Safety Data Sheet(SDS)

According to Regulation (EU) No. 2020/878

Version : 3-1

Revision date : 01-06-2026

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

1.1. Product identifier

Product identifier : BD_BUTADIENE

Other means of identification : No data

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

○ Relevant identified uses

1.Raw materials and intermediates

○ Uses advised against

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

1.3. Details of the supplier of the safety data sheet

○ Seller

Company name : Lotte Daesan Petrochem Corporation
Address : 82 Dokgot 1-ro, Daesan-eup, Seosan-si, Chungcheongnam-do
Telephone number : +82-41-689-5114
Fax number : +82-41-689-5985
Email : www.ldpc.co.kr (contact)

1.4. Emergency telephone number

Emergency phone number : (Control Room) +82-41-689-5119
Opening hours : 08:30~17:30 (GMT+9)
Other comments(e.g. language(s) of the phone service) : English

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

2.2. 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 well-ventilated place.
P405 Store locked up.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

- Disposal

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

2.3. Other hazards

- No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name	1) CAS No 2) EC No	Classification	1) Index number 2) SCL 3) M-Factor 4) ATE	Content(wt%)
1,3-Butadiene	1) 106-99-0 2) 203-450-8	Flam. Gas 1A, Press. Gas (Comp.), Carc. 1A, Muta. 1B	1) - 2) - 3) - 4) Acute toxicity(Oral) : 5480mg/kg	100

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- 4.1.1. 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.
- 4.1.2. Skin contact
  - Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
  - In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
  - For minor skin contact, avoid spreading material on unaffected 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.
  - Seek immediate medical assistance.
  - Remove and isolate contaminated clothing and shoes.
- 4.1.3. 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.
  - Keep victim warm and quiet.
  - Give artificial respiration if victim is not breathing.
  - Move to fresh air.
  - Seek immediate medical assistance.
- 4.1.4. If swallowed
  - Seek immediate medical assistance.
  - 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.

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

- No data available

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

- 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 .

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

- Water spray.

○ Unsuitable extinguishing media

- Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

- Some may burn but none ignite readily.
- Some of these materials, if spilled, may evaporate leaving a flammable residue.
- 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.

5.3. Advice 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

○ Protective equipment

- The wearing of suitable protective equipment to prevent any contamination of skin, eyes and personal clothing.

○ Emergency procedures

- Removal of ignition sources, provision of sufficient ventilation.

6.1.2. For emergency responders

- Do not direct water at source of leak.
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Isolate area until gas has dispersed.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Please note that materials and conditions to be avoided.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

6.2. Environmental precautions

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

6.3. Methods and material for containment and cleaning up

6.3.1. For containment

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

6.3.2. For cleaning up

- Clear spills immediately.
- Don't use a brush or compressed air for cleaning surfaces or clothing.

6.3.3. Other information

- Absorb the liquid and scrub the area with detergent and water.
- Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Dike and collect water used to fight fire.

6.4. Reference to other sections

- Section 8 (protective equipment), section 13 (disposal instructions)

SECTION 7: Handling and storage

7.1. 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.

7.2. 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.

7.3. Specific end use(s)

- See section 1 for recommended use.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Components	Occupational Exposure	ACGIH regulations	Biological limit values	DNEL/DMEL	PNEC-Values
1,3-Butadiene	2.2 mg/m3 TWA; 1 ppm TWA	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	No data available	No data available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

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

8.2.2. Individual protection measures, such as personal protective equipment

○ Eye/face protection

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

○ Skin protection

(i) Hand protection

- Wear chemical safety gloves.

(ii) Other

- No data available

○ Respiratory protection

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

○ Thermal hazards

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

8.2.3. Environmental exposure controls

- Ensure not to cause envirionmental pollution by discharging into rivers or other waterways.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Property name	Values	Source
Physical state	Gas; Liquefied Gas	
Colour	colourless	HSDB
Odour	Do not attempt to smell the product as it is hazardous.	HSDB
Melting point/freezing point	-109℃	ChemIDplus
Initial boiling point and boiling range(℃)	-4 ℃	ChemIDplus
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
Flash point(℃)	-76 ℃	ICSC
Auto ignition temperature	414℃	ICSC
Decomposition temperature	Decomposition Energy : -2541.5 K (kJ/mol)	HSDB
pH	No data available	
Kinematic viscosity(㎟/s, 40℃)	0.00754 cP (Liquid, - 40℃)	HSDB
Solubility	735mg/L (20℃)	NICS
Partition coefficient(n-octanol/water)	logPow 1.99	HSDB
Vapour pressure	255 ㎪ (20℃)	ECHA
Density/Relative density	0.61 g/㎤ (25℃)	KISChem
Relative Vapour density	1.87 (Air = 1.0)	HSDB
Particle characteristics	Not applicable	
Specific gravity	0.6 (Water=1)	ICSC

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Property name	Values	Source
Flammable gases	Flash point : -76℃, Initial boiling point and boiling range : -4℃	

9.2.2. Other safety characteristics

- No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

- 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.

10.2. Chemical stability

- 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.

10.3. 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.

10.4. Conditions to avoid

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

10.5. Incompatible materials

- Combustibles, reducing material.

10.6. Hazardous decomposition products

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

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

○ Acute toxicity

- Acute toxicity(Oral)
  - LD50 5480 mg/kg Test 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

- No irritation was observed as a result of severe eye damage/irritation test using rabbits.

○ Respiratory sensitization

- No data available

○ Skin sensitization

- No data available

○ Carcinogenicity

- EU-CLP Classifications (Category 1A)

1 (IARC)

K (NTP)

A2 (ACGHI)

Specially Controlled Substances (Occupational Safety and Health Act)

1A (Notification of Ministry of Employment and Labor)

1A (EU CLP)

○ Germ cell mutagenicity

- EU-CLP Classifications (Category 1B)

Results of reversion mutation test using microorganisms OECD TG 471, chromosomal abnormality test results using mammalian cultured cells. OECD TG 473 positive with or without metabolic activation system. Test resultOECD TG 474 positive

○ Reproductive toxicity

- No adverse effects were observed as a result of a reproductive toxicity test using rats (NOAEC=13,276 mg/m3) (OECD Guideline 421, GLP) No adverse effects were observed as a result of a developmental toxicity/teratogenicity test using rats (NOEC=2212 mg/m3)) (EU Method B.31)

○ Specific target organ toxicity single exposure

- Eye, nasal, larynx, and lung irritation accompanied by coughing in humans

○ Specific target organ toxicity repeated exposure

- 103 week inhalation carcinogenicity study using rats OECD TG 453, GLP, Result: Increased heart weight and intrarenal tubular degenerative nephropathy were observed in the 8000ppm, 17701 mg/m3 concentration group, NOAEC=1000 ppm2212 mg/m3 Target organs: ovary, testis , bone marrow

○ Aspiration hazard

- No data available

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

- 1,3-Butadiene

  Not applicable

11.2.2. Other information

- 1,3-Butadiene

  No other hazards have been identified

SECTION 12: Ecological information

12.1. Toxicity

- Fish

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

- Crustaceans

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

- Aquatic algae

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

12.2. Persistence and degradability

- Degradability

  No data available

- Biodegradation

  No data available

12.3. Bioaccumulative potential

- n-octanol water partition coefficient

  1.99 log Kow

- Bioconcentration factor(BCF)

  No data available

12.4. Mobility in soil

No data available

12.5. Result of PBT and vPvB assessment

Not applicable

12.6. Endocrine disrupting properties

Not applicable

12.7. Other adverse effects

Not applicable

SECTION 13: Disposal considerations

13.1. Waste treatment methods

13.1.1. Product / Packaging disposal

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

○ Waste codes / waste designations according to LoW

- No data available

13.1.2. Waste treatment-relevant information

- Disposal according to local regulations.

13.1.3. Sewage disposal-relevant information

- Disposal according to local regulations and avoid release to the environment.

13.1.4. Other disposal recommendations

- No data available

SECTION 14: Transport information

14.1. UN number or ID number : 1010

14.2. UN proper shipping name : BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40 % butadienes

14.3. Transport hazard class(es) : 2.1

14.4. Packing group : Not applicable

14.5. Environmental hazards : No

14.6. Special precautions for user :

Emergency measures in case of fire : F-D

Emergency measures in the effluent : S-U

14.7. Maritime transport in bulk according to IMO instruments :

Not applicable

- 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

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU regulations

- EU - REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances

- 1,3-Butadiene : Use restricted. See item 28. (D); Use restricted. See item 29. (D); Use restricted. See item 75. (D, U)

- EU - REACH (1907/2006) - Annex XIV - Substances Subject to Authorization

- 1,3-Butadiene : Not applicable

15.1.2. Other EU regulations

- EU - Persistent Organic Pollutants (POPs) (2019/1021) - Annex III - Substances Subject to Release Reduction Provisions

- Not applicable

- EU - Persistent Organic Pollutants (POPs) (2019/1021) - Annex I - Substances Subject to Prohibitions

- Not applicable

- EU - Persistent Organic Pollutants (POPs) (2019/1021) - Annex IV - Waste Management - Concentration Limits

- Not applicable

- EU - Persistent Organic Pollutants (POPs) (2019/1021) -Annex V-Waste Management-Maximum Concentration Limits

- Not applicable

- EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) - Annex II A - WB Phase 1 - VOCs

- Not applicable

- EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) - Annex II A - WB Phase 2 - VOCs

- Not applicable

- EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) - Annex II B - Vehicles - VOCs

- Not applicable

- EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) - Annex II A - SB Phase 1 - VOCs

- Not applicable

- EU - Paints, Varnishes, Vehicle Refinishing Products (2004/42/CE) - Annex II A - SB Phase 2 - VOCs

- Not applicable

- EU - Seveso III Directive (2012/18/EU) - Qualifying Quantities of Dangerous Substances - Lower-Tier

Requirements

- Not applicable

- EU - Seveso III Directive (2012/18/EU) - Qualifying Quantities of Dangerous Substances - Higher-Tier Requirements

- Not applicable

- EU - Export and Import Restrictions (649/2012) - Chemicals Subject to Export Notification Procedure

- Not applicable

- EU - Export and Import Restrictions (649/2012) - Chemicals and Articles Subject to Export Ban

- Not applicable

- EU - Export and Import Restrictions (649/2012) - Chemicals Subject to the PIC Procedure under the Rotterdam Convention

- Not applicable

- EU - Export and Import Restrictions (649/2012) - Chemicals Qualifying for PIC Notification

- Not applicable

15.2. Chemical safety assessment

- A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

16.1. Key literature references and sources for data

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

16.2. Issuing date : 26-12-2022

16.3. Indication of changes

- Revision number : 3-1
- Revision date : 01-06-2026

16.4. Abbreviations and acronyms

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

For explanation of abbreviations see section 16.

• This substance/mixture contain(s) only ingredients which have been registered, or are exempt from registration, according to Regulation (EC) No. 1907/2006 (REACH).

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
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