BIONEER
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Material Safety Data Sheet

Product Name	CAS No.	KE No.	UN No.	EU No.
AccuPrep® His-tagged Protein purification kit Elution buffer				

1. Chemical and Manufacturer Information

A. Product Name — Elution buffer

B. Recommended Usage and Limitations

Recommended Usage — This product is designed for Protein extraction from various samples. Product is used for purification of 6X Histidine tagged protein.

Limitations of Usage — This product is designed for the purpose of purification protein. Product users must be certified for Purification protein handling or trained in molecular biological experimental methods.

C. Manufacturer/Supplier/Distributor Information

Company Name — Bioneer Corporation

Address — Daedeok-gu Munpyeong-dong 49-3, Daejeon, South Korea

Emergency Contact Number — +82-42-930-8648

2. Risks·Hazards

A. Risk·Hazard Classification

Corrosive to metal : Category 1
Acute toxicity (oral) : Category 4
Skin corrosion / skin irritation : Category 2
Severe Eye Damage / Eye Irritation : Category 1
Reproductive Toxicity : Category 1A

B. Caution Items Including Preventative Measures

Warning Symbols

Warning Phrase — Danger

Risk·Hazard Phrase

H290 May be corrosive to metals.
H302 Hazardous if swallowed
H315 Causes skin irritation.
H318 Causes serious eye damage.
H361 Cause damage to the fetus or the reproductive capacity is suspect.

Preventative Measure Phrases

Prevention

P201 Obtain special instructions before use
P202 Do not handle until all safety precautions have been read understands.
P234 Keep only in original container.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective glove/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.

Response

P301+P312 Seek medical attention if swallowed and feeling uncomfortable
P302+P352 IF ON SKIN: Gently wash with plenty of soap and water.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 IF exposed or concerned: Get medical advice/ attention.

	P310 Immediate medical examination Seek.
	P321 Emergency treatment.
	P330 Rinse mouth.
	P332+P313 If skin irritation occurs: Get medical advice/ attention.
	P362 Take off contaminated clothing and wash before reuse.
	P390 Absorb spillage to prevent material damage.
Storage	P405 Store locked up.
	P406 Store in corrosive resistant/… container with a resistant inner liner.
Disposal	P501 Dispose of contents/container to …

C. Other Risks·Hazards Not Included in Risk·Hazard Classification (NFPA)

Imidazole	
Health	3
Fire	1
Reactivity	0
Sodium Chloride	
Health	1
Fire	0
Reactivity	0
Tris (hydroxymethyl) aminomethane	
Health	2
Fire	1
Reactivity	0

3. Ingredient Information

Ingredient Name	Other Name	CAS No.	% of Total
Sodium Chloride	Sodium Chloride	7647-14-5	2.9
Tris (hydroxymethyl) aminomethane	2-Amino-2-hydroxymethyl-propane-1,3-diol	77-86-1	0.6
Imidazole	Glyoxaline	288-32-4	3.2

4. First-Aid Measures

A. Upon Eye Contact	Flush eyes with water for several minutes. Remove contact lenses if possible. Seek emergency medical attention.
B. Upon Skin Contact	Seek medical attention if you feel irritation. Take off contaminated clothing and wash before reuse. If the hot material, heat affected area to eliminate of press wash in large amount cold water. Seek emergency medical attention. Remove contaminated clothing and shoes, and isolate the contaminated area Please. Materials in contact immediately wash the skin and eyes with flowing water more than 20 minutes. In case of minor exposure, prevent further spread of contamination.
C. Upon Inhalation	Immediate medical advice Seek. Please move to fresh air. Please warm and stable.
D. Upon Ingestion	Seek medical attention if exposure or contact is suspected. Rinse mouth. If ingestion or inhalation is suspected, do not perform mouth-to-mouth resuscitation but use a medical breathing device.
E. Other Cautions	Contact medical service upon exposure and perform emergency measures such as source analysis. Inform medical staff of substance and take all precautionary protection measures.

5. Explosion·Fire Measures

A. Proper(Improper) Extinguishing Material	
Proper(Improper) Extinguishing Material	To extinguish fire related to this material, use alcohol foam, carbon dioxide or water spraying. Use dry sand or earth for fire suppression
B. Specific Hazards from Chemicals	
Specific Hazards from Chemicals	May cause corrosion metals

Toxic gases may form during heat decomposition or combustion.
Container may explode upon heating.
Portions may burn but will not ignite easily.
May form explosive mixture when vapor is mixed with air.
Non-volatile. The chemical itself does not burn but heating may disintegrate and form corrosive/toxic fumes.

C. Firefighting Protection and Precautions

Sodium Chloride

Rescuers must wear appropriate protection.
Maintain a safe distance when extinguishing flames.
May be transported when melted.
Dig a trough to contain the spread of extinguished fluid.
Remove container if conditions are not hazardous.
For tank fires, extinguish at maximum distance or with unmanned extinguishing devices.
For tank fires, cool the container with excess water even after fire is extinguished.
During tank fires, if a high pitched sound emits from the pressure release valve or the tank becomes discolored, retreat immediately.
During tank fires, retreat from a tank consumed in flames.
During tank fires, if the fire is large-scale, use an unmanned extinguishing device or retreat and let the fire burn.

Tris (hydroxymethyl) aminomethane

Rescuers must wear appropriate protection.
Maintain a safe distance when extinguishing flames.
May be transported when melted.
Dig a trough to contain the spread of extinguished fluid.
Remove container if conditions are not hazardous.
For tank fires, extinguish at maximum distance or with unmanned extinguishing devices.
For tank fires, cool the container with excess water even after fire is extinguished.
During tank fires, if a high pitched sound emits from the pressure release valve or the tank becomes discolored, retreat immediately.
During tank fires, retreat from a tank consumed in flames.
During tank fires, if the fire is large-scale, use an unmanned extinguishing device or retreat and let the fire burn.

Imidazole

Rescuers must wear appropriate protection.
Maintain a safe distance when extinguishing flames.
Dig a trough to contain the spread of extinguished fluid.
Remove container if conditions are not hazardous.
For tank fires, extinguish at maximum distance or with unmanned extinguishing devices.
For tank fires, cool the container with excess water even after fire is extinguished.
During tank fires, if a high pitched sound emits from the pressure release valve or the tank becomes discolored, retreat immediately.
During tank fires, retreat from a tank consumed in flames.
During tank fires, if the fire is large-scale, use an unmanned extinguishing device or retreat and let the fire burn.

6. Accidental Release Measures

A. Measures and Protection for Personal Protection

Immediately wipe spills and follow prevention measures.
Remove all potential ignition sources.
Stop release if conditions are not hazardous.
Do not handle release or broken container without proper protection.
Use a plastic sheet to prevent spread.
Be aware of conditions and chemicals to avoid.

B. Measures for Environmental Protection

Prevent introduction into waterways, sewers, basements and sealed spaces.

C. Claining and Removal Measures

Construct a bank to extinguish fire and collect water.
Absorb spills with inert materials (e.g. dry sand or earth), and dispose of as chemical waste.
Absorb liquids and clean contaminated area with detergent and water.
For prevent of Material damage, please absorb the leak.

7. Handling and Storage

A. Handling Precautions	Do not handle until all safety measures and precautions are read and understood. Wash hands thoroughly after handling. Do not eat, drink or smoke while using this product. Residual material may exist after container is emptied. Follow all MSDS/label precautions. Handle/store with caution. Open lid carefully. Prolonged or continuous skin contact, please stop. Arising from heated material Do not breathe vapors. Do not enter storage areas lacking adequate ventilation. Be aware of conditions and chemicals to avoid.
B. Storage Precautions	Please keep the original container only. Keep sealed and store. Because the metal corrosive substances (defined in a manufacturer or government office) Store in a corrosion-resistant containers. Completely drain empty drums and adequately seal. Immediately return drum to controller or place appropriately. Keep away from food and drinks.

8. Exposure Prevention and Personal Protection

A. Chemical Exposure Standards, Biological Exposure Standards Etc.	
Domestic Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information
ACGIH Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	Not Applicable
Biological Exposure Standards	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	Not Applicable
B. Proper Physical Management	Use process separation, local ventilation, minimizing air contamination below exposure thresholds etc. for physical management. Install face and emergency showers where this material is stored or used.
C. Personal Protection	
Respiratory Protection	
Sodium Chloride	Use KOSHA certified respiratory protection appropriate for the particular material and its physical and chemical properties.
Tris (hydroxymethyl) aminomethane	Use KOSHA certified respiratory protection appropriate for the particular material and its physical and chemical properties.
Imidazole	Use KOSHA certified respiratory protection appropriate for the particular material and its physical and chemical properties.

9. Physical and Chemical Properties

A. Appearance	
Form	No Information
Color	No Information
B. Odor	No Information
C. Threshold Odor	No Information
D. pH	No Information
E. Freezing/Melting Point	No Information
F. Boiling Point and Range	No Information
G. Flash Point	No Information
H. Evaporation Speed	No Information
I. Flammability (Solid, Gas)	No Information
J. Ignition or Explosion Range (Upper/Lower)	No Information
K. Vapor Pressure	No Information
L. Solubility	No Information
M. Vapor Density	No Information

N. Specific Weight	No Information
O. n-Octanol/Water Solubility Coefficient	No Information
P. Self-Flammability	No Information
Q. decomposition Temperature	No Information
R. Viscosity	No Information
S. Molecular Weight	No Information

Sodium Chloride

A. Appearance	
Form	Solid
Color	Colorless, white
B. Odor	None
C. Threshold Odor	No Information
D. pH	pH 6.7 (6.7-7.3)
E. Freezing/Melting Point	801 ℃
F. Boiling Point and Range	1413 ℃
G. Flash Point	No Information
H. Evaporation Speed	No Information
I. Flammability (Solid, Gas)	No Information
J. Ignition or Explosion Range (Upper/Lower)	- / -
K. Vapor Pressure	9.01575 ㎜Hg (at 1026.85℃)
L. Solubility	360000 ㎎/ℓ
M. Vapor Density	No Information
N. Specific Weight	2.16
O. n-Octanol/Water Solubility Coefficient	-0.46
P. Self-Flammability	No Information
Q. decomposition Temperature	No Information
R. Viscosity	No Information
S. Molecular Weight	58.44

Tris (hydroxymethyl) aminomethane

A. Appearance	
Form	Solid
Color	White
B. Odor	Somewhat unique odor
C. Threshold Odor	No Information
D. pH	pH 10.4
E. Freezing/Melting Point	171 ~ 172℃
F. Boiling Point and Range	219 ~ 220℃ (at 10mmHg)
G. Flash Point	170 ℃
H. Evaporation Speed	No Information
I. Flammability (Solid, Gas)	No Information
J. Ignition or Explosion Range (Upper/Lower)	- / -
K. Vapor Pressure	0.000002 ㎜Hg (at 25℃)
L. Solubility	550 ㎎/ℓ
M. Vapor Density	No Information
N. Specific Weight	1.328
O. n-Octanol/Water Solubility Coefficient	-1.56 (estimated)
P. Self-Flammability	No Information
Q. decomposition Temperature	No Information
R. Viscosity	No Information
S. Molecular Weight	121.14

Imidazole

A. Appearance	
Form	Solid, Crystal
Color	Colorless to yellow
B. Odor	Fishy smell
C. Threshold Odor	(No Information)
D. pH	9.8 ((10.0% solution))
E. Freezing/Melting Point	90 ℃ (Melting Point)
F. Boiling Point and Range	257 ℃
G. Flash Point	145 ℃
H. Evaporation Speed	(Not Applicable)
I. Flammability (Solid, Gas)	(No Information)
J. Ignition or Explosion Range (Upper/Lower)	- / - % (No Information)
K. Vapor Pressure	0.0462 ㎜Hg (at 25℃ (estimated))
L. Solubility	(Water solubility: 159 g/L at 25℃ (estimated))

M. Vapor Density	2.36 (air=1)
N. Specific Weight	0.6 ((water=1))
O. n-Octanol/Water Solubility Coefficient	-0.08
P. Self-Flammability	480 ℃
Q. decomposition Temperature	(No Information)
R. Viscosity	(No Information)
S. Molecular Weight	68.08

10. Stability and Reactivity

A. Chemical Stability and Toxic Reaction Potential

Sodium Chloride	Toxic gases may form by decomposition under high heat. Container may explode upon heating. Portions may burn but will not ignite easily. Non-volatile. The chemical itself does not burn but heating may disintegrate and form corrosive/toxic fumes.
Tris (hydroxymethyl) aminomethane	Container may explode upon heating. Portions may burn but will not ignite easily. Non-volatile. The chemical itself does not burn but heating may disintegrate and form corrosive/toxic fumes. During a fire can cause irritation, corrosive, toxic gas.
Imidazole	May cause corrosion metals. Toxic gases may form by decomposition under high heat. Container may explode upon heating. Contact with some metals and can generate flammable hydrogen gas. Non-volatile. The chemical itself does not burn but heating may disintegrate and form corrosive/toxic fumes. Some oxidizers may ignite combustibles as.

B. Conditions to Avoid

Sodium Chloride	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Tris (hydroxymethyl) aminomethane	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Imidazole	Heat

C. Chemicals to Avoid

Sodium Chloride	Flammable material, reducing material.
Tris (hydroxymethyl) aminomethane	Flammable material, reducing material.
Imidazole	Flammable material, reducing material.

D. Toxic Chemicals Formed with Decomposition

Sodium Chloride	Irritating and highly toxic gases may form while burning through heat decomposition or combustion.
Tris (hydroxymethyl) aminomethane	Irritating and highly toxic gases may form while burning through heat decomposition or combustion.
Imidazole	Irritating and highly toxic gases may form while burning through heat decomposition or combustion.

11. Toxicology Information

A. Probable Exposure Paths

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	May cause irritation, respiratory distress, headache, dizziness, sleepiness, loss of motor function. May cause burns. May cause irritation.

B. Heath Hazard Information

Acute Toxicity

Oral

Sodium Chloride	LD50 3000 ㎎/㎏ Rat
Tris (hydroxymethyl) aminomethane	LD50 5900 ㎎/㎏ Rabbit
Imidazole	LD50 960 ~ 970 ㎎/㎏ Rat

Skin

Sodium Chloride	LD50 > 10000 ㎎/㎏ Rabbit
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	(No Information)

Inhalation

Sodium Chloride	Dust LC50> 10.5 ㎎/ℓ 4 hr Rat
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	(No Information)

Skin Corrosion or Irritation

Sodium Chloride	Rabbit: Minimal irritant.
Tris (hydroxymethyl) aminomethane	Causes skin irritation.
Imidazole	4 hours after exposure, 24 hours in 48 hours, necrosis takes place.

Severe Eye Damage or Irritation

Sodium Chloride	Rabbit: Medium irritation.
Tris (hydroxymethyl) aminomethane	Causes eyes irritation.
Imidazole	10-12 day Recovery irritation, 1day in 8day, Cause a slight inflammation, The iris score 5/10, chemosis score 10~14 Irritating to medium.

Respiratory Hypersensitivity

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

Skin Hypersensitivity

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

Carcinogenic Properties

Industrial Safety Regulation

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

Department of Labor Notice

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

IARC

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

OSHA

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

ACGIH

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

NTP

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

EU CLP

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

Reproductive Cell Mutation Properties

Sodium Chloride	In vitro - Salmonella typhimurium/TA97, TA98, TA100, TA1535, TA1537, TA1538(Ames test): Negative, Nonhuman/Chromosome abberation test:Negative, CHO Cells/Chromosome abberation test: Positive
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	Ames test: Negative Salmonella typhimurium TA1535, TA97, 98, 100, 102 : 0.625, 1.25, 2.5, 5, 10 mg/plate, Unscheduled DNA synthesis : Negative Rat primary hepatocytes: 0.25, 0.5, 1, 2, 4 mg/ml, In vivo: Negative NMRI mouse : 500, 1000, 2000 mg/kg bw

Reproductive Toxicity

Sodium Chloride	Female/placental administration (27 mg/kg for 15W of pregnancy): Miscarriage, fetal toxicity, musculoskeletal abnormality
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	Reproductive Toxicity: Negative Developmental and teratogenicity toxicity: NOAEL materal/ developmental toxicity/teratogenicity : 60 mg/kg bw

	Rat(Wistar), Dose : 0, 20, 60, 180 mg/kg bw/d(14 d) test result: Highest concentrations in patients of 6-8day and 17-20 day gestation period was significantly reduced body weight, The influence of body weight, especially 17-20 days 26% reduction in uterine weight caused, reabsorption ratio increased, the average fetal weight and mother-compared to the low toxicity. Reduction in the ratio, Increased post-implantation loss. Mother-toxic effects were, 10% increase in skeletal abnormalities
Target Organ Toxicity (Single Exposure)	
Sodium Chloride	Rat/Oral (1 mg/kg/24hr): Sodium-Potassium excretion effect.
Tris (hydroxymethyl) aminomethane	Irritating to pray inhalation.
Imidazole	Unbalance of convulsions and lateral posture.
Target Organ Toxicity (Repeat Exposure)	
Sodium Chloride	High blood pressure rats injected with salt displayed kidney and arterydisability, nephron and glomerular damage. No effect on non-salt injectednormal rats. Potassium intake prevents high blood pressure. Rat/Oral (16800 mg/kg/28D): TOXIC EFFECTS: Endocrinal - Adrenal gland weight difference Rat/Oral (16800 mg/kg/28D): TOXIC EFFECTS: Endocrine - Changes in adrenal weight No Information
Tris (hydroxymethyl) aminomethane Imidazole	Target organ: Liver and kidney Rat NOAEL: about 60 mg/kg, 90일 Exposure, Concentration 0, 20, 60, 180 mg/kg bw/d, Renal proximal convoluted tubule α2u-microglobulin store.
Inhalation Toxicity	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

12. Ecological Information

A. Biological Toxicity

Fish	
Sodium Chloride	LC50 1294.6 ㎎/ℓ 96 hr Lepomis macrochirus
Tris (hydroxymethyl) aminomethane	LC50 955.892 ㎎/ℓ 96 hr
Imidazole	LC50 327 ㎎/ℓ 96 hr 기타
Crustacean	
Sodium Chloride	EC50 402.6 ㎎/ℓ 48 hr Daphnia magna
Tris (hydroxymethyl) aminomethane	EC50 19.793 ㎎/ℓ 48 hr
Imidazole	EC50 341 ㎎/ℓ 48 hr Daphnia magna
Avian	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	EC50 163.053 ㎎/ℓ 96 hr
Imidazole	ErC50 133 ㎎/ℓ 72 hr Scenedesmus subspicatus

B. Persistency and Degradability

Persistency	
Sodium Chloride	log Kow -0.46
Tris (hydroxymethyl) aminomethane	log Kow -1.56 (estimated)
Imidazole	log Kow -0.08
Degradability	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

C. Bioconcentration

Concentration	
Sodium Chloride	BCF 3.162
Tris (hydroxymethyl) aminomethane	BCF 3
Imidazole	No Information
Biodegradability	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	98 (%) 18 day

D. Soil Mobility

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

E. Other Toxic Effects

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

13. Disposal Information

A. Disposal Method

Sodium Chloride	Observe all local and national environmental regulations if applicable.
Tris (hydroxymethyl) aminomethane	Observe all local and national environmental regulations if applicable.
Imidazole	Observe all local and national environmental regulations if applicable.

B. Disposal Considerations

Sodium Chloride	Observe all local and national environmental regulations if applicable.
Tris (hydroxymethyl) aminomethane	Observe all local and national environmental regulations if applicable.
Imidazole	Observe all local and national environmental regulations if applicable.

14. Transport Information

A. UN No.

Sodium Chloride	No classification information.
Tris (hydroxymethyl) aminomethane	No classification information.
Imidazole	1759

B. Proper Shipping Name

Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Imidazole	CORROSIVE SOLID, N.O.S.

C. Shipping Hazard Classification

Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Imidazole	8

D. Container Classification

Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Imidazole	1

E. Marine Pollutant

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

F. Special Safety Measures for Users Regarding Shipping or Shipping Measures

Fire Emergency Measures

Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Imidazole	F-A

Release Emergency Measures

Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Imidazole	S-B

15. Regulatory Status

A. Industrial Safety and Health Regulation

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

B. Hazardous Chemical Management Regulation

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

C. Dangerous Material Management Regulation

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

D. Waste Management Regulation

Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Imidazole	No Information

E. Other Domestic and International Regulations

Domestic Regulation

Residual Organic Contaminant Management Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
International Regulations
OSHA Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
CERCLA Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EPCRA 302 Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EPCRA 304 Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EPCRA 313 Regulation
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
Rotterdam Convention Substance
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
Stockholm Convention Substance
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
Montreal Protocol Substance
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EU Classification (Confirmed Classification Result)
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EU Classification (Risk Phrases)
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable
EU Classification (Safety Phrases)
Sodium Chloride Not Applicable
Tris (hydroxymethyl) aminomethane Not Applicable
Imidazole Not Applicable

16. Other References
A. Source of Information
Sodium Chloride
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (Form)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (Color)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (B. Odor)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (D. pH)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (E. Freezing/Melting Point)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (F. Boiling Point and Range)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (K. Vapor Pressure)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (L. Solubility)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (N. Specific Weight)
Quantitative Structure Activity Relation(QSAR) (O. n-Octanol/Water Solubility Coefficient)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (S. Molecular Weight)
International Uniform ChemicaL Information Database(IUCLID)(http://ecb.jrc.it/esis) (Oral)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Skin)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Inhalation)
International Uniform ChemicaL Information Database(IUCLID)(http://ecb.jrc.it/esis) (Skin Corrosion or Irritation)
International Uniform ChemicaL Information Database(IUCLID)(http://ecb.jrc.it/esis) (Severe Eye Damage or Irritation)
National Library of Medicine/genetic toxicology(NLM/GENETOX)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?GENETOX) (Reproductive Cell Mutation Properties)
International Uniform ChemicaL Information Database(IUCLID)(http://ecb.jrc.it/esis) (Reproductive Cell Mutation Properties)
National Library of Medicine/Chemical Carcinogenesis Research Information System(NLM/CCRIS)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CCRIS) (Reproductive Cell Mutation Properties)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Reproductive Toxicity)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Target Organ Toxicity (Single Exposure))
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Target Organ Toxicity (Repeat Exposure))
International Uniform ChemicaL Information Database(IUCLID)(http://ecb.jrc.it/esis) (Target Organ Toxicity (Repeat Exposure))
The ECOTOXicology database (ECOTOX)(http://cfpub.epa.gov/ECOTOX/quick_query.htm) (Fish)
The ECOTOXicology database (ECOTOX)(http://cfpub.epa.gov/ECOTOX/quick_query.htm) (Crustacean)
Quantitative Structure Activity Relation(QSAR) (Persistency)
Quantitative Structure Activity Relation(QSAR) (Concentration)

Tris (hydroxymethyl) aminomethane
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (Form)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (Color)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (B. Odor)
The Merck Index 13th Ed.(D. pH)
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB) (E. Freezing/Melting Point)
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB) (F. Boiling Point and Range)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (G. Flash Point)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (K. Vapor Pressure)
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB) (L. Solubility)
The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (N. Specific Weight)
HSDB(O. n-Octanol/Water Solubility Coefficient)
National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB) (S. Molecular Weight)
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com) (Oral)
Ecological Structure Activity Relationships(ECOSAR) (Fish)
Ecological Structure Activity Relationships(ECOSAR) (Crustacean)
Ecological Structure Activity Relationships(ECOSAR) (Avian)
HSDB (Persistency)
HSDB (Concentration)
Akron University(http://ull.chemistry.uakron.edu/erd/)

Imidazole
TOME(Oral)
SIDS(Skin Corrosion or Irritation)
SIDS(Severe Eye Damage or Irritation)
SIDS(Reproductive Cell Mutation Properties)
SIDS(Reproductive Toxicity)
SIDS(Target Organ Toxicity (Single Exposure))
SIDS(Target Organ Toxicity (Repeat Exposure))
SIDS(Fish)
SIDS(Crustacean)
SIDS(Avian)
SIDS(Biodegradability)

B. Initial Issue Date	2011-06-30
C. Revision Count and Latest Revision Date	
Revision Count	0
Latest Revision Date	0
D. Other	

○ This Material Safety Data Sheet (MSDS) is based on, edited and partially modified from a MSDS obtainedfrom the Korean Occupational Safety & Health Agency.