release measures

1) Personal precautions, protective equipment and emergency procedures
   - Isolate area until gas has dispersed.
   - Isolate hazard area.
   - Keep unnecessary and unprotected personnel from entering.
   - Please note that materials and conditions to be avoided.
   - Some of these materials, if spilled, may evaporate leaving a flammable residue.
   - Stop leak if you can do it without risk.
   - The very fine particles can cause a fire or explosion, eliminate all ignition sources.
   - Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
   - Ventilate the contaminated area.
   - All equipment used when handling the product must be grounded.
   - Allow substance to evaporate.
   - Clean up spills immediately, observing precautions in Protective Equipment section.
   - Cover with plastic sheet to prevent spreading.
   - Do not direct water at source of leak.
   - Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
   - Do not touch or walk through spilled material.
   - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
   - If possible, turn leaking containers so that gas escapes rather than liquid.

2) Environmental precautions
   - Prevent entry into waterways, sewers, basements or confined areas.
   - Prevent spreading of vapors through sewers, ventilation systems and confined areas.

3) Methods and materials for containment and cleaning up
   - Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
   - Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
   - Absorb the liquid and scrub the area with detergent and water.
   - Dike and collect water used to fight fire.

7. Handling and storage

1) Precautions for safe handling
   - All equipment used when handling the product must be grounded.
   - Avoid breathing vapors from heated material.
   - Do not enter storage area unless adequately ventilated.
   - DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION;.
   - Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
   - Handling refer to engineering control/personal protection section.
   - Loosen closure cautiously before opening.
   - Please note that materials and conditions to be avoided.
   - Use care in handling/storage.

2) Conditions for safe storage (including any incompatibilities)

- Containers can build up pressure if exposed to heat (fire).
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Store in a closed container.

8. Exposure controls & personal protection

1) Chemical exposure limits, Biological exposure standard

Components	ACGIH regulations	Biological limit values
1,3-Butadiene	2 ppm TWA	2.5 mg / l medium: urine time: end of shift parameter: 1,2dihydroxy4 (Nacetylcysteinyl) butane (Background, Semiquantitive); 2.5 PMOL / G Hemoglobin Medium: Blood Time: Not Critical Parameter: Mixture of N1 and N2 (HydroxyButenyl) Valine Hemoglobin Adduct

2) Appropriate engineering controls

- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

3) Personal protective equipment

○ Respiratory protection

- If you have a direct contact or exposed to the material, wear the appropriate form of respiratory protection certified.

○ Eye protection

- If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles.

○ Hand protection

- Wear chemical safety gloves.

○ Skin protection

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

9. Physical and chemical information

Property name	Values	Source
Appearance		
Physical state	Gas; Liquefied Gas	
Color	colourless	HSDB
Odor	Do not attempt to smell the product as it is hazardous.	HSDB
Odor threshold	1.6	
pH	No data available	
Melting point/freezing point	-109	ChemIDplus
Initial boiling point and boiling range(℃)	-4 ℃	ChemIDplus

Flash point(℃)	-76 ℃	ICSC
Evaporation rate	≥ 25 (Butyl Acetate = 1)	HSDB
Flammability(solid, gas)	Flammable Gas	ECHA
Upper/lower flammability or explosive limits	Upper explosive limits : 16.3 %(V) Lower explosive limits : 1.1 %(V)	ICSC
Vapour pressure	255 ㎪ (20℃)	ECHA
Solubility(ies)	735mg/L (20℃)	NICS
Vapour density	1.87 (Air = 1.0)	HSDB
Relative density	No data available	
n-octanol/water partition coefficient	logPow 1.99	HSDB
Auto ignition temperature	414	ICSC
Decomposition temperature	Decomposition Energy : -2541.5 K (kJ/mol)	HSDB
Viscosity(㎟/s, 40℃)	0.00754 cP (Liquid, - 40℃)	HSDB
Molecular weight(mass)	54.09	HSDB
Density	0.61 g/㎤ (25℃)	KISChem
Specific gravity	0.6 (Water=1)	ICSC

10. Stability and hazardous reactivity

1) Chemical stability and Possibility of hazardous reactions

- Some may burn but none ignite readily.
- Vapors may cause dizziness or asphyxiation without warning.
- Vapors may travel to source of ignition and flash back.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.
- Can decompose at high temperatures forming toxic gases.
- Containers may explode when heated.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Extremely flammable.
- Fire may produce irritating, corrosive and/or toxic gases.
- May violently polymerize and result in fire and explosion.
- Silane will ignite spontaneously in air.
- Some may be irritating if inhaled at high concentrations.

2) Conditions to avoid

- Heat, contamination.
- Heat.
- Ignition source(heat, spark, flame, etc.).

3) Incompatible materials

- Combustibles, reducing material.

4) Hazardous decomposition products

- Corrosive/toxic fume.
- Irritating, corrosive and/or toxic gas.

11. Toxicological information

1) Information on the likely routes of exposure

○ Skin Contact

- Can be absorbed in body by inhalation or contact skin and the digestive organs.

2) Delayed and immediate effects and also chronic effects from short and long term exposure

○ Acute toxicity

● Acute toxicity(Oral)

- LD50 5480 ㎎ / ㎏ experimental species: Rat

● Acute toxicity(Dermal)

- No data available

● Acute toxicity(Inhalation:Gases)

- No data available

● Acute toxicity(Inhalation:Vapours)

- No data available

● Acute toxicity(Inhalation:Dust/mist)

- No data available

○ Skin corrosion/irritation

- No data available

○ Serious eye damage/eye irritation

- Serious eye with a rabbit damage / irritation Irritating test results are not observed

○ Respiratory sensitization

- No data available

○ Skin sensitization

- No data available

○ Carcinogenicity

- Ministry of Environment(Category 1A)

○ Germ cell mutagenicity

- Ministry of Environment(Category 1B)

○ Reproductive toxicity

- Results reproduction toxicity test using a rat no harmful effect is observed (NOAEC = 13,276 mg / m3) (OECD Guideline 421, GLP) developmental toxicity / teratogenicity test results using rat No harmful effect is

observed (NOEC = 2212 mg / m3) (EU Method B.31)

○ Specific target organ toxicity single exposure

- This appears to involve the people coughing in the snow, rain, larynx and lung irritation

○ Specific target organ toxicity repeated exposure

- 103 shares inhalation carcinogenicity studies OECD TG 453, GLP, results 8000ppm, increased heart weight in 17701 mg / m3 concentration group and elongation within tubular degeneration nephritis is observed NOAEC = 1000 ppm2212 mg / m3 target organ using the rat: ovary, testis marrow

○ Aspiration hazard

- No data available

12. Ecological information

1) Ecotoxicity

- Hazardous to the aquatic environment, short-term (acute)

  No data available

- Hazardous to the aquatic environment, long-term (chronic)

  No data available

- Fish

  LC50 45 ㎎ / ℓ 96 hr Pimephales promelas (QSAR (TGD Recommended equation))

- Crustaceans

  EC50 33 ㎎ / ℓ 48 hr Daphnia magna (QSAR)

- Aquatic algae

  EC50 33 ㎎ / ℓ 72 hr Other (QSAR (TGD Recommended equation))

2) Persistence and degradability

- Degradability

  No data available

- Biodegradation

  No data available

3) Bioaccumulative potential

- n-octanol water partition coefficient

  1.99 log Kow

- Bioconcentration factor(BCF)

  No data available

4) Mobility in soil

No data available

5) Other adverse effects

No data available

13. Disposal considerations

1) Disposal methods

- Empty containers should be taken to an approved waste handling site for recycling or disposal.

2) Precautions (including disposal of contaminated container of package)

- Dispose of in accordance with local regulations.
- Send to a licensed waste management company.

14. Transport information

1) UN No. : 1010

2) Proper shipping name : BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40 % butadienes

3) Hazard class : 2.1

4) Packing group : Not applicable

5) Marine pollutant : No

6) Special precautions for user related to transport or transportation measures :

Emergency measures in case of fire : F-D

Emergency measures in the effluent : S-U

- ADR

· Tunnel restriction code : B/D

- IMDG

· Marine pollutant : No

- Air transport(IATA)

· UN No. : 1010

· Proper shipping name : BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40 % butadienes

· Class or division : 2.1

· Packing group : Not applicable

15. Regulatory information

Australia Industrial Chemicals Notification and Assessment Act

- Inventory - Australia - Inventory of Industrial Chemicals (AIIC)

- 1,3-Butadiene : Present

China Inventory of Existing Chemical Substances (IECSC)

- Inventory - China - Inventory of Existing Chemical Substances (IECSC)

- 1,3-Butadiene : Present [06005]

92/32/EEC

- Not applicable

European Union Official Journal of the European Communities 15 June 1990 - Annex Based on Article 13 of Directive 67/548/EEC Amended by Directive 79/831/EEC

- Inventory - European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

- 1,3-Butadiene : 203-450-8

Japan - ISHL Ordinance Hazardous Substances Whose Names Are to be Indicated on the Label

Japan Law Concerning the Examination and Regulations of Manufacture, etc. of Chemical Substances

- Inventory - Japan - Existing and New Chemical Substances (ENCS)

- 1,3-Butadiene : (2)-17 (listed under Butadiene)

New Zealand Environmental Protection Authority, Inventory of Chemicals

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

- 1,3-Butadiene : HSNO Approval: HSR000988

Turkey Regulation on Inventory and Control of Chemicals

- Not applicable

Taiwan Chemical Substance Inventory

- Inventory - Taiwan - Taiwan Chemical Substance Inventory (TCSI)

- 1,3-Butadiene : Present

U.S. Toxic Substances Control Act

Vietnam National Chemicals Inventory (NCI)

- Inventory - Vietnam - National Chemicals Inventory (NCI) (DRAFT)

- 1,3-Butadiene : Present 01787

16. Other information

1) Reference

NCIS, KOSHA, Montreal Protocol, ECHA, OECD SIDS, EU IUCLID, HSDB(PubChem), NITE, NTP, ACGIH, IARC, NIOSH, ChemIDplus, EPA, EPI Suite, INCHEM

2) Issue date : 26-12-2022

3) Revision date

○ Revised date count : 3-1

○ Last revised date : 01-06-2026

4) Other

ACGIH : American Conference of Governmental Industrial Hygienists
ADR : Agreement Concerning the International Carriage of Dangerous Goods by Road
ATE : The Acute Toxicity Estimate
ECHA : European Chemicals Agency
EPA : United States Environmental Protection Agency
EPI Suite : The Estimation Programs Interface for Windows
EU IUCLID : International Uniform Chemical Information Database
HSDB : Hazardous Substances Data Bank
IARC : International Agency for Research on Cancer
IATA : International Air Transport Association
IMDG : International Maritime Dangerous Goods Codes
INCHEM : Internationally Peer Reviewed Chemical Safety Information
M-Factor : The Multiplication Factor
NIOSH : National Institute of Occupational Safety and Health
NITE : National Institute of Technology and Evaluation(JAPAN)
NTP : National Toxicology Program
SCL : Specific Concentration Limit
OECD SIDS : Organization for Economic Co-operation and Development Screening Information Dataset

GHS/EN