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Company	GENEALL BIOTECHNOLOGY CO., LTD.
Technical Phone	82-2-407-0096
Fax	82-2-407-0779
E-mail Address	geneall@geneall.com

The following MSDS included following products;

Cat. No	Product description
111-150	Exfection™ Plasmid LE mini [50preps]
111-102	Exfection™ Plasmid LE mini [200preps]
111-110	Exfection™ Plasmid LE mini sample [10preps]

GENEALL BIOTECHNOLOGY

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**

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

1.1 Product identifier

Product name	Buffer P1

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

This product is NOT classified as regulated substance and NOT subject to label elements.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms	No data available
Signal word	No data available
Hazardous statements	No data available
Precautionary statements	
Prevention	No data available
Response	No data available
Storage	No data available
Disposal	No data available

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
EDTA, DISODIUM DIHYDRATE	6381-92-6	0.01~0.05
TRIS	77-86-1	0.005~0.01

4. FIRST AID MEASURES

4.1 Description of first aid measures

General informations	Notify doctor/physician about the substance to take necessary actions.
Following eye contact	Immediately flush the eyes with water for minutes. Remove contact lense, if possible. Keep washing. Get medical advice/attention, if symtom persists.
Following skin contact	If the material is hot, immerse or wash the affected area with a large amount of cold water to remove the heat. Get emergency medical attention. Remove contaminated clothing and footwear and isolate contaminated areas. In case of contact with substance, flush the skin immediately with water for at least 20 minutes. In case of minor skin contact, prevent the spread of contamination. If skin irritation occurs, take medical advice or attention. Remove contaminated clothing and wash before reusing.
Following inhalation	If exposed to excessive dust or fumes, remove them with clean air. Seek medical attention, if you experience coughing or other symptoms. Move to an area with fresh air. If breathing has stopped, perform artificial respiration. If breathing is difficult, provide oxygen. Keep the person warm and comfortable.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**

Following ingestion: Get medical advice/attention.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media:
Use alcohol foam, carbon dioxide, or water spray.
Use dry sand or soil for smothering fires.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting:
Highly toxic gases can be generated by pyrolysis or combustion during burning.
If heated, containers may explode.
Some may combust but does not ignite easily.
It's not flammability, but if heated, it may decompose to cause corrosive/toxic fumes.

5.3 Precautions for fire-fighters

Special protective equipment for firefighters:
Wear appropriate protective apparatus.
Extinguish the fire from a safe distance away from the area.
Be aware that it may be transported in a melted form.
Be aware that some may be transported at high temperatures.
Dig a ditch for the disposal of the fire fighting water and keep the material from dispersing.
Move the containers from fire, if not dangerous.
In case of tank fire:
Extinguish it away from maximum distance or use unmanned fire extinguisher.
Keep cooling the container with a large amount of water even after the fire is out.
If there's a high pitched noise or change of color, keep away immediately.
Keep away from the tank covered in flames.
Use unmanned fire extinguishing equipment, and if it's unavailable, just let it burn.

5.4 Further information

No information available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions:
Clean spills and see section 5.3.
Remove all ignition sources.
If it's not dangerous, stop the leak.
Avoid contact without proper protective apparatus.
Cover with plastic sheet to prevent spread.
Avoid formation of dust.
Note the substances and conditions to avoid.
Avoid breathing dust/fume/gas/mist/vapours/spray

6.2 Environmental precautions

Environmental precautions:
Avoid spread into waterway, sewers, drains, or confined areas.
Do not release to the environment.

6.3 Methods and material for containment and cleaning up

Method for cleaning up:
Soak up with inert absorbent material(e.g. dry sand or soil), and place into the containers for chemical waste.
Absorb the liquid and wash off the contaminated area with detergent and water.
(large leaks) Make a ditch keeping distance from the leaks.
Use a clean shovel to place the spilled material into a clean, dry container. Loosely close the container and move it away from the spill area.
(podwer leaks) Cover with plastic sheet to prevent spread and keep dry.
(small leaks) Absorb it with sand or an inert material and place it into a container.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**

Advice on safe handling	Empty containers may retain product residue and can be hazardous. Follow all MSDS/label precautions. Carefully open the cap. Avoid prolonged or continuous skin contact. Be aware of the substances and conditions to avoid. See section 8 for exposure controls and protective equipment. Be cautious of high temperatures. Avoid breathing dust/fume/gas/mist/vapours/spray Wash the handling area thoroughly after work. Handle only outdoors or in a well-ventilated area.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels	Completely drain empty drums and seal them properly before placing them. Store containers tightly sealed in a well-ventilated area.

7.3 Specific end use(s)

Specific end use(s)	Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits	
	No data available
ACGIH exposure limits	
	No data available
Biological Exposure Indices (BEIs)	
	No data available

8.2 Exposure controls

	If driving generates dust, fumes, or mist, ensure adequate ventilation to keep air pollution levels below exposure limits. Install facilities for wash and shower to use the material.

8.3 Personal protective equipment

Respiratory protection	No information available.
EDTA	Wear respiratory protective equipment certified by the Korea Occupational Safety and Health Agency that matches the physical and chemical properties of the particulate matter to which you are exposed. For particulate matter, the following respiratory protection is recommended: Filtering facepiece respirators or air-purifying respirators (with high-efficiency particulate filters) or powered air-purifying respirators (with filters for dust, mist, and fumes). If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus (SCBA).
TRIS	Wear respiratory protective equipment certified by the Korea Occupational Safety and Health Agency that matches the physical and chemical properties of the particulate matter to which you are exposed. For particulate matter, the following respiratory protection is recommended: Filtering facepiece respirators or air-purifying respirators (with high-efficiency particulate filters) or powered air-purifying respirators (with filters for dust, mist, and fumes). If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus (SCBA).
Suitable eye protection	Wear protective goggles that are breathable to safeguard your eyes against particulate matter that may cause eye irritation or other health hazards. Install emergency washing facilities (shower-type) and eye wash stations in easily accessible locations for workers.
Hand protection	Wear suitable protective gloves, considering physical and chemical properties of chemical substances.
Skin and body protection	Wear suitable protective clothing, considering physical and chemical properties of chemical substances.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	liquid
Color	colorless

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Product Name	**Buffer P1**
Odor	No data available
Odour Threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Boiling point/boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	No data available
Vapour pressure	No data available
Solubility (ies)	No data available
Vapour density	No data available
Specific gravity	No data available
Partial coefficient n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	No data available
EDTA	
Physical state	solid
Color	white
Odor	No data available
Odour Threshold	No data available
pH	5.3 (solution)
Melting point/freezing point	255 ℃
Boiling point/boiling range	Not applicable
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	No data available
Vapour pressure	Not applicable
Solubility (ies)	1000000 ㎎/ℓ (estimated)
Vapour density	Not applicable
Specific gravity	No data available
Partial coefficient n-octanol/water	-10.70 (estimated)
Auto-ignition temperature	No data available
Decomposition temperature	252 ℃
Viscosity	No data available
Molecular weight	372.14
TRIS	
Physical state	solid
Color	white
Odor	slightly unique odor
Odour Threshold	No data available
pH	10.4 (0.1 molar solution)
Melting point/freezing point	171 ~ 172 ℃
Boiling point/boiling range	219 ~ 220 ℃ (at 10mmHg)
Flash point	170 ℃
Evaporation rate	No data available

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**
Flammability (soild, gas)	flammability
Upper/lower flammability or explosive limits	-/-
Vapour pressure	0.000002 ㎜Hg (@ 25 ℃, estimated)
Solubility (ies)	550000 ㎎/ℓ (@ 25 ℃)
Vapour density	4.18
Specific gravity	1.32 (@ 20.4 ℃)
Partial coefficient n-octanol/water	-1.56 (estimated)
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	121.14

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

If heated, containers may explode.
Some may combust but does not ignite easily.
Non- flammable : this material does not burn but may evolve corrosive/toxic fumes when heated.

10.2 Conditions to avoid

Ignition sources such as heat, sparks, and flames

10.3 Materials to avoid

Flammable substances and reducing agents

10.4 Hazardous decomposition products

Highly toxic gases can be generated by pyrolysis or combustion during burning.
Corrosive/toxic fumes.

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

EDTA	Irritation, nausea, vomiting, diarrhea.
TRIS	No data available.

11.2 Information on toxicological effects

Acute toxicity

Oral

EDTA	LD50 5900 ㎎/㎏ Rabbit
TRIS	No data available.

Dermal

EDTA	No data available.
TRIS	No data available.

Inhalation

EDTA	No data available.
TRIS	No data available.

Skin corrosion/irritation

EDTA	Slight irritation
TRIS	Causes skin irritation.

Serious eye damage/eye irritation

EDTA	Causes eye irritation.
TRIS	Causes eye irritation.

Respiratory sensitisation

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**

No data available.

Skin sensitisation

No data available.

Carcinogenicity

No data available.

Genotoxicity

No data available.

Reproductive toxicity

No data available.

Specific target organ toxicity - single exposure

EDTA	No data available.
TRIS	Irritates the respiratory tract upon inhalation.

Specific target organ toxicity - repeated exposure

No data available.

Other harmful effects

No data available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish

EDTA	No data available.
TRIS	LC50 955.892 ㎎/ℓ 96 hr

Toxicity to Crustacean

EDTA	No data available.
TRIS	EC50 19.793 ㎎/ℓ 48 hr

Toxicity to Algae

EDTA	No data available.
TRIS	EC50 163.053 ㎎/ℓ 96 hr

12.2 Persistnece and degradability

Persistence

EDTA	log Kow -10.70 (estimated)
TRIS	log Kow -1.56 (estimated)

Degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation

EDTA	BCF 3.16 (estimated)
TRIS	BCF 3

Biodegradability

EDTA	Non-biodegradable - high potential for bioaccumulation due to lack of decomposition
TRIS	No data available

12.4 Mobility in soil No data available

12.5 Other adverse effects No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with all applicable environmental laws and regulations.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

This product is NOT categorized under UN number

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P1**

14.2 UN Proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Enviromental hazards

Not applicable

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

No data available

15.2 Toxic Chemicals Control Act

No data available

15.3 Safety Control of Dangerous Substances Act

No data available

15.4 Wastes Control Act

Designated waste

15.5 Other requirements in domesitc and other countires

Not applicable

16. OTHER INFORMATION

Issued date
2016-02-12

Revision number
2

Revision date
2023-05-11

Reference
EPISUITE
HSNO CCID
HSDB
ECHA
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)
ChemIDplus
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com)
Ecological Structure Activity Relationships(ECOSAR)
Akron University

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**

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

1.1 Product identifier

Product name	Buffer P2

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Metal corrosive substances	Category 1
Acute oral toxicity	Category 4
Acute transdermal toxicity	Category 4

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms

Signal word: Warning

Hazardous statements:
H290 May be corrosive to metal.
H302 Harmful if swallowed.
H312 Harmful if contacted.

Precautionary statements

Prevention:
P234 Store only in original container.
P264 Wash skin/hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/clothing/eye protection/face protection.

Response:
P301+P312 IF SWALLOWED: Consult with doctor if you feel unwell.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P312 – Consult with doctor if you feel unwell.
P330 – Rinse mouth.
P362+P364 Take off contaminated clothing and wash before reuse.
P390 Absorb spillage to prevent material damage.

Storage	P406 Store in a corrosion-resistant container.
Disposal	P501 Dispose containers in accordance with all applicable environmental laws and regulations.

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
Sodium Docecyl Sulfate	151-21-3	0.1~1

4. FIRST AID MEASURES

4.1 Description of first aid measures

General informations	Notify doctor/physician about the substance to take necessary actions.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**
Following eye contact	Get an immediate medical treatment. Upon contact with the substance, immediately wash the skin and eyes with running water for at least 20 minutes. Rinse cautiously with water for minutes. Remove contact lenses, if possible. Keep washing.
Following skin contact	If the substance is hot, immerse or rinse the affected area in a large amount of cold water to remove the heat. Get an immediate medical treatment. Take off all contaminated clothing and shoes and isolate the areas. Upon contact with the substance, immediately wash the skin and eyes with running water for at least 20 minutes. Prevent the spread of contamination in case of minor skin contact. If you experience discomfort, seek medical attention from a healthcare provider. Remove or take off all contaminated clothing. Take off contaminated clothing and wash before reuse.
Following inhalation	Move to an area with fresh air. Do not perform resuscitation; use appropriate respiratory medical equipment instead. Keep warm and comfortable. Get an immediate medical treatment.
Following ingestion	Do not perform resuscitation; use appropriate respiratory medical equipment instead. If swallowed, seek medical attention immediately. Consult with doctor, if you feel unwell. Rinse the mouth Do not induce vomiting.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	alcohol foam / carbon dioxide / water spray dry sand or soil

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	During burning, irritating and highly toxic gases may be generated by thermal decomposition or combustion. If heated, containers may explode. Some may burn but do not ignite easily. Some may generate flammable hydrogen gas on contact with metals. It's not flammability, but if heated, it may decompose to cause corrosive/toxic fumes. Some are oxidizing agents and may ignite combustible materials. Toxicity: Can cause serious injury or death if inhaled, ingested, or contacted with skin. Contact with molten material can cause severe burns to skin and eyes. Can produce irritant, corrosive, and toxic gases in case of fire. May corrode metals.

5.3 Precautions for fire-fighters

Special protective equipment for firefighters	Rescuers must wear appropriate protective equipment. Extinguish the fire from the distance for safety. Dig a ditch for the disposal of the fire fighting water and keep the material from dispersing. Move containers from fire area if it's not dangerous. In case of tank fire: Extinguish it from the maximum distance or use fire extinguishing equipment. Do not allow water to enter into the container. Cool the container with plenty of water even after the fire is extinguished. If there's a high-pitched sound or the tank changes color, leave immediately. Keep away from the tank covered in flames. In the case of large-scale fire, use unmanned firefighting equipment and if that's not possible, retreat and let it burn.

5.4 Further information

No information available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**

Personal precautions

Wipe up spills immediately and follow section 8.
Eliminate all ignition sources. Prevent leak if it's not dangerous.
Do not touch broken containers or spills without appropriate protective clothing.
Do not allow water to enter into the container.
Cover with plastic sheet to prevent spread.
Be aware of substances and conditions to avoid.

6.2 Environmental precautions

Environmental precautions

Spillage is corrosive/toxic and may cause contamination.
Prevent entry into waterways, drains, basements and confined spaces.

6.3 Methods and material for containment and cleaning up

Method for cleaning up

Absorb spill with inert material (e.g. dry sand or earth) and place in chemical waste container.
Absorb liquid and flush contaminated area with detergent and water.
Absorb spillage to prevent material damage.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling

Use only in well-ventilated areas. Follow all MSDS/label precautions.
Use with caution and pay attention to handling and storage.
Carefully open the cap.
Avoid long-term or continuous skin contact.
Do not breathe vapors from heated material.
Do not inhale vapors generated from heated substances.
Do not enter the storage area without proper ventilation.
Be aware of substances and conditions to avoid.
Work with reference to section 8.
Be careful of high temperatures.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Completely drain empty drums, seal them properly, and return them to the drum controller or place them appropriately.
Keep away from food and beverages.
Be aware of substances and conditions to avoid.
Store only in the original container.
Store in a locked storage area.
Since it is a corrosive material, store in corrosion-resistant containers.

7.3 Specific end use(s)

Specific end use(s)

Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits

Sodium Docecyl Sulfate

No data available

ACGIH exposure limits

STEL C 2 mg/m^3
ETC

Sodium Docecyl Sulfate

No data available

Biological Exposure Indices (BEIs)

No data available

8.2 Exposure controls

Implement process isolation, use local exhaust ventilation, or apply other engineering controls to maintain air levels below exposure limits.
Install facilities for wash and shower to use the material.

8.3 Personal protective equipment

Respiratory protection

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Product Name	**Buffer P2**
Sodium Docecyl Sulfate	Wear respiratory protective equipment certified by the Korea Occupational Safety and Health Agency that matches the physical and chemical properties of the particulate matter to which you are exposed. For particulate matter, the following respiratory protection is recommended: Filtering facepiece respirators or air-purifying respirators (with high-efficiency particulate filters) or powered air-purifying respirators (with filters for dust, mist, and fumes). If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus (SCBA).
Suitable eye protection	Wear breathable safety glasses to protect your eyes from particulate matter that may cause eye irritation or other health hazards. Install emergency washing facilities in a location that is easily accessible to workers.
Hand protection	Wear suitable gloves, considering physical/chemical properties of substance.
Skin and body protection	Wear suitable clothes, considering physical/chemical properties of substance.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	liquid
Color	colorless
Odor	No data available
Odour Threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Boiling point/boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	No data available
Vapour pressure	No data available
Solubility (ies)	No data available
Vapour density	No data available
Specific gravity	No data available
Partial coefficient n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	No data available
Physical state	solid
Color	white
Odor	Odorless
Odour Threshold	No data available
pH	(0.05% solution 12; 0.5% solution 13; 5% solution 14 (2))
Melting point/freezing point	318 ℃
Boiling point/boiling range	1390 ℃
Flash point	Not applicable
Evaporation rate	No data available
Flammability (soild, gas)	Non-flammable (1)
Upper/lower flammability or explosive limits	- / -
Vapour pressure	< 0.001 ㎪

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**
Solubility (ies)	109 g/100㎖ (20℃)
Vapour density	No data available
Specific gravity	2.1
Partial coefficient n-octanol/water	-3.88 (Estimate)
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	40
Sodium Docecyl Sulfate	
Physical state	solid
Color	white
Odor	slight odor
Odour Threshold	No data available
pH	Not applicable
Melting point/freezing point	204 ~ 207 ℃
Boiling point/boiling range	Not applicable
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	- / -
Vapour pressure	0.00000000000047 ㎜Hg (at 25 ℃(estimated))
Solubility (ies)	(10%)
Vapour density	Not applicable
Specific gravity	(>1.1 (water=1))
Partial coefficient n-octanol/water	1.6
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	288.38

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

Sodium Docecyl Sulfate	Containers may explode when heated. Some may burn but do not ignite easily. Non-flammable, the material itself does not burn, but may decompose when heated, generating corrosive/toxic fumes. In case of fire, irritating, corrosive and toxic gases may be generated.

10.2 Conditions to avoid

Sodium Docecyl Sulfate	ignition sources such as heat, sparks, and flames

10.3 Materials to avoid

Sodium Docecyl Sulfate	combustible substances, reducible substances

10.4 Hazardous decomposition products

Sodium Docecyl Sulfate	irritating, corrosive and toxic gas

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**

Sodium Docecyl Sulfate	Irritation, vomiting; skin irritation, skin disorders, eye irritation.

11.2 Information on toxicological effects

Acute toxicity

Oral

Sodium Docecyl Sulfate	LD50 1200 ㎎/㎏ Rat

Dermal

Sodium Docecyl Sulfate	LD50 600 ㎎/㎏ Rabbit

Inhalation

No data available.

Skin corrosion/irritation

Sodium Docecyl Sulfate	250 ㎎ / 24 hr skin - human slight irritation

Serious eye damage/eye irritation

Sodium Docecyl Sulfate	10 ㎎ / 24 hr eyes - rabbit moderate irritation

Respiratory sensitisation

No data available.

Skin sensitisation

Sodium Docecyl Sulfate	No data available.

Carcinogenicity

No data available.

Genotoxicity

Sodium Docecyl Sulfate	Reverse mutation test: negative Sister chromatid exchange test: negative Micronucleus test: negative

Reproductive toxicity

Sodium Docecyl Sulfate	NOAEL 300 mg/kg/day (maternal toxicity) NOAEL = 400 mg/kg/day (resorption/litter loss) NOAEL =600 mg/kg/day

Specific target organ toxicity - single exposure

Sodium Docecyl Sulfate	No data available.

Specific target organ toxicity - repeated exposure

Sodium Docecyl Sulfate	NOAEL 100 mg/kg/day, liver toxicity

Other harmful effects

No data available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish

Sodium Docecyl Sulfate	LC50 1.31 ㎎/ℓ 96 hr Cyprinus carpio

Toxicity to Crustacean

Sodium Docecyl Sulfate	EC50 6 ㎎/ℓ 48 hr Daphnia magna

Toxicity to Algae

Sodium Docecyl Sulfate	EC50 1.2 ㎎/ℓ 96 hr Skeletonema costatum

12.2 Persistnece and degradability

Persistence

Sodium Docecyl Sulfate	log Kow 1.60

Degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation

Sodium Docecyl Sulfate	BCF 2.1 ~ 7.1

Biodegradability

Sodium Docecyl Sulfate	100 (%) 28 day

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**

12.4 Mobility in soil No data available

12.5 Other adverse effects No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Sodium Docecyl Sulfate — pre-treat using oil-water separation methods, if available.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

Sodium Docecyl Sulfate — Not classified as dangerous good

14.2 UN Proper shipping name

Sodium Docecyl Sulfate — Not applicable

14.3 Transport hazard class(es)

Sodium Docecyl Sulfate — Not applicable

14.4 Packing group

Sodium Docecyl Sulfate — Not applicable

14.5 Enviromental hazards

Sodium Docecyl Sulfate — No data available

14.6 Special precautions for user

Sodium Docecyl Sulfate — Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

Sodium Docecyl Sulfate — No data available

15.2 Toxic Chemicals Control Act

Sodium Docecyl Sulfate — No data available

15.3 Safety Control of Dangerous Substances Act

No data available

15.4 Wastes Control Act

Designated waste

15.5 Other requirements in domesitc and other countires

In accordance with international laws and regulations of country.

16. OTHER INFORMATION

Issued date
2016-02-12

Revision number
2

Revision date
2023-05-22

Reference

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer P2**

ICSC
SIDS
NCIS
ECHA
NLM
SRC
ECOTOX
OECD SIDS
IUCLID
EPISUITE
HSNO CCID

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer G3**

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

1.1 Product identifier

Product name	Buffer G3

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Acute oral toxicity	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Specific Target Organ toxicity (single exposure)	Category 3 (Respiratory Irritation)

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms

Signal word	Danger
Hazardous statements	H302: Harmful if swallowed. H314: Causes severe skin burns and eye damage. H318: Causes serious eye damage. H335: May cause respiratory irritation.
Precautionary statements	
Prevention	P280: Wear protective gloves/protective clothing/eye protection/face protection. P261: Avoid breathing dust/fume/gas/mist/vapors/spray. P271: Use only outdoors or in a well-ventilated area.
Response	P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353: IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water/shower. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Storage	P405: Store locked up. P403+P233: Store in a well-ventilated place. Keep container tightly closed.
Disposal	P501 Dispose containers in accordance with all applicable environmental laws and regulations.

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
Guanidinium chloride	50-01-1	40 - 45
Acetic acid	64-19-7	15 - 20

4. FIRST AID MEASURES

4.1 Description of first aid measures

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer G3**

General informations	Symptoms may be delayed after contact or inhalation. Notify doctor/physician about the substance to take necessary actions.
Following eye contact	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing and seek immediate medical attention.
Following skin contact	Immediately remove contaminated clothing. Rinse skin with water/shower. Seek medical attention if irritation or burns develop.
Following inhalation	Move to fresh air. Keep at rest in a position comfortable for breathing. Seek medical attention if symptoms persist.
Following ingestion	Rinse mouth. Do NOT induce vomiting. Seek immediate medical attention.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	Releases toxic fumes under fire conditions (carbon oxides, nitrogen oxides).

5.3 Precautions for fire-fighters

Wear self-contained breathing apparatus and full protective gear.
Wear self-contained breathing apparatus and full protective clothing.
Cool containers with water spray if safe to do so.
Prevent firefighting water from entering drains or watercourses.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes and clothing. Avoid breathing mist or vapours. Ensure adequate ventilation. Wear appropriate personal protective equipment (see section 8). Keep unprotected persons away from the spill area.

6.2 Environmental precautions

Environmental precautions	Leaks may cause contamination. Avoid spread into waterway, sewers, drains, or confined areas. Do not release to the environment.

6.3 Methods and material for containment and cleaning up

Method for cleaning up	Absorb spill with inert absorbent material (e.g. vermiculite, dry sand) and place in suitable waste containers. Wash contaminated surface with plenty of water after material pick-up is complete. Prevent run-off from entering drains or watercourses.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer G3**

Advice on safe handling	Avoid contact with skin and eyes. Do not breathe mist or vapours. Use only in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels	Keep container tightly closed in a cool, well-ventilated place. Store away from strong bases, oxidizing agents and reactive metals. Keep only in the original container.

7.3 Specific end use(s)

Specific end use(s)	Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

ACGIH exposure limits	
Acetic Acid	10 ppm TWA; 15 ppm STEL
Biological Exposure Indices (BEIs)	
Guanidinium chloride	No data available

8.2 Exposure controls

	Use appropriate engineering controls such as local exhaust ventilation to maintain airborne concentrations below recommended exposure limits. Provide eyewash stations and safety showers in the work area.

8.3 Personal protective equipment

Respiratory protection	Eye/face protection: Safety goggles with side shields. Skin protection: Chemical-resistant gloves and protective clothing. Respiratory protection: Use a NIOSH-approved respirator if ventilation is inadequate or exposure limits are exceeded.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Liquid
Color	Colorlessness
Odor	Odorless
Odour Threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Boiling point/boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	No data available
Vapour pressure	No data available
Solubility (ies)	No data available
Vapour density	No data available
Specific gravity	No data available
Partial coefficient n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	No data available

9.2 Other information

No data available

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer G3**

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

The product is stable under recommended storage conditions.
Non-flammable aqueous solution.
Thermal decomposition may produce toxic and corrosive fumes (e.g. nitrogen oxides, acetic acid vapours).

10.2 Conditions to avoid

High temperatures. Avoid contact with incompatible materials.

10.3 Materials to avoid

Strong bases, strong oxidizing agents, reactive metals.

10.4 Hazardous decomposition products

Nitrogen oxides, acetic acid vapours and other irritating or corrosive gases may be released in case of fire.

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

May cause burns to the mouth, throat and stomach if swallowed.
Causes severe skin and eye irritation or burns.
Inhalation of mists may cause irritation of the respiratory tract, coughing and shortness of breath.

11.2 Information on toxicological effects

Acute toxicity	
Oral	May be harmful if swallowed.
Dermal	Based on available data, the mixture is not classified for acute dermal toxicity; however, contact may cause severe skin irritation or burns.
Inhalation	Mist or vapour may cause respiratory tract irritation (STOT SE 3).
Skin corrosion/irritation	Causes severe skin irritation and chemical burns due to the presence of guanidinium chloride and acetic acid.
Serious eye damage/eye irritation	Causes serious eye damage. Exposure may result in severe irritation, corneal injury, or permanent eye damage.
Respiratory sensitisation	Not expected to be a respiratory sensitiser based on available component information.
Skin sensitisation	Component data (guanidinium chloride) indicates negative sensitisation results.
Germ cell mutagenicity	Component guanidinium chloride has shown negative results in standard genotoxicity tests.
Carcinogenicity	None of the mixture components are listed as carcinogens by IARC, NTP, or OSHA.
Reproductive toxicity	Not expected to cause reproductive toxicity based on available component information.
Specific target organ toxicity - single exposure	Inhalation of mist or aerosol may cause coughing, sore throat, and respiratory tract irritation.
Specific target organ toxicity - repeated exposure	Not classified due to insufficient evidence.
Aspiration hazard	Not expected to present an aspiration hazard based on physicochemical properties (aqueous mixture, low viscosity).
Other harmful effects	No other adverse effects known for the mixture. Exposure may cause symptoms consistent with corrosive materials: burning sensation, coughing, difficulty breathing, and gastrointestinal distress if ingested.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

May be harmful to aquatic organisms if released in significant quantities.

Acetic acid is known to be toxic to aquatic life at high concentrations.

Guanidinium chloride shows moderate aquatic toxicity in fish studies

12.2 Persistnece and degradability

No data available for the mixture.

Acetic acid is readily biodegradable.

Guanidinium chloride shows limited available data, and persistence cannot be fully assessed.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer G3**

12.3 Bioaccumulative potential

No data available for the mixture.

Acetic acid is not expected to bioaccumulate (low log Kow).

Guanidinium chloride is not expected to significantly bioaccumulate based on available information.

12.4 Mobility in soil

No data available for the mixture.

Due to its high water solubility, the mixture is expected to have high mobility in soil and may migrate in aqueous environments.

12.5 Other adverse effects	No known significant environmental hazards. Avoid uncontrolled release to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Neutralise the solution with a suitable alkaline material, if appropriate, and dilute with plenty of water.
Dispose of contents and container through a licensed waste disposal contractor in accordance with local/regional/national regulations.
Do not discharge into drains or the environment without proper treatment.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number	This product is NOT categorized under UN number
14.2 UN Proper shipping name	Not applicable
14.3 Transport hazard class(es)	Not applicable
14.4 Packing group	Not applicable
14.5 Environmental hazards	Not classified as environmentally hazardous for transport.
14.6 Special precautions for user	Avoid contact with skin and eyes. Prevent release into waterways. Use protective equipment during handling and spill response.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Indusrial Satefy and Health Act	Relevant exposure standards apply (ACGIH or KOSHA exposure limits)
15.2 Toxic Chemicals Control Act	This mixture does not contain substances regulated under the Toxic Chemicals Control Act.
15.3 Safety Control of Dangerous Substances Act	Not applicable
15.4 Wastes Control Act	Dispose of contents/container in accordance with local waste regulations. Neutralization may be required before disposal.
15.5 Other requirements in domestic and other countries	The components of this product are listed or exempted on major chemical inventories (e.g., TSCA, REACH, DSL/NDSL).

16. OTHER INFORMATION

Issued date
2021-02-12
Revision number
2
Revision date
2025-12-05
Reference
-

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

GENEALL BIOTECHNOLOGY

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

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

1.1 Product identifier

Product name	Buffer EW1

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Acute oral toxicity	Category 4
Skin Irritation	Category 2
Eye Irritation	Category 2A

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms

Signal word	Warning
Hazardous statements	H302 Harmful if swallowed. H315: Causes skin irritation. H319: Causes serious eye irritation.

Precautionary statements

Prevention	P280: Wear protective gloves/protective clothing/eye protection/face protection.
Response	301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage	Store in a tightly closed container in a cool, dry, well-ventilated area away from incompatible substances.
Disposal	P501 Dispose containers in accordance with all applicable environmental laws and regulations.

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
Guanidinium chloride	50-01-1	25~50

4. FIRST AID MEASURES

4.1 Description of first aid measures

General informations	Symptoms may be delayed after contact or inhalation. Notify doctor/physician about the substance to take necessary actions.
Following eye contact	Rinse thoroughly with water for at least 15 minutes. Seek medical attention if irritation persists.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

Following skin contact	Wash with soap and water. Remove contaminated clothing. Get medical attention if irritation develops.
Following inhalation	Move to fresh air. Seek medical attention if symptoms persist.
Following ingestion	Rinse mouth. Do NOT induce vomiting. Seek immediate medical attention.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting:

The reaction can undergo vigorous polymerization, which may lead to fire and explosion.
The vapor can be transferred to an ignition source and may ignite.
Highly irritative and toxic gases can be generated by pyrolysis or combustion during burning.
It can form explosive mixtures at or above the flash point.
If heated, containers may explode.
Flammability: Easily ignited by heat, sparks, or flames.
Spills may cause a fire/explosion.
There is a risk of vapor explosion indoors, outdoors, and in sewers.
Some may combust but does not ignite easily.
Vapors can form explosive mixtures with air.
Vapors can travel to an ignition source and flash back.
It's not flammability, but if heated, it may decompose to cause corrosive/toxic fumes.
May be toxic, if inhaled or absorbed through the skin.
Flammable liquid and vapor

Contact may cause severe burn on eyes and skin.
Vapors may cause dizziness or asphyxiation without awareness.
It may be toxic if inhaled or ingested.
Flammable liquid and vapor.
May cause corrosion of metals.

5.3 Precautions for fire-fighters

Guanidinium chloride:

Wear appropriate protective apparatus.
Extinguish the fire from a safe distance away from the area.
Be aware that it may be transported in a melted form or at high temperature.
Dig a ditch for the disposal of the fire fighting water and keep the material from dispersing.
Move the containers from fire, if not dangerous.

In case of tank fire:
Extinguish it away from maximum distance or use unmanned fire extinguisher.
Keep cooling the container with a large amount of water even after the fire is out.
If there's a high pitched noise or change of color, keep away immediately.
Keep away from the tank covered in flames.
Use unmanned fire extinguishing equipment, and if it's unavailable, just let it burn.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions:

Extremely fine particles can cause fire or explosion, so remove all ignition sources.
Clean up spills immediately and follow the preventive measures in the SDS for protective equipment.
Avoid contact with leaks.
Remove all ignition sources.
Ground all equipment when handling the material.
If it's not dangerous, stop the leak.
Avoid contact without proper protective apparatus.
Foam suppressants can be used to reduce vapor.
Wear a full-face vapor protective suit in case of a leak without fire.
Cover with plastic sheet to prevent spread.
Avoid formation of dust.
Be aware of the substances and conditions to avoid.
Do not breathing dust/fume/gas/mist/vapours/spray.
Cover with plastic sheet to prevent spread.
Note the substances and conditions to avoid.
Avoid breathing dust/fume/gas/mist/vapours/spray

6.2 Environmental precautions

Environmental precautions:

Leaks may cause contamination.
Avoid spread into waterway, sewers, drains, or confined areas.
Do not release to the environment.

6.3 Methods and material for containment and cleaning up

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

Method for cleaning up: Absorb with inert material and place in chemical waste container. Wash spill site after material pickup.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling

Prevention
Use with adequate ventilation.
Avoid contact with skin, eyes, and clothing.
Do not eat, drink, or smoke when using this product.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response
In case of skin contact: Wash with soap and water.
In case of eye contact: P305+P351+P338: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If inhaled: Move to fresh air and seek medical attention if symptoms persist.
If ingested: P301+P312: Rinse mouth and call a POISON CENTER or doctor/physician if you feel unwell.

Storage
Store in a tightly closed container in a cool, dry, well-ventilated area away from incompatible substances.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels: Completely drain empty drums and seal them properly before placing them.
Be aware of the substances and conditions to avoid.
Keep away from heat, sparks, open flames, and hot surfaces. - No smoking
Store containers tightly sealed in a cool and well-ventilated area.

7.3 Specific end use(s)

Specific end use(s): Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits

Guanidinium chloride: No data available

ACGIH exposure limits

Guanidinium chloride: No data available

Biological Exposure Indices (BEIs)

Guanidinium chloride: No data available

8.2 Exposure controls

Use appropriate engineering controls such as process enclosure, local exhaust ventilation,or maintaining airborne concentrations below recommended exposure limits.
Install facilities for wash and shower to use the material.

8.3 Personal protective equipment

Respiratory protection: Wear respiratory protection, according to the physical and chemical properties of the exposed material which has been tested and approved under appropriate government standard.

If the exposure concentration is:
(below 2,000 ppm) wear a half-face respirator equipped with an appropriate filter or canister.
(below 5,000 ppm) wear a loose-fitting powered air-purifying respirator (PAPR) equipped with an appropriate filter or canister, or a continuous-flow particulate respirator/chemical cartridge respirator (particulate respirators are only applicable for liquid aerosols).
(below 10,000 ppm) wear a full-face or powered half-face respirator, or an air-supplied continuous-flow/pressure-demand half-face respirator equipped with an appropriate filter or canister.
(below 200,000 ppm) wear a full-face or helmet/hood-type, pressure-demand supplied-air respirator.
(below 2,000,000 ppm) wear a self-contained breathing apparatus (SCBA) or a pressure-demand self-contained breathing apparatus (SCBA) equipped with an appropriate filter or canister.

Suitable eye protection: Wear protective goggles that are breathable to safeguard your eyes against particulate matter that may cause eye irritation or other health hazards.
Install emergency washing facilities (shower-type) and eye wash stations in easily accessible locations for workers.
Wear the following types of eye protection against eye irritation or other health hazards:
(For gaseous organic substances) wear sealed goggles.
(For vaporous organic substances) wear goggles or ventilated goggles.
(For particulate substances) wear ventilated goggles.

Hand protection: Wear suitable protective gloves, considering physical and chemical properties of chemical substances.

Skin and body protection: Wear suitable protective clothing, considering physical and chemical properties of chemical substances.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	liquid
Color	colorless
Odor	No data available
Odour Threshold	No data available
pH	6.2 (10% solution)
Melting point/freezing point	178 ~ 185℃
Boiling point/boiling range	>82°C
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	No data available
Vapour pressure	0.00000176 ㎜Hg (25℃ (estimated))
Solubility (ies)	Soluble in water
Vapour density	No data available
Specific gravity	1.3
Partial coefficient n-octanol/water	-1.7
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	95.5

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

If heated, containers may explode.
Some may combust but does not ignite easily.
It's not flammability, but if heated, it may decompose to cause corrosive/toxic fumes.
It may release irritating, corrosive, or toxic gases in the event of a fire.

10.2 Conditions to avoid

Ignition sources such as heat, sparks, and flames

10.3 Materials to avoid

Flammable materials, reducing agents

10.4 Hazardous decomposition products

Highly toxic gases can be generated by pyrolysis or combustion during burning.
Corrosive/toxic fume
Irritative/toxic gas

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

May cause irritation, nausea, vomiting, loss of voice, difficulty breathing, headache, lung damage, diarrhea, hyperactivity, sleep disturbances, convulsions, and pupil dilation.

11.2 Information on toxicological effects

Acute toxicity

Oral

LD50 475 ㎎/㎏ Rat

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

Dermal

LD50 > 2000 ㎎/㎏ Rabbit

Inhalation

LC50 5.319 ㎎/ℓ 4 hr Rat

Skin corrosion/irritation

As a result of a test on rabbits, severe irritation was observed.

Serious eye damage/eye irritation

As a result of a test on rabbits, moderate irritation was observed.

Respiratory sensitisation

No data available

Skin sensitisation

The sensitization test using guinea pigs yielded a negative result.

Carcinogenicity

IARC

No data available

OSHA

No data available

ACGIH

No data available

NTP

No data available

EU CLP

No data available

Genotoxicity

The results of the microbial reverse mutation test : Negative
The results of the chromosome aberration test : Negative

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Inhalation Toxicity

No data available

Other harmful effects

No data available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Ecotoxicity: Harmful to aquatic life with long-lasting effects.

12.2 Persistnece and degradability

Persistence

Guanidinium chloride	No data available

Degradability

Guanidinium chloride	No data available

12.3 Bioaccumulative potential

Bioaccumulation

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

No data available

Biodegradability

(activated Sludge, domestic Sewage)

12.4 Mobility in soil

No data available

12.5 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Perform pre-treatment using an oil-water separation method, if available.
Incinerate at high temperature or treat by high-temperature melting.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

This product is NOT categorized under UN number

14.2 UN Proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Enviromental hazards

No data available

14.6 Special precautions for user

Emergency measures in case of fire

Not applicable

Emergency measures in case of spill

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

Guanidinium chloride	No data available

15.2 Toxic Chemicals Control Act

Guanidinium chloride	No data available

15.3 Safety Control of Dangerous Substances Act

Guanidinium chloride	No data available

15.4 Wastes Control Act

Guanidinium chloride	No data available

15.5 Other requirements in domesitc and other countires

Guanidinium chloride	No data available

16. OTHER INFORMATION

Issued date
2021-02-12
Revision number
1
Revision date
2023-05-23
Reference

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW1**

Corporate Solution From Thomson Micromedex(http://csi.micromedex.com)
ECB-ESIS(European chemical Substances Information System)(http://ecb.jrc.it/esis)
ECOTOX Database, EPA(http://cfpub.epa.gov/ecotox)
IUCLID Chemical Data Sheet, EC-ECB
International Chemical Safety Cards(ICSC)(http://www.nihs.go.jp/ICSC)
TOXNET, U.S. National Library of Medicine(http://toxnet.nlm.nih.gov)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)
ICSC
ECHA
PATTY
ACGIH

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

GENEALL BIOTECHNOLOGY

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW2**

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

1.1 Product identifier

Product name	Buffer EW2

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

This product is NOT classified as regulated substance and NOT subject to label elements.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms	No data available
Signal word	No data available
Hazardous statements	No data available
Precautionary statements	
Prevention	No data available
Response	No data available
Storage	No data available
Disposal	No data available

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
No hazardous substance		

4. FIRST AID MEASURES

4.1 Description of first aid measures

General informations	Notify doctor/physician about the substance to take necessary actions.
Following eye contact	No data available
Following skin contact	No data available
Following inhalation	Try artificial respiration, if not breathe. Provide oxygen, if breathing is difficult.
Following ingestion	Do not give any food to an unconscious person.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	No data available

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	If heated, containers may explode.

5.3 Precautions for fire-fighters

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW2**

Special protective equipment for firefighters

In case of tank fire:
Keep cooling the container with a large amount of water even after the fire is out.
If there's a high pitched noise or change of color, keep away immediately.
Keep away from the tank covered in flames.
Heated or exploded containers may release water that can cause burns to the skin and eyes.

5.4 Further information

No information available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Be aware of the substances and conditions to avoid.

6.2 Environmental precautions

Environmental precautions: No data available

6.3 Methods and material for containment and cleaning up

Method for cleaning up: No data available

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling:
Be aware of the substances and conditions to avoid.
See section 8 for exposure controls and protective equipment.
Be cautious of high temperatures.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels: Be aware of the substances and conditions to avoid.

7.3 Specific end use(s)

Specific end use(s): Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits

No data available

ACGIH exposure limits

No data available

Biological Exposure Indices (BEIs)

No data available

8.2 Exposure controls

No data available

8.3 Personal protective equipment

Respiratory protection:
Wear respiratory protection, according to the physical and chemical properties of the exposed material which has been tested and approved under appropriate government standard.
Proper protective apparatus for respiration such like Face filter dust mask, air filter dust mask, electric fan attached dust mask is recommended.
If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus (SCBA).

Suitable eye protection: Wear protective goggles that are breathable to safeguard your eyes against particulate matter that may cause eye irritation or other health hazards.

Hand protection: Wear suitable protective gloves, considering physical and chemical properties of chemical substances.

Skin and body protection: Wear suitable protective clothing, considering physical and chemical properties of chemical substances.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state: liquid

Color: colorless

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW2**
Odor	No odor
Odour Threshold	Not applicable
pH	7-8
Melting point/freezing point	No data available
Boiling point/boiling range	No data available
Flash point	Not applicable
Evaporation rate	No data available
Flammability (soild, gas)	Not applicable
Upper/lower flammability or explosive limits	-/-
Vapour pressure	No data available
Solubility (ies)	No data available
Vapour density	No data available
Specific gravity	No data available
Partial coefficient n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	No data available

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

Stable under ambient temperature and pressure conditions.
If heated, containers may explode.

10.2 Conditions to avoid

heat, contamination

10.3 Materials to avoid

water-reactive substance

10.4 Hazardous decomposition products

No data available

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

No data available

11.2 Information on toxicological effects

Acute toxicity

Oral

No data available.

Dermal

No data available.

Inhalation

No data available.

Skin corrosion/irritation

Not applicable

Serious eye damage/eye irritation

Not applicable

Respiratory sensitisation

Not applicable

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW2**

Skin sensitisation

Not applicable

Carcinogenicity

No data available.

Genotoxicity

Not applicable

Reproductive toxicity

Not applicable

Specific target organ toxicity - single exposure

Not applicable

Specific target organ toxicity - repeated exposure

Not applicable

Other harmful effects

No data available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish

No data available.

Toxicity to Crustacean

No data available.

Toxicity to Algae

No data available.

12.2 Persistnece and degradability

Persistence

No data available.

Degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation

No data available

Biodegradability

No data available

12.4 Mobility in soil No data available

12.5 Other adverse effects No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with all applicable environmental laws and regulations.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

This product is NOT categorized under UN number

14.2 UN Proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Enviromental hazards

No data available

14.6 Special precautions for user

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EW2**

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

Not applicable

15.2 Toxic Chemicals Control Act

Not applicable

15.3 Safety Control of Dangerous Substances Act

Not applicable

15.4 Wastes Control Act

Not applicable

15.5 Other requirements in domesitc and other countires

Not applicable

16. OTHER INFORMATION

Issued date
2016-10-31
Revision number
1
Revision date
2023-08-27
Reference

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

GENEALL BIOTECHNOLOGY

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**

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

1.1 Product identifier

Product name	Buffer EF

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Specific Target Organ toxicity (single exposure)	Category 3 (respiratory irritation)

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms

Signal word	Warning
Hazardous statements	H315 Causes skin irritation. H319 Causes serious eye irritation. H335 May cause respiratory irritation.

Precautionary statements

Prevention	P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P264 Wash skin/hands thoroughly after handling. P271 Handle it only outdoors or in a well-ventilated area. P280 Wear protective gloves/clothing/eye protection/face protection.
Response	P302+P352 IF ON SKIN: Wash with plenty of soap and water. P304+P340 IF INHALED: Move patients into fresh air and help them to get rest. P305+P351+P338 IF IN EYES: Rinse with water attentively for several minutes. P312 Consult with doctor if you feel unwell. P332+P313 If skin irritation occurs: Get medical advice/attention. P337+P313 If eye irritation persists: Get medical advice/attention. P362+P364 Take off contaminated clothing and wash before reuse.
Storage	P403 + P233 Keep container tightly closed and store in a well-ventilated place. P405 Store it being locked up.
Disposal	P501 Dispose containers in accordance with all applicable environmental laws and regulations.

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
TRIS	77-86-1	0.001~0.01

4. FIRST AID MEASURES

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**

4.1 Description of first aid measures

General informations	Notify doctor/physician about the substance to take necessary actions.
Following eye contact	Immediately flush the eyes with water for minutes. Remove contact lense, if possible. Keep washing.
Following skin contact	If the material is hot, immerse or wash the affected area with a large amount of cold water to remove the heat. Get emergency medical attention. Remove contaminated clothing and footwear and isolate contaminated areas. In case of contact with substance, flush the skin immediately with water for at least 20 minutes. In case of minor skin contact, prevent the spread of contamination. If skin irritation occurs, take medical advice or attention. Remove contaminated clothing and wash before reusing.
Following inhalation	If exposed to excessive dust or fumes, remove them with clean air. Seek medical attention, if you experience coughing or other symptoms. If breathing has stopped, perform artificial respiration. If breathing is difficult, provide oxygen.
Following ingestion	Get medical advice/attention.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	Use alcohol foam, carbon dioxide, or water spray. Use dry sand or soil for smothering fires.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	Highly toxic gases can be generated by pyrolysis or combustion during burning. If heated, containers may explode. Some may combust but does not ignite easily. It's not flammability, but if heated, it may decompose to cause corrosive/toxic fumes.

5.3 Precautions for fire-fighters

Special protective equipment for firefighters	Wear appropriate protective apparatus. Extinguish the fire from a safe distance away from the area. Be aware that it may be transported in a melted form. Dig a ditch for the disposal of the fire fighting water and keep the material from dispersing. Move the containers from fire, if not dangerous. In case of tank fire: Extinguish it away from maximum distance or use unmanned fire extinguisher. Keep cooling the container with a large amount of water even after the fire is out. If there's a high pitched noise or change of color, keep away immediately. Keep away from the tank covered in flames. Use unmanned fire extinguishing equipment, and if it's unavailable, just let it burn.

5.4 Further information

No information available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	Clean spills and see section 5.3. Remove all ignition sources. If it's not dangerous, stop the leak. Cover with plastic sheet to prevent spread. Note the substances and conditions to avoid. Avoid breathing dust/fume/gas/mist/vapours/spray

6.2 Environmental precautions

Environmental precautions	Avoid spread into waterway, sewers, drains, or confined areas.

6.3 Methods and material for containment and cleaning up

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**

Method for cleaning up	Soak up with inert absorbent material(e.g. dry sand or soil), and place into the containers for chemical waste. Absorb the liquid and wash off the contaminated area with detergent and water.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling	Empty containers may retain product residue. Follow all MSDS/label precautions. Carefully open the cap. Avoid prolonged or continuous skin contact. Be aware of the substances and conditions to avoid. See section 8 for exposure controls and protective equipment. Avoid breathing dust/fume/gas/mist/vapours/spray Wash the handling area thoroughly after work. Handle only outdoors or in a well-ventilated area.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels	Completely drain empty drums and seal them properly before placing them. Store containers tightly sealed in a well-ventilated area.

7.3 Specific end use(s)

Specific end use(s)	Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits	
	No data available
ACGIH exposure limits	
	No data available
Biological Exposure Indices (BEIs)	
	No data available

8.2 Exposure controls

	If driving generates dust, fumes, or mist, ensure adequate ventilation to keep air pollution levels below exposure limits. Install facilities for wash and shower to use the material.

8.3 Personal protective equipment

Respiratory protection	Wear respiratory protective equipment certified by the Korea Occupational Safety and Health Agency that matches the physical and chemical properties of the particulate matter to which you are exposed. For particulate matter, the following respiratory protection is recommended: Filtering facepiece respirators or air-purifying respirators (with high-efficiency particulate filters) or powered air-purifying respirators (with filters for dust, mist, and fumes). If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus (SCBA).
Suitable eye protection	Wear protective goggles that are breathable to safeguard your eyes against particulate matter that may cause eye irritation or other health hazards. Install emergency washing facilities (shower-type) and eye wash stations in easily accessible locations for workers.
Hand protection	Wear suitable protective gloves, considering physical and chemical properties of chemical substances.
Skin and body protection	Wear suitable protective clothing, considering physical and chemical properties of chemical substances.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	liquid
Color	colorless
Odor	Slight distinctive odor
Odour Threshold	No data available
pH	10.4 (0.1 molar solution)

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**
Melting point/freezing point	171 ~ 172℃
Boiling point/boiling range	219 ~ 220℃ (at 10mmHg)
Flash point	170 ℃
Evaporation rate	No data available
Flammability (soild, gas)	flammability
Upper/lower flammability or explosive limits	-/-
Vapour pressure	0.000002 ㎜Hg (@ 25 ℃, estimated)
Solubility (ies)	550000 ㎎/ℓ (@ 25 ℃)
Vapour density	4.18
Specific gravity	1.32 (@ 20.4 ℃)
Partial coefficient n-octanol/water	-1.56 (estimated)
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	121.14

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

If heated, containers may explode.
Some may combust but does not ignite easily.
Non-flammable : this material does not burn but may evolve corrosive/toxic fumes when heated.
Can produce irritant, corrosive, and toxic gases in case of fire.

10.2 Conditions to avoid

Ignition sources such as heat, sparks, and flames

10.3 Materials to avoid

Flammable substances and reducing agents

10.4 Hazardous decomposition products

Highly toxic gases can be generated by pyrolysis or combustion during burning.
Corrosive/toxic fumes.

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

No data available.

11.2 Information on toxicological effects

Acute toxicity

Oral

LD50 5900 ㎎/㎏ Rabbit

Dermal

No data available.

Inhalation

No data available.

Skin corrosion/irritation

Causes skin irritation.

Serious eye damage/eye irritation

Causes eye irritation.

Respiratory sensitisation

No data available.

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**

Skin sensitisation

No data available.

Carcinogenicity

No data available.

Genotoxicity

No data available.

Reproductive toxicity

No data available.

Specific target organ toxicity - single exposure

Irritates the respiratory tract upon inhalation.

Specific target organ toxicity - repeated exposure

No data available.

Other harmful effects

No data available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish

LC50 955.892 ㎎/ℓ 96 hr

Toxicity to Crustacean

EC50 19.793 ㎎/ℓ 48 hr

Toxicity to Algae

EC50 163.053 ㎎/ℓ 96 hr

12.2 Persistnece and degradability

Persistence

log Kow -1.56 (estimated)

Degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation

BCF 3

Biodegradability

No data available

12.4 Mobility in soil No data available

12.5 Other adverse effects No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with all applicable environmental laws and regulations.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

This product is NOT categorized under UN number

14.2 UN Proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Enviromental hazards

Not applicable

MATERIAL SAFETY DATA SHEET

Product Name	**Buffer EF**

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

Not applicable

15.2 Toxic Chemicals Control Act

Not applicable

15.3 Safety Control of Dangerous Substances Act

Not applicable

15.4 Wastes Control Act

Not applicable

15.5 Other requirements in domesitc and other countires

Not applicable

16. OTHER INFORMATION

Issued date
2016-02-12

Revision number
2

Revision date
2023-05-23

Reference
HSDB
ECHA
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)
ChemIDplus
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com)
Ecological Structure Activity Relationships(ECOSAR)
Akron University

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-

GENEALL BIOTECHNOLOGY

MATERIAL SAFETY DATA SHEET

Product Name	**RNase A**

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

1.1 Product identifier

Product name	RNase A solution

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

Use of the substance or mixture	Laboratory chemicals

1.3 Details of the supplier of the safety data sheet

Name	GENEALL BIOTECHNOLOGY CO., LTD
Address	GeneAll Bldg., 303-7, Dongnam-ro, Songpa-gu, Seoul, 05729, Korea
Information contact	<+82-2-407-0096
E-Mail (competent person)	**sales@geneall.com**
Emergency Telephone Number	<+82-2-407-0096

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

This product is NOT classified as regulated substance and NOT subject to label elements.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard pictograms	No data available
Signal word	No data available
Hazardous statements	No data available
Precautionary statements	
Prevention	No data available
Response	No data available
Storage	No data available
Disposal	No data available

2.3 Other Non-GHS Classfication

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name	CAS No.	Concentration (%)
RIBONUCLEASE A TYPE I	9001-99-4	2-10

4. FIRST AID MEASURES

4.1 Description of first aid measures

General informations	Notify doctor/physician about the substance to take necessary actions.
Following eye contact	In case of contact with substance, flush the eyes immediately with water for at least 20 minutes. Immediately seek medical advice/attention.
Following skin contact	In case of contact with substance, flush the skin immediately with water for at least 20 minutes. Remove contaminated clothing and footwear and isolate contaminated areas. Take off contaminated clothing and wash before reuse. Get an immediate medical treatment.
Following inhalation	Get an immediate medical treatment. Move to an area with fresh air. Try artificial respiration, if not breathe. Provide oxgen, if it is hard to breathe.
Following ingestion	Do not give any food to an unconscious person. Get an immediate medical treatment.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	Small fire: dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, carbon dioxide (suitable extinguishing media) Large fire: Use water spray/mist, general foam (suitable extinguishing media)

MATERIAL SAFETY DATA SHEET

Product Name	**RNase A**

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	Can be ignited by heat, sparks, or flames. If heated, containers may explode. Some may combust but does not ignite easily. Can produce irritant and toxic gases in case of fire. Inhalation of the substance may be harmful. Some liquids may produce vapors that can cause dizziness or asphyxiation.

5.3 Precautions for fire-fighters

Special protective equipment for firefighters	Move containers from fire area if it's not dangerous. Some may be transported at high temperatures. Spills may cause contamination. Contact may cause burns to skin and eyes. Dig a ditch for the disposal of the fire fighting water and keep the material from dispersing. In case of tank fire: Cool the container with plenty of water even after the fire is extinguished. If there's a high-pitched sound or the tank changes color, leave immediately. Keep away from the tank covered in flames.

5.4 Further information

No information available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	Remove all ignition sources. Stop the leak, if it's not dangerous. Be aware of the substances and conditions to avoid. Ventilate the contaminated area. Do not touch the exposed material. Prevent dust formation.

6.2 Environmental precautions

Environmental precautions	Avoid spread into waterway, sewers, drains, or confined areas.

6.3 Methods and material for containment and cleaning up

Method for cleaning up	(small leaks) Wash the contaminated area with plenty of water. (small leaks) Absorb it with sand or an inert material and place it into a container. (large leaks) Make a ditch keeping distance from the leaks. Use a clean shovel to place the spilled material into a clean, dry container. Loosely close the container and move it away from the spill area. Cover with plastic sheet to prevent spread and keep dry.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling	Be aware of the substances and conditions to avoid. Wash thoroughly after handling. Work with reference to section 8. Be cautious of high temperatures.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels	Keep container tightly closed. Store in a cool, dry place. Be aware of the substances and conditions to avoid.

7.3 Specific end use(s)

Specific end use(s)	Laboratory chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

KOSHA exposure limits

No data available

ACGIH exposure limits

No data available

Biological Exposure Indices (BEIs)

No data available

8.2 Exposure controls

MATERIAL SAFETY DATA SHEET

Product Name	RNase A

Use appropriate engineering controls and local exhaust ventilation below recommended exposure limits.

8.3 Personal protective equipment

Respiratory protection	Wear respiratory protection, according to the physical and chemical properties of the exposed material which has been tested and approved under appropriate government standard. Proper protective apparatus for respiration such like Face filter dust mask, air filter dust mask, electric fan attached dust mask is recommended. If oxygen levels are insufficient (<19.6%), wear supplied-air respirators or self-contained breathing apparatus.
Suitable eye protection	Wear protective goggles that are breathable to safeguard your eyes against particulate matter that may cause eye irritation or other health hazards.
Hand protection	Wear suitable chemical-resistant gloves, considering physical and chemical properties of chemical substances.
Skin and body protection	Wear suitable chemical-resistant clothing, considering physical and chemical properties of chemical substances.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	liquid
Color	colorless
Odor	No data available
Odour Threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Boiling point/boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (soild, gas)	No data available
Upper/lower flammability or explosive limits	-/-
Vapour pressure	No data available
Solubility (ies)	No data available
Vapour density	No data available
Specific gravity	No data available
Partial coefficient n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Molecular weight	No data available

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

Stable under ambient temperature and pressure conditions.
If heated, containers may explode.
Some may combust but does not ignite easily.
Can produce irritant and toxic gases in case of fire.
Inhalation of the substance may be harmful.
Some liquids may produce vapors that can cause dizziness or asphyxiation.

10.2 Conditions to avoid

Ignition sources such as heat, sparks, and flames

10.3 Materials to avoid

flammable material, irritant/toxic gas

10.4 Hazardous decomposition products

MATERIAL SAFETY DATA SHEET

Product Name	RNase A

No data available

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure

No data available

11.2 Information on toxicological effects

Acute toxicity

Oral

No data available.

Dermal

No data available.

Inhalation

No data available.

Skin corrosion/irritation

No data available.

Serious eye damage/eye irritation

No data available.

Respiratory sensitisation

No data available.

Skin sensitisation

No data available.

Carcinogenicity

No data available.

Genotoxicity

No data available.

Reproductive toxicity

No data available.

Specific target organ toxicity - single exposure

No data available.

Specific target organ toxicity - repeated exposure

No data available.

Other harmful effects

No data available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to Fish

No data available.

Toxicity to Crustacean

No data available.

Toxicity to Algae

No data available.

12.2 Persistnece and degradability

Persistence

No data available.

Degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation

No data available

Biodegradability

No data available

12.4 Mobility in soil No data available

12.5 Other adverse effects No data available

MATERIAL SAFETY DATA SHEET

Product Name	**RNase A**

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with all applicable environmental laws and regulations.

13.2 Disposal considerations

Dispose of in accordance with all applicable environmental laws and regulations.

14. TRANSPORT INFORMATION

14.1 UN number

This product is NOT categorized under UN number

14.2 UN Proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Enviromental hazards

No data available

14.6 Special precautions for user

For personal protection see section 8.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

15. REGULATORY INFORMATION

15.1 Industiral Satefy and Health Act

No data available

15.2 Toxic Chemicals Control Act

No data available

15.3 Safety Control of Dangerous Substances Act

No data available

15.4 Wastes Control Act

Dispose of as hazardous waste in compliance with local and national regulations.

15.5 Other requirements in domesitc and other countires

Not applicable

16. OTHER INFORMATION

Issued date
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Revision number
2
Revision date
2023-05-22
Reference

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- END OF SAFETY DATA SHEET-