	MATERIAL SAFETY DATA SHEET	MSDS No.	M-02
BloomchemAG	1,4-BUTANEDIOL	Effective From	03/01/2023

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	1,4 BUTANEDIOL
CAS Number:		110-63-4
Chemical characterization	:	Glycols
Chemical Name	:	1,4-Butanediol
Synonyms		Tetra Methylene Glycol, BDO
REACH No.	:	01-2119471849-20-XXXX

Use of the Substance/Mixture : Manufacture of substances, Formulation & (re)packing of substance and mixtures, Uses in Coatings, Use as binders and release agents, Use in laboratories, Polymer production

Recommended restrictions on use : Cosmetics, Soluble coatings on children's toys

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SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity; Oral	Category 4
Specific target organ systemic toxicity - single exposure; Inhalation Central nervous system	Category 3

GHS Classification Scale (1= severe hazard; 4= slight hazard)

Label elements

Hazard symbols :

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H336 May cause drowsiness or dizziness.

Precautionary Statements : **Prevention**

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

Response

P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P330 Rinse mouth.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.P312 Call a POISON CENTER or doctor/ physician if you feel unwell.

Storage

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

Other hazards

Hazards Not Otherwise Classified (HNOC)
1,4 Butanediol can competitively inhibit the enzyme that metabolizes alcohol, hence combined exposures may increase the toxic effects of alcohol, and delay or prolong thetoxicity of 1,4-butanediol.

SECTION 3. Composition/informationon ingredients Substances

Chemical nature : Substance

Ingredients

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

Key:
(A) Substance

SECTION 4. FIRST AID MEASURES

First aid procedures

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

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 doctorin 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 plentyof 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 sidewith 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 ControlCenter. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMMEDIATELY!
If vomiting does occur, have victim lean forward to reducerisk 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 : 1,4-Butanediol (BDO) is rapidly absorbed and metabolized to 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

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point : > 239 °F (115 °C)
at 1,013 hPa (760 mm Hg)
Method: closed cup

Autoignition temperature : 725 °F (385 °C)
at 1,013 hPa (760 mm Hg)

Lower explosion limit : 1.9 vol%

Upper explosion limit : 13.2 vol%

Fire fighting

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.

Protective equipment and precautions for firefighters

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.

SECTION 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 practicesare 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.

SECTION 7. HANDLING AND STORAGE

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 toavoid 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.

Storage

Requirements for storage areas and containers : Store in a warm location (25° -30°C)/(77-86°F) to assist in emptying containers.
Store in stainless steel or lined carbon steel containers.

Section 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	: When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. 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 contactdue 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 characteristicsof the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encounteredduring 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	:	liquid at > 68 °F (> 20 °C)
Color	:	Clear, colorless.
Odor	:	Little or no odor.

Safety data

Flash point	:	> 239 °F (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)	:	Non-flammable.
Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	725 °F (385 °C) at 1,013 hPa (760 mm Hg)
Decomposition temperature	:	not determined
pH	:	no data available
Melting point/range	:	68.7 °F (20.4 °C) at 1,013 hPa (760 mm Hg)
Boiling point/boiling range	:	446 °F (230 °C) at 1,013 hPa (760 mm Hg)
Vapor pressure	:	0.014 hPa (0.011 mm Hg) at 77 °F (25 °C)
Density	:	1.02 g/cm3 at 68 °F (20 °C) Relative
Water solubility	:	> 100 g/l Miscible in water.
Partition coefficient: n-octanol/water	:	log Pow: -0.88 at 77 °F (25 °C)
Viscosity, kinematic	:	83.2 mm2/s

at 68 °F (20 °C)

Relative vapor density : ~3.2
at 59 - 68 °F (15 - 20 °C)
(Air = 1.0)

Explosive properties : Not explosive

Remarks - Other information : No additional information available.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Stable under recommended storage conditions.

Chemical stability : Stable under recommended storage conditions.

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 : Carbon oxides (CO, CO2)

Thermal decomposition : Thermal decomposition may produce carbon monoxide and other toxic vapors.

Hazardous reactions : Not expected to occur.

SECTION 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

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 : Based on skin sensitization values, not classified.

Chronic toxicity

Carcinogenicity : Not classified
No adverse effect observed.

Germ cell mutagenicity : Not classified
No adverse effect observed.

Reproductive toxicity

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

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure : Routes of exposure: Inhalation
Target Organs: Central nervous system
Classified, May cause drowsiness or dizziness.

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

Ecotoxicology Assessment

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

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

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.

Persistence and degradability

Biodegradability : Rapidly degradable.

: >60%
Testing period: 7 d

Bioaccumulative potential

Bioaccumulation : This material is not expected to bioaccumulate.

: Bioconcentration factor (BCF):
3.16 (QSAR calculated value)

Mobility in soil

Distribution among environmental compartments : Stability in soil
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 : No additional information available.

Environmental fate and pathways

Results of PBT and vPvB assessment

Not applicable.

Other adverse effects

Additional ecological information : No additional information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information : Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes.
Comply with federal, state, or local regulations for disposal.

SECTION 14. TRANSPORT INFORMATION

Not regulated for transport

SECTION 15. REGULATORY INFORMATION

If identified components of this product are listed under the TSCA 12(b) Export Notification rule,they will be listed below.

SARA 302/304

This product contains no known chemicals regulated under SARA 302/304.

SARA 311/312

Based upon available information, this material is classified as the following health and/orphysical hazards according to Section 311 & 312:

Immediate (Acute) Health Hazard.

SARA 313

This product contains no known chemicals regulated under SARA 313.

State Reporting

This material is not known to contain a chemical substance known to the State of California to cause cancer, reproductive, or developmental toxicity under California Proposition 65.

Other international regulations

Global Inventory Status

The ingredients of this product are compliant with the following chemical inventoryrequirements 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

SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 1
Flammability: 1

1 0

Physical hazards: 0

NFPA Classification : Health Hazard: 1
Fire Hazard: 1
Instability: 0

Other Information
NFPA rating scale (0 = minimal hazard; 4 = severe hazard)
HMIS rating scale (0 = minimal hazard; 4 = severe hazard)

Material safety datasheet sections which have been updated:
Updated format ; Revised Section(s): 1 – 03/Jan/23

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