



# Material Safety Data Sheet (MSDS)

<b>Product</b>	<b>2,3-Butanediol</b>		
<b>CAS No.</b>	<b>Date of preparation</b>	<b>Date of preparation</b>	<b>Department of Team</b>
513-85-9	2016-08-30	2019-09-20	Safety / Health Planning Team

## 1. IDENTIFICATION

### A. Product name

- 2,3-Butanediol [PD1155]

### B. Recommended use and restriction on use

- General use : Cosmetic and personal care product, Fertilizer
- Restriction on use : Not available

### C. Manufacturer / Supplier / Distributor information

- Company name : GS Caltex Corporation
- Address : 508 Nonhyun-ro, Gangnam-gu, Seoul, Korea
- Telephone number : 1544-5151
- Emergency telephone number : 1544-5151
- Fax number : 02-565-5168

## 2. HAZARD IDENTIFICATION

### A. GHS Classification

- Not applicable

### B. GHS label elements

- Hazard symbols**
  - Not applicable
- Signal words**
  - Not applicable
- Hazard statements**
  - Not applicable
- Precautionary statements**
  - 1) Prevention**
    - Not applicable
  - 2) Response**
    - Not applicable
  - 3) Storage**
    - Not applicable
  - 4) Disposal**
    - Not applicable

### C. Other hazards which do not result in classification : (NFPA Classification)

- NFPA grade (0 ~ 4 level)**
  - Health : 0, Flammability : 1, Reactivity : 0

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
2,3-Butanediol	2,3-Dihydroxybutane; 2,3-Butylene glycol	513-85-9	>99.9
Water	Dihydrogen oxide ; Oxidane	7732-18-5	<0.1

#### 4. FIRST AID MEASURES

##### A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.

##### B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.

##### C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.

##### D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.

##### E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

##### F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

#### 5. FIREFIGHTING MEASURES

##### A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

##### B. Specific hazards arising from the chemical

- The product is not flammable.
- Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

##### C. Special protective actions for firefighters

- Notify your local firestation and inform the location of the fire and characteristics hazard.
- Avoid inhalation of materials or combustion by-products.
- Do not access if the tank on fire.
- Use appropriate extinguishing measure suitable for surrounding fire.
- Wear appropriate protective equipment.
- Keep containers cool with water spray.
- Vapor or gas is burned at distant ignition sources can be spread quickly.

#### 6. ACCIDENTAL RELEASE MEASURES

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

- Wear proper personal protective apparatus as indicated in Section 8 and avoid skin contact and inhalation.
- Ventilate closed spaces before entering.
- Must work against the wind, let the upwind people to evacuate.
- Move container to safe area from the leak area.
- Do not direct water at spill or source of leak.

## B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

## C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.
- Small leak: sand or other non-combustible material, please let use absorption.
- Wipe off the solvent.
- Dike for later disposal.

## 7. HANDLING AND STORAGE

### A. Precautions for safe handling

- Since emptied containers retain product residue(vapor, liquid, solid) follow all MSDS and label warnings even after container is emptied.
- Avoid contact with incompatible materials.
- Get the manual before use.
- Do not handle until all safety precautions have been read and understood.
- Do not inhale the steam prolonged or repeated.

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

- Check regularly for leaks.
- Do not use damaged containers.
- Do not apply any physical shock to container.
- Keep in the original container.
- Keep sealed when not in use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### A. Exposure limits

- **ACGIH TLV**
  - [2,3-Butanediol] : Not available
  - [Water] : Not available
- **OSHA PEL**
  - [2,3-Butanediol] : Not applicable
  - [Water] : Not applicable

### B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

### C. Individual protection measures, such as personal protective equipment

- **Respiratory protection**
  - Under conditions of heavy exposure, Respiratory protection may be needed.
  - Respiratory protection is ranked in order from minimum to maximum.
  - Consider warning properties before use.
  - Any chemical cartridge respirator with organic vapor cartridge(s).
  - Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
  - Any air-purifying respirator with a full facepiece and an organic vapor canister.
  - For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- **Eye protection**
  - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

- Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Hand protection**
  - Wear appropriate glove.
- Skin protection**
  - Wear appropriate clothing.
- Others**
  - Not available

## 9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid
- Color	<10 (APHA)
B. Odor	Odorless
C. Odor threshold	Not available
D. pH	5.0~7.5
E. Melting point/Freezing point	13 °C
F. Initial Boiling Point/Boiling Ranges	181 °C @101.3 kPa
G. Flash point	96 °C CC
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not relevant
J. Upper/Lower Flammability or explosive limits	11.4/3.1
K. Vapour pressure	36.7 Pa @ 25°C
L. Solubility	531 g/l water @ 20°C
M. Vapour density	3.1 ((Air=1))
N. Specific gravity(Relative density)	1.002 @ 20°C
O. Partition coefficient of n-octanol/water	log Pow = -0.81±0.03
P. Autoignition temperature	402°C
Q. Decomposition temperature	Not available
R. Viscosity	128.6 mPa s @ 25°C, 40.1 mPa s @ 40°C
S. Molecular weight	90.12

## 10. STABILITY AND REACTIVITY

### A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

### B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

### C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces

### D. Incompatible materials

- Not available

### E. Hazardous decomposition products

- Not available

## 11. TOXICOLOGICAL INFORMATION

### A. Information on the likely routes of exposure

- (Respiratory tracts)
  - Not available
- (Oral)

- Not available
- **(Eye-Skin)**
- Not available

## B. Delayed and immediate effects and also chronic effects from short and long term exposure

- **Acute toxicity**
  - \* **Oral**
    - [2,3-Butanediol] : : LD<sub>50</sub> >5000 mg/kg, Oral, Rat Read-across data
    - [Water] : LD<sub>50</sub> > 90000 mg/kg Rat (KOSHA)
  - \* **Dermal**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
  - \* **Inhalation**
    - [2,3-Butanediol] : LC<sub>50</sub> >0.85 mg/l, Inhalation, Rat Read-across data
    - [Water] : Not available
- **Skin corrosion/irritation**
  - Not irritating., Based on available data the classification criteria are not met. Cell Viability 89.8% (OECD 439)
- **Serious eye damage/irritation**
  - Cell Viability 85.15% (OECD 492) Not irritating. Based on available data the classification criteria are not met.
- **Respiratory sensitization**
  - Not available
- **Skin sensitization**
  - Guinea pig maximization test (GPMT) - Guinea pig: Not sensitising. (OECD 406) Read-across data. Based on available data the classification criteria are not met.
- **Carcinogenicity**
  - \* **IARC**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
  - \* **OSHA**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
  - \* **ACGIH**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
  - \* **NTP**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
  - \* **EU CLP**
    - [2,3-Butanediol] : Not available
    - [Water] : Not available
- **Germ cell mutagenicity**
  - Bacterial reverse mutation test: Negative. Chromosome aberration: Negative. Gene mutation: Negative. Based on available data the classification criteria are not met.
- **Reproductive toxicity**
  - Two-generation study - NOAEL 5000 mg/kg/day, Oral, Rat F1 Read-across data. Conclusive data but not sufficient for classification. Fetotoxicity: - NOAEL: 2500 mg/kg/day, Oral, Rat Read-across data.
- **STOT-single exposure**
  - Not available
- **STOT-repeated exposure**
  - NOAEL 5000 mg/kg/day, Oral, Rat Read-across data. Conclusive data but not sufficient for classification.
- **Aspiration hazard**
  - Not available

## A. Ecotoxicity

- **Fish**
  - [2,3-Butanediol] : LC<sub>50</sub>, 96 hours: 2830 mg/l, Fish (QSAR)
  - [Water] : Not available
- **Algae**
  - [2,3-Butanediol] : NOEC, 72 hours: >100 mg/l, Pseudokirchneriella subcapitata
  - [Water] : Not available
- **Aquatic invertebrates**
  - [2,3-Butanediol] : EC<sub>50</sub>, 48 hours: > 100 mg/l, Daphnia magna Read-across data.  
EC<sub>50</sub>, 30 minutes: > 1000 mg/l, Activated sludge (OECD 209), Read-across data.
  - [Water] : Not available

## B. Persistence and degradability

- **Persistence**
  - [2,3-Butanediol] : Not available
  - [Water] : Not available
- **Degradability**
  - [2,3-Butanediol] : Not available
  - [Water] : Not available

## C. Bioaccumulative potential

- **Bioaccumulative potential**
  - [2,3-Butanediol] : Bioaccumulation is unlikely. log Pow: -0.81±0.03
  - [Water] : Not available
- **Biodegradation**
  - [2,3-Butanediol] : Water - Degradation 85.8 %: 28 days, The substance is readily biodegradable.
  - [Water] : Not available

## D. Mobility in soil

- [2,3-Butanediol] : Expected to have a low potential for adsorption. Endpoint waived according to REACH Annex VII, IX or XI. 70.2 mN/m @ 20°C
- [Water] : Not available

## E. Other adverse effects

- Not available

## 13. DISPOSAL CONSIDERATIONS

### A. Disposal methods

- Since more than two kinds of designated waste is mixed, it is difficult to treat separately, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.

### B. Special precautions for disposal

- The user of this product must dispose by oneself or entrust it to a waste disposer, a person who recycles other's waste or establishes and operates waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

## 14. TRANSPORT INFORMATION

### A. UN No. (IMDG CODE/IATA DGR)

- Not applicable

### B. Proper shipping name

- Not applicable

### C. Hazard Class

- Not applicable

**D. IMDG CODE/IATA DGR Packing group**

- Not applicable

**E. Marine pollutant**

- Not applicable

**F. Special precautions for user related to transport or transportation measures**

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : Not available
- EmS SPILLAGE SCHEDULE : Not available
- ADR/RID, AND, IMDG, ICAO/IATA : Not restricted

**15. REGULATORY INFORMATION****A. National and/or international regulatory information**

- POPs Management Law**
  - [2,3-Butanediol] : Not applicable
  - [Water] : Not applicable
- Information of EU Classification**
  - \* **Classification**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
- U.S. Federal regulations**
  - \* **OSHA PROCESS SAFETY (29CFR1910.119)**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
  - \* **CERCLA Section 103 (40CFR302.4)**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
  - \* **EPCRA Section 302 (40CFR355.30)**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
  - \* **EPCRA Section 304 (40CFR355.40)**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
  - \* **EPCRA Section 313 (40CFR372.65)**
    - [2,3-Butanediol] : Not applicable
    - [Water] : Not applicable
- Rotterdam Convention listed ingredients**
  - [2,3-Butanediol] : Not applicable
  - [Water] : Not applicable
- Stockholm Convention listed ingredients**
  - [2,3-Butanediol] : Not applicable
  - [Water] : Not applicable
- Montreal Protocol listed ingredients**
  - [2,3-Butanediol] : Not applicable
  - [Water] : Not applicable

**16. OTHER INFORMATION****A. Reference**

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

**B. Issue date**

- 2016-08-30

**C. Revision number and Last date revised**

- 2nd, 2019-09-20

**D. Other**

- This SDS is prepared according to the Globally Harmonized System (GHS).