

1,4 BUTANEDIOL

Gen. Variant: SDS_TW

Version 1.3

Revision Date 2017-04-17

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SDS No.: BE177

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Trade name : 1,4 BUTANEDIOL
CAS Number: : 110-63-4
Chemical characterization : Glycols
Chemical name : 1,4-Butanediol
Synonyms : Tetra Methylene Glycol, BDO

Identified uses : Monomer; Intermediate

Prohibited uses : Cosmetics; Toiletries; Personal care products; Applications involving human consumption; Coatings on toys

The manufacturer, importer or supplier's name, address and telephone number

Company Address

LyondellBasell Taiwan Co., Ltd.
7F-6, #101, Fu Hsiung North Road, Taipei,
Taiwan

Company Telephone

(Tel) 02-7707-9000
(Fax) 02-8770-1122
product.safety@lyb.com

Emergency telephone number

(886) 933 635 556 Taiwan

E-mail address : product.safety@lyb.com

Responsible/issuing person

2. HAZARDS IDENTIFICATION**GHS-Classification**

Acute toxicity; Oral

Category 4

Specific target organ systemic toxicity - single exposure

Category 3

GHS-Labeling

Symbol(s)



Signal word

: Warning

Hazard Statements

: H302
H336

Harmful if swallowed.

May cause drowsiness or dizziness.

Precautionary Statements

: **Prevention:**

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- P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

Storage:

- P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Other hazards

No additional information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS**Substances****Ingredients**

Chemical name	CAS-No. EC-No.	<u>Weight %</u>	Component Type
1,4-Butanediol	110-63-4	>= 99.5 %	A

Key:
(A) Substance

4. FIRST AID MEASURES

General advice : Harmful by ingestion.
Ingestion may cause CNS depression (drowsiness and

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dizziness) and respiratory failure.

Vapors may cause drowsiness and dizziness.

Always observe self-protection methods

Move out of dangerous area.

If you feel unwell, seek medical advice (show the label where possible).

Show this material safety data sheet to the doctor in attendance.

If inhaled

: If symptoms are experienced, move victim to fresh air.
Give oxygen or artificial respiration as needed.
Obtain emergency medical attention.
Prompt action is essential.

In case of skin contact

: Wash off immediately with soap and plenty of water.
Remove contaminated clothing and wash skin with plenty of soap and water.
Flush with lukewarm water for 15 minutes.
Seek medical attention if ill effect or irritation develops.

In case of eye contact

: Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
If eye irritation persists: Get medical advice/ attention.

If swallowed

: If victim is drowsy or unconscious, place on the left side with head down.
If victim is conscious and able to swallow, have victim drink water to dilute. Never give anything by mouth if victim is unconscious or having convulsions. Induce vomiting only if advised by a physician or Poison Control Center. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY!
If vomiting does occur, have victim lean forward to reduce risk of aspiration.
Prompt action is essential.

Notes to physician

Symptoms

: Accidental or intentional ingestion can cause depressed respiratory rates, vomiting, seizures, unconsciousness and death.

Hazards

: Harmful if swallowed.
May cause drowsiness or dizziness.
1,4-Butanediol (BDO) is rapidly absorbed and metabolized to

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gamma-hydroxybutyrate (GHB) which is thought to produce the neurotoxic effects of BDO. BDO can competitively inhibit the enzyme that metabolizes alcohol, hence combined exposures may increase the toxic effects of alcohol and delay and prolong the toxicity of BDO.

Treatment : Treat symptomatically.
Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam
LARGE FIRE: Use water spray, water fog or alcohol-resistant foam

Unsuitable extinguishing media : Do not use solid water stream - may spread fire.

Specific hazards during fire fighting : Heat from fire can generate flammable vapor.
When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.
Vapors may be heavier than air.
May travel long distances along the ground before igniting and flashing back to vapor source.
Fine sprays/mists may be combustible at temperatures below normal flash point.
Fight fire from a safe distance/protected location.
Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries.
Use water spray/fog for cooling.
Avoid frothing/steam explosion.
Burning liquid may float on water.
Although water soluble, may not be practical to extinguish fire by water dilution.
Notify authorities immediately if liquid enters sewer/public waters.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for fire-fighters : Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear.
Structural firefighter's protective clothing will only provide limited protection.

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6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
- Environmental precautions : An authoritative evaluation of environmental exposure and risk indicates that no special risk management practices are needed to control environmental release.
- Methods for containment /
Methods for cleaning up : May contaminate water supplies/pollute public waters.
Soak up small spills with inert solids.
Do not touch or walk through spilled material.
Slippery walking/spread granular cover or soak up.
Evacuate/limit access.
Equip responders with proper protection.
Prevent flow to sewer/public waters.
Stop release.
Notify fire and environmental authorities.
Restrict water use for cleanup.
Impound and recover large land spill.
Soak up small spill with inert solids; use suitable disposal containers.
May biodegrade.
Contain/collect rapidly to minimize dispersion.
Disperse residue to reduce aquatic harm.
Report per regulatory requirements.

7. Handling and storage**Precautions for safe handling**

- Advice on safe handling : Wear recommended personal protective equipment.
Use in a well-ventilated area.
Keep container tightly closed when not in use.
Store in a warm location (25° -30°C)/(77-86°F) to assist in emptying containers.
If direct heat is applied to improve material flow, use care to avoid localized overheating and possible product degradation and container overpressure.
Keep floor around container free of spilled product to prevent highly viscous material from sticking to and contaminating shoes.

Conditions for safe storage, including any incompatibilities

- Requirements for storage : Store in a warm location (25° -30°C)/(77-86°F) to assist in

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areas and containers

emptying containers.

Store in stainless steel or lined carbon steel containers.

Specific end use(s)

: See Section 1.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Control parameters****Ingredients with workplace control parameters**

Consult local authorities for acceptable exposure limits.

Exposure controls**Engineering measures**

General room or local exhaust ventilation is usually required to meet exposure limit(s).

Personal protective equipment

Respiratory protection : No occupational exposure limits have been developed for this material.
Where exposure through inhalation may occur from use, approved respiratory protection equipment is recommended.

Hand protection : Wear chemical resistant gloves such as:
Butyl rubber.
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye and face protection : Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor.
Safety glasses are the minimum requirements.

Skin and body protection : Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn.
The equipment must be cleaned thoroughly after each use.

Hygiene measures : Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the

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hazards and/or potential hazards that may be encountered during use.
Wash hands before eating, drinking, smoking, or using toilet facilities.
Take off contaminated clothing and wash before reuse.
Shower after work using plenty of soap and water.
Use good personal hygiene practices.
Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: liquid at > 20 °C
Color	: Clear, colorless.
Odor	: Little or no odor.
Odor Threshold	: No value available.
Flash point	: > 115 °C at 1,013 hPa (760 mm Hg) Method: closed cup
Lower explosion limit	: 1.9 vol%
Upper explosion limit	: 13.2 vol%
Flammability (solid, gas)	: Not applicable
Oxidizing properties	: Not considered an oxidizing agent.
Autoignition temperature	: 385 °C at 1,013 hPa
Decomposition temperature	: not determined
Melting point/range	: 20.4 °C at 1,013 hPa
Boiling point/boiling range	: 230 °C at 1,013 hPa
Vapor pressure	: 0.014 hPa at 25 °C
Density	: 1.02 g/cm ³ at 20 °C Relative

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Water solubility	: > 100 g/l Miscible in water.
Partition coefficient: n-octanol/water	: log Pow: -0.88 at 25 °C
Viscosity, kinematic	: 83.2 mm ² /s at 20 °C
Relative vapor density	: ~ 3.2 at 15 - 20 °C (Air = 1.0)
Explosive properties	: Not considered explosive
Other Information	: No additional information available.

10. STABILITY AND REACTIVITY

Reactivity	: Not classified as a reactivity hazard.
Chemical stability	: Stable under recommended storage conditions.
Hazardous reactions	: Not expected to occur.
Conditions to avoid	: Heat, sparks, open flame, other ignition sources, and oxidizing conditions.
Materials to avoid	: Strong oxidizers such as hydrogen peroxide, nitric acid, sulphuric acid, etc.
Hazardous decomposition products	: Not expected to decompose under normal conditions.
Thermal decomposition	: Thermal decomposition may produce carbon monoxide and other toxic vapors.

11. TOXICOLOGICAL INFORMATION

Product Summary	: The below given information is based on the assessment of the product including impurities.
Acute toxicity	
Acute oral toxicity	: Classified Harmful if swallowed.
	: LD50 (Oral): 1,500 mg/kg Species: Rat

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Acute inhalation toxicity : Based on acute toxicity values, not classified.

: LC50 (Inhl): > 5.1 mg/l
Exposure time: 4 HOURS
Species: Rat

Acute dermal toxicity : Based on acute toxicity values, not classified.

: LD50 (Skin): > 2,000 mg/kg
Species: Rat

Skin corrosion/irritation : Based on skin irritation values, not classified.

Serious eye damage/eye irritation : Based on eye irritation values, not classified.

Respiratory or skin sensitization : Skin sensitization
Not classified
No adverse effect observed.

: Respiratory sensitization
Not classified
No study available.

Chronic toxicity

Carcinogenicity : Not classified
No adverse effect observed.

Germ cell mutagenicity : Not classified
No adverse effect observed.

Reproductive toxicity

Effects on fertility / : Not classified
Effects on or via lactation : No adverse effect observed.

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure : Classified, May cause drowsiness or dizziness.

: Exposure routes: Inhalation
Target Organs: Central nervous system

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Target Organ Systemic Toxicant - Repeated exposure	: Based on repeated exposure toxicity values, not classified.
Aspiration hazard	: Based on physico-chemical values or lack of human evidence, not classified.
Further information	: 1,4-Butanediol is rapidly absorbed and metabolized to gamma-hydroxybutyrate (GHB) which is thought to produce the neurotoxic effects of 1,4-Butanediol.

12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

Toxicity to fish	: Low acute toxicity to fish
Toxicity to daphnia and other aquatic invertebrates	: Low acute toxicity to aquatic invertebrates.
Toxicity to algae	: Low toxicity to algae.
Toxicity to bacteria	: Low toxicity to sewage microbes.
Toxicity to fish (Chronic toxicity)	: Low chronic toxicity to fish.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: Low chronic toxicity to aquatic invertebrates.

Elimination information (persistence and degradability)

Bioaccumulation	: This material is not expected to bioaccumulate.
	: Bioconcentration factor (BCF): 3.16 (QSAR calculated value)
Distribution among	: Stability in soil

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environmental compartments

no data available
Low absorption to soil particulates predicted (QSAR calculated value)

: Stability in water
Hydrolytically stable.
Stable at pH 4, 7 and 9 @ 25C

**Additional advice
Environmental fate and pathways**

: No additional information available.

Biodegradability

: Rapidly degradable.

: > 60 %
Testing period: 7 d

Further information on ecology**Ecotoxicology Assessment**

Acute aquatic toxicity : Based on acute aquatic toxicity values, not classified.

Chronic aquatic toxicity : Not classified, based on readily biodegradability and low acute toxicity.

Results of PBT assessment

Not applicable.

Additional ecological information

: No additional information available.

13. Disposal considerations**Waste treatment methods**

Product : The product should not be allowed to enter drains, water courses or the soil.
Dispose of as hazardous waste in compliance with local and national regulations.
Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes.
Comply with applicable local, state or international regulations concerning solid or hazardous waste disposal and/or container disposal.

14. TRANSPORT INFORMATION

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BLG (MARPOL Annex II)

Description of the goods : BUTYLENE GLYCOL
Pollution category : Z
Ship type : 3

15. REGULATORY INFORMATION**Toxic Chemical Substances Control Act**

Not relevant

Taiwan - Labor Safety & Health Law**Taiwan - Traffic Regulation****Other international regulations****Global Inventory Status**

The ingredients of this product are compliant with the following chemical inventory requirements or exemptions.

*Additional Explanatory Status Statements follow the table, as necessary.

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Canada	DSL	Compliant
China	IECSC	Compliant
Europe	REACH	See REACH Compliance Statement
Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
United States of America	TSCA	Compliant
Taiwan	TCSCA	Compliant

REACH status

If the product has been purchased from any company of the LyondellBasell group of companies registered in the European Union, we confirm that the chemical substance in this product has been pre-registered or, where required under REACH, registered, and that we have the intention to proceed with any required registration in accordance with the deadlines set forth in REACH. (Regulation (EU) No. 1907/2006)

Contact product.safety@lyb.com for additional global inventory information.

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16. OTHER INFORMATION**Material safety datasheet sections which have been updated:**

Revised Section(s): 1 4 7 16 April 12 2017

SDS Preparation Date: 2017-04-17**SDS Prepared by:** LyondellBasell Taiwan Co., Ltd., HSE Department, 7F-6, #101, Fu Hsiung North Road, Taipei, Taiwan, (Tel) 02-7707-9000, (Fax) 02-8770-1122,**SDS Prepared by:** Kevin Kung, Manger Quality Management and Product Stewardship**Version No:** 1.3

Disclaimer

This document is generated for the purpose of distributing health, safety, and environmental data.

Information is correct to the best of our knowledge at the date of the SDS publication.

It is not a specification sheet nor should any displayed data be construed as a specification.

Before using a product sold by a company of the LyondellBasell family of companies, users should make their own independent determination that the product is suitable for the intended use and can be used safely and legally.

SELLER MAKES NO WARRANTY; EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTY) OTHER THAN AS SEPARATELY AGREED TO BY THE PARTIES IN A CONTRACT.

Users should review the applicable Safety Data Sheet before handling the product.

This product(s) may not be used in the manufacture of any of the following, without prior written approval by Seller for each specific product and application:

- (i) U.S. FDA Class I or II Medical Devices; Health Canada Class I, II or III Medical Devices; European Union Class I or II Medical Devices;
- (ii) film, overwrap and/or product packaging that is considered a part or component of one of the aforementioned medical devices;
- (iii) packaging in direct contact with a pharmaceutical active ingredient and/or dosage form that is intended for inhalation, injection, intravenous, nasal, ophthalmic (eye), digestive, or topical (skin) administration;
- (iv) tobacco related products and applications, electronic cigarettes and similar devices.

The product(s) may not be used in:

- (i) U.S. FDA Class III Medical Devices; Health Canada Class IV Medical Devices; European Class III Medical Devices;
- (ii) applications involving permanent implantation into the body;
- (iii) life-sustaining medical applications.

All references to U.S. FDA, Health Canada, and European Union regulations include another country's equivalent regulatory classification.

In addition to the above, LyondellBasell may further prohibit or restrict the use of its products in certain applications. For further information, please contact a LyondellBasell representative.

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Numerical Data Presentation

The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234,56 mg/kg.

Language Translations

The information presented in this document has been translated from English by a vendor LyondellBasell believes to be reliable. LyondellBasell and its vendor have made a good-faith effort to verify the accuracy of the translation, but assume no liability or other responsibility for any errors that may have occurred. Please refer to our web site (www.lyondellbasell.com) for the original document written in English.

End of Material Safety Data Sheet