MATERIAL SAFETY DATA SHEET

(±)1,3-Butylene Glycol

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: (±)1,3-Butylene Glycol

SYNONYM: 1,3-Dihydroxy butane

MOLECULAR FORMULA: $C_4H_{10}O_2$

MOLECULAR WEIGHT: 90.12 g/mol

CONTACT PERSON:

Mr. S.G.Mokashi
Godavari Biorefineries Ltd.
45-47, Somaiya Bhavan
M.G.Road, P.O.Box384
Fort, Mumbai 400001
Tel: 0091 22 22048272
Fax: 0091 22 22047297

CREATION DATE: Mar 02 2007

REVISION DATE: Jan 13 2016

2. HAZARDS IDENTIFICATION

This substance is not classified based on Directive 1272/2008/EC and its amendments (CLP Regulation, GHS).***

Other Hazards: The substance does not meet the criteria for PBT / vPvB according to REACH,
Annex XIII

Classification and labelling (according to Directive 67/548/EWG or 1999/45/EC)

This substance is not classified in Annex I of Directive 67/548/EEC, as amended***

3. COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.	EC No.	Chemical Name	Percent
107-88-0	203-529-7	1,3 Butylene Glycol	>99

4. FIRST AID MEASURES

General Information

Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Inhalation

Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

Skin

Wash off immediately with plenty of water. When symptoms persist or in all cases of doubt seek medical advice

Eyes

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses.
Immediate medical attention is required.

Ingestion

Call a physician immediately. Do not induce vomiting without medical advice.

Main symptoms

Cough

Special hazard

Lung irritation

Notes to physician (Main symptoms)

Treat symptomatically. If ingested, irrigate the stomach using activated charcoal.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media

Foam, Dry chemical, Carbon dioxide (CO2), water spray

Extinguishing media which must not be used for safety reasons

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

Special exposure hazards arising from the substance or preparation itself, its combustion products, or released gases

Under conditions giving incomplete combustion, hazardous gases produced may consist of Carbon monoxide, Carbon dioxide (CO2)

Combustion gases of organic materials must in principle be graded as inhalation poisons***

Vapors are heavier than air and may spread along floors

Special protective equipment for fire fighters

Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Environmental precautions

Dike and collect water used to fight fire. Water run-off can cause environmental damage.

Other Information

Cool containers / tanks with water spray. Keep people away from and upwind of fire

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.

For emergency responders: Personal protections see section 8.

Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

Methods for containment

Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors).

Additional information

Consult trained personnel. Consider the information for "Personal Protection" in chapter 8 of this Safety Data Sheet***

7. HANDLING AND STORAGE

Handling

Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Provide sufficient air exchange and/or exhaust in work rooms.

Advice on safe handling

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Provide sufficient air exchange and/or exhaust in work rooms.

Incompatible products

Keep away from: Strong oxidizing agents

Protection - fire and explosion:

Keep away from sources of ignition - No smoking. Vapours are heavier than air and may spread along floors. Take necessary action to avoid static electricity discharge. In case of fire, emergency cooling with water spray should be available

Reduce the release of the substance or mixture to the environment See Section 8: Environmental exposure controls

Temperature class

T2

Storage

Material storage

Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Keep at temperatures between 15 and 27 °C (60 and 80 °F).

Incompatible products

Keep away from: Strong oxidizing agents

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

DNEL & PNEC
1,3-Butylene glycol (Butane-1,3-diol), CAS: 107-88-0
General population ***
DN (M) EL - long-term exposure - systemic effects – Oral 25-mg/kg bw/day

Environment ***	
PNEC aqua - freshwater	0.85 mg/l
PNEC aqua - marine water	0.085 mg/l
PNEC aqua - intermittent releases	2 mg/l
PNEC STP	10 mg/l
PNEC sediment - freshwater	1.78 mg/kg
PNEC sediment - marine water	0.178 mg/l
PNEC soil	0.13 mg/kg

Engineering measures

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General advice

Avoid contact with skin, eyes and clothing. Do not breathe vapors or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection

Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Equipment should conform to EN 166

Skin protection

Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Hand protection

Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Chemicals resistant gloves

Suitable material	: Nitrile-rubber
Evaluation	: according to EN 374: level 6
Material thickness	: approx. 0.55 mm
Break through time	: approx. 360 min

Suitable material	: Polyvinyl Chloride/ Nitrile rubber
Evaluation	: according to EN 374: level 3
Material thickness	: approx. 0.9 mm
Break through time	: approx. 360 min

The times listed are suggested by measurements taken at 22 °C and constant contact. Temperatures raised by warmed substances, body heat, etc. and a weakening of the effective layer thickness caused by expansion can lead to a significantly shorter breakthrough time. In case of doubt contact the gloves'
manufacturer. A 1.5-times increase / decrease in the layer thickness doubles / halves the breakthrough time. This data only applies to the pure substance. Transferred to mixtures of substances, these figures should only be taken as an aid to orientation.

Environmental exposure controls

If possible use in closed systems. If leakage cannot be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

Environmental Precautions

Should not be released into the environment

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Colour:	Colourless
Odour:	No Significant odour
Flash point:	108 °C - Closed cup
Auto-ignition temperature:	410 °C @ 1013 hPa

Lower explosion limit: 1.9 VOL %

Upper explosion limit: 12.6 VOL %

Melting point/Freezing Point: -57 °C

Boiling point/range: 203 – 204 °C

Refractive index: 1.440 @ 20 °C

Viscosity: No Data Available

pH: 6.0 – 7.0 @ 20 °C

Water solubility: Miscible

log Pow: No Data Available

Vapour density: No Data Available

Surface tension: No Data Available

Vapour Pressure:

Values [hPa]	@ C	@ F
<1	20	68
1.8	50	122

Density:

Values [g/cm]	@ C	@ F	Method
1,0035	20	68	DIN51757

Remark:

Hygroscopic

10. STABILITY AND REACTIVITY

Chemical Stability

Stable under recommended storage conditions

Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition

Incompatible Materials

Keep away from Strong oxidizing agents

Hazardous decomposition products

No decomposition if stored and applied as directed

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure Inhalation, Eye contact, Skin contact, Ingestion

1,3-Butylene glycol (Butane-1,3-diol) (107-88-0)

Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	22800 mg/kg	rat, male	
Inhalative	LC0	290 mg/m^3	rat, male	OECD 403

Irritation and corrosion
(Butane-1,3-diol) (107-88-0)

Target Organ Effects	Species	Result	Method
Skin	rabbit	No skin irritation	
Eyes	rabbit	Mild eye irritation	

Sensitization
(Butane-1,3-diol) (107-88-0)

Target Organ Effects	Species	Evaluation	Method
Skin	Human	experience not sensitizing	Patch-test

Subacute, subchronic and prolonged toxicity
(Butane-1,3-diol) (107-88-0)

Type	Dose	Species	Method	
Chronic toxicity	NOAEL: 5000 mg/kg/d	rat, male/female	Oral	two-year

Carcinogenicity, Mutagenicity, Reproductive toxicity (Butane-1,3-diol) (107-88-0)

Type	**Dose**	**Species**	**Evaluation**	**Method**	
Mutagenicity		Rat, male/female	Negative		In vivo

Reproductive Toxicity	LOAEL 12000 mg/kg/d	Rat		Oral	
Reproductive Toxicity	NOAEL 5000 mg/kg/d	Rat		Oral	
Developmental Toxicity	NOAEL 2500 mg/kg/d	Rat		Oral	Maternal toxicity
Developmental Toxicity	NOAEL 12000 mg/kg/d	Rat		Oral	Teratogenicity
Developmental Toxicity	LOAEL 5000 mg/kg/d	Rat		Oral	Fetal toxicity
Developmental Toxicity	NOAEL 2500 mg/kg/d	Rat		Oral	Fetal toxicity
Carcinogenicity	NOAEL 5000 Mg/kg/d	Rat		Oral	

Main symptoms
Cough

Note
Handle in accordance with good industrial hygiene and safety practice

12. ECOLOGICAL INFORMATION

Acute aquatic toxicity

Species	Exposure Time	Dose	Method
Daphnia magna (Water flea)	48H	EC50: > 1000 mg/l	OECD202
Desmodesmus subspicatus	72H	EC50: > 1070 mg/l (growth period)	OECD201
Oryzias latipes (Medaka)	96H	LC50: > 100 mg/l	OECD203
Activated sludge (bacteriae)	3H	EC20: > 100 mg/l	OECD 209

Long term toxicity

Type	Species	Dose	Method
Reproductive toxicity	Daphnia magna (Water flea)	EC50: > 85 mg/l/21d	OECD 202

Biodegradation

81 % (29 d), activated sludge (domestic) aerobic, non-adapted, OECD 301B

PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

Note

Avoid release to the environment

13. DISPOSAL CONSIDERATIONS

Product Information

Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned empty packaging

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

14. TRANSPORT INFORMATION

ADR/RID

UN/ID No.

Proper Shipping Name	1,3 Butylene Glycol
Hazard Class	
Subsidiary Risk	
Classification Code	
Packing group	
Environmentally hazardous	no
Tunnel Restriction Code	
Hazard Label(s)	
Hazard Number	

ADNR

ADNR	Container and Tanker
UN/ID No.	
Proper Shipping Name	1,3 Butylene Glycol
Hazard Class	
Subsidiary Risk	
Classification Code	
Packing group	
Environmentally hazardous	
Hazard Labels	

ICAO/IATA	Non restricted

IMDG

UN/ID No.	
Proper Shipping Name	1,3 Butylene Glycol
Hazard Class	
Subsidiary Risk	
Packing group	
Marine pollutant	
Hazard Labels	
EMS Code	

15. REGULATORY INFORMATION

GHS & CLP

Based on present data no classification and labelling is required according to Directive 1272/2008/EC and its amendments (CLP Regulation, GHS). (See chapter 2)
International Inventories

Listed on the chemical inventories of the following countries or qualifies for an exemption:

Australia (AICS)

Canada (DSL)

China (IECSC) Europe (EINECS) Japan (ENCS) Japan (ISHL) Korea (KECI)

New Zealand (NZIoC) Philippines (PICCS) United States (TSCA)***

16. OTHER INFORMATION

Other Information:

• Observe national and local legal requirement against the previous version are marked by ***

Training advice

Make sure that employees are aware of the hazards / risks as detailed on this Safety Data Sheet. When wearing a breathing apparatus, the need for appropriate training needs to be considered

Sources of key data used to compile the datasheet

Information contained in this safety data sheet is based on data from public sources deemed valid or acceptable. The absence of data elements required by ANSI or 1907/2006/EC indicates that no data meeting these requirements is available***

Abbreviation and Acronym:

ADR = Accord européen sur le transport des marchandises dangereuses par Route (European Agreement

concerning the International Carriage of Dangerous Goods by Road)

CAS = Chemical Abstracts Service (division of the American Chemical Society) CLP = Classification, Labelling and Packaging

DNEL = Derived No Effect Level

EINECS = European Inventory of Existing Commercial Chemical Substances GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC Code = International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk

(IMO)

ICAO = International Civil Aviation Organization

IMDG = International Maritime Code for Dangerous Goods LC50 = Lethal Concentration

LD50 = Lethal Dose

LOAEC = Low Observed Adverse Effect Concentration LOAEL = Low Observed Adverse Effect Level

LOEL = Low Observed Effect Level
MEST = Mouse Ear Swelling Test

NOAEC = No Observed Adverse Effect Concentration NOAEL = No Observed Adverse Effect Level

NOEC = No Observed Effect Concentration NOEL = No Observed Effect Level

PBT = Persistent, Bioaccumulative and Toxic

PNEC = Predicted No Effect Concentration RCR = Risk Characterization Ratio

RID = Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

R-Phrases = Risk Phrases

S-Phrases = Safety Phrases

STOT RE = Specific Target Organ Toxicity Repeated Exposure

STOT SE = Specific Target Organ Toxicity Single Exposure STP = Sewage Treatment Plant

vPvB = very Persistent and very Bioaccumulative***

The information in this safety data sheet is based on data and samples provided. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes.
The safety data sheet offers no quality specification for the substances/preparations/mixtures in question. Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. Godavari Biorefineries Limited does not guarantee the accuracy or exhaustiveness of the information provided.