

Material Safety Data Sheet

Product Name	CAS No.	KE No.	UN No.	EU No.
AccuPrep® His-tagged Protein purification ki				
Binding/washing buffer				
. Chemical and Manufacturer Information				
A. Product Name	Binding/washing buffe	r		
B. Recommended Usage and Limitations	Diffullity/washing built	;		
Recommended Usage	This product is design	ad for Dratain	autroption from	vorious some
necommended Osage	This product is design Product is used for pu			
Limitations of Usage	This product is design			
	Product users must be			
	trained in molecular bi			-
C. Manufacturer/Supplier/Distributor Information		ological exper	intental method	5.
Company Name	Bioneer Corporation			
Address	Daedeok-gu Munpyed	na-dona 19-	3 Daoioon Sou	ith Koroa
Emergency Contact Number	+82-42-930-8648	ing doing 43	0, Daejeon, 000	
Emergency contact number	102 42 930 0040			
. Risks∙Hazards				
A. Risk Hazard Classification	Reproductive Toxicity	: Category 2		
B. Caution Items Including Preventative Measures Warning Symbols				
Warning Phrase	Warning			
Warning Phrase Risk·Hazard Phrase	Warning H361 Cause damage	o the fetus or	the reproductiv	e capacity is
-		o the fetus or	the reproductiv	e capacity is
-	H361 Cause damage	o the fetus or	the reproductiv	e capacity is
Risk Hazard Phrase	H361 Cause damage suspect. P201 Obtain special ir	structions bef	ore use	
Risk·Hazard Phrase Preventative Measure Phrases	H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u	structions bef	ore use	
Risk·Hazard Phrase Preventative Measure Phrases	H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands.	nstructions bef ntil all safety p	ore use recautions have	e been read
Risk·Hazard Phrase Preventative Measure Phrases Prevention	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal processional processional procession. 	nstructions bef ntil all safety p otective equipt	ore use recautions have ment as require	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal pro P308+P313 IF expose 	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propagation provides and provides the second statement of th	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal pro P308+P313 IF expose 	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propersonal P308+P313 IF expose P405 Store locked up. P501 Dispose of contract of the part of th	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propersonal P308+P313 IF expose P405 Store locked up. P501 Dispose of contract of the part of th	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal C. Other Risks Hazards Not Included in Risk Hazar	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propersonal P308+P313 IF expose P405 Store locked up. P501 Dispose of contract of the part of th	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal C. Other Risks Hazards Not Included in Risk Hazar Sodium Chloride	H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal pro P308+P313 IF expose P405 Store locked up. P501 Dispose of cont d Classification (NFPA)	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal C. Other Risks Hazards Not Included in Risk Hazar Sodium Chloride Health Fire Reactivity	H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal pro P308+P313 IF expose P405 Store locked up. P501 Dispose of cont d Classification (NFPA)	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal C. Other Risks Hazards Not Included in Risk Hazar Sodium Chloride Health Fire	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propose P308+P313 IF expose P405 Store locked up. P501 Dispose of control d Classification (NFPA) 1 0 	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.
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Risk Hazard Phrase Preventative Measure Phrases Prevention Response Storage Disposal C. Other Risks Hazards Not Included in Risk Hazar Sodium Chloride Health Fire Reactivity Tris (hydroxymethyl) aminomethane	 H361 Cause damage suspect. P201 Obtain special ir P202 Do not handle u understands. P281 Use personal propersonal P308+P313 IF expose P405 Store locked up. P501 Dispose of control d Classification (NFPA) 1 0 0 	nstructions bef ntil all safety p otective equip d or concerne	ore use recautions have ment as require d: Get medical	e been read d.

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

4. First-Aid Measures	
A. Upon Eye Contact	Seek emergency medical attention.
	Materials in contact immediately wash the skin and eyes with flowing
	water more than 20 minutes.
B. Upon Skin Contact	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	Seek medical attention if exposure or contact is suspected.
	Please move to fresh air.
	If ingestion or inhalation is suspected, do not perform mouth-to-
	mouth resuscitation but use a medical breathing device.
	Please warm and stable.
D. Upon Ingestion	Seek medical attention if exposure or contact is suspected.
	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
Toper(improper) Extinguishing Material	dioxide or water spraying.
	Use dry sand or earth for fire suppression
B. Specific Hazards from Chemicals	
Specific Hazards from Chemicals	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.
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.
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	May be transported when melted.
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	extinguishing device or retreat and let the fire burn.

6. Accidental Release Measures A. Measures and Protection for Personal

Immediately wipe spills and follow prevention measures.

Protection	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.
7. Handling and Storage	
A. Handling Precautions	Do not handle until all safety measures and precautions are read and understood.
	Residual material may exist after container is emptied. Follow all
	MSDS/label precautions.
	Handle/store with caution.
	Open lid carefully.
	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	Keep sealed and store.
	Completely drain empty drums and adequately seal. Immediately
	return drum to controller or place appropriately.
8. Exposure Prevention and Personal Protection	
A. Chemical Exposure Standards, Biological Expo	osure Standards Etc.
Domestic Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
ACGIH Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
Biological Exposure Standards	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
B. Proper Physical Management	Use process separation, local ventilation, minimizing air

management.

used.

C. Personal Protection Respiratory Protection Sodium Chloride

Tris (hydroxymethyl) aminomethane

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

Use KOSHA certified respiratory protection appropriate for the particular material and its physical and chemical properties. Use KOSHA certified respiratory protection appropriate for the particular material and its physical and chemical properties.

contamination below exposure thresholds etc. for physical

Install face and emergency showers where this material is stored or

N. Specific Weight No Information O. n-Octanol/Water Solubility Coefficient No Information P. Self-Flammability No Information No Information Q. decomposition Temperature 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 pH 6.7 (6.7-7.3) D. pH E. Freezing/Melting Point 801 °C F. Boiling Point and Range 1413 ℃ No Information G. Flash Point H. Evaporation Speed No Information I. Flammability (Solid, Gas) No Information J. Ignition or Explosion Range (Upper/Lower) - / -9.01575 mmHg (at 1026.85℃) K. Vapor Pressure L. Solubility 360000 mg/l M. Vapor Density No Information N. Specific Weight 2.16 O. n-Octanol/Water Solubility Coefficient -0.46 No Information P. Self-Flammability Q. decomposition Temperature No Information R. Viscositv No Information 58.44 S. Molecular Weight Tris (hydroxymethyl) aminomethane A. Appearance Form Solid Color White Somewhat unique odor B. Odor No Information C. Threshold Odor D. pH pH 10.4 E. Freezing/Melting Point 171 ~ 172℃ 219 ~ 220℃ (at 10mmHg) F. Boiling Point and Range G. Flash Point 170 °C H. Evaporation Speed No Information I. Flammability (Solid, Gas) No Information J. Ignition or Explosion Range (Upper/Lower) - / -K. Vapor Pressure 0.000002 mmHg (at 25℃) L. Solubility 550 mg/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 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. 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. C. Chemicals to Avoid Sodium Chloride Flammable material, reducing material. Tris (hydroxymethyl) aminomethane 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. 11. Toxicology Information A. Probable Exposure Paths Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information B. Heath Hazard Information Acute Toxicity Oral Sodium Chloride LD50 3000 mg/kg Rat Tris (hydroxymethyl) aminomethane LD50 5900 mg/kg Rabbit Skin LD50 > 10000 mg/kg Rabbit Sodium Chloride Tris (hydroxymethyl) aminomethane No Information Inhalation Sodium Chloride Dust LC50> 10.5 mg/l 4 hr Rat Tris (hydroxymethyl) aminomethane No Information Skin Corrosion or Irritation Sodium Chloride Rabbit: Minimal irritant. Tris (hydroxymethyl) aminomethane Causes skin irritation. Severe Eye Damage or Irritation Sodium Chloride Rabbit: Medium irritation. Tris (hydroxymethyl) aminomethane Causes eyes irritation. Respiratory Hypersensitivity Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information Skin Hypersensitivity Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information Carcinogenic Properties Industrial Safety Regulation No Information Sodium Chloride Tris (hydroxymethyl) aminomethane No Information Department of Labor Notice No Information Sodium Chloride Tris (hydroxymethyl) aminomethane No Information IARC Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information OSHA Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information ACGIH Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information NTP Sodium Chloride No Information Tris (hydroxymethyl) aminomethane No Information EU CLP Sodium Chloride No Information Tris (hydroxymethyl) aminomethane 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

Reproductive Toxicity Sodium Chloride	Female/placental administration (27 mg/kg for 15W of pregnancy):
	Miscarriage, fetal toxicity, musculoskeletal abnormality
Tris (hydroxymethyl) aminomethane Target Organ Toxicity (Single Exposure)	No Information
Sodium Chloride	Rat/Oral (1 mg/kg/24hr): Sodium-Potassium excretion effect.
Tris (hydroxymethyl) aminomethane Target Organ Toxicity (Repeat Exposure)	Irritating to pray inhalation. High blood pressure rats injected with salt displayed kidney and
Sodium Chloride	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 Inhalation Toxicity	Target organ: Liver and kidney Rat NOAEL: about 60 mg/kg, 90일
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
12. Ecological Information	
A. Biological Toxicity Fish	
Sodium Chloride	LC50 1294.6 mg/l 96 hr Lepomis macrochirus
Tris (hydroxymethyl) aminomethane Crustacean	LC50 955.892 mg/l 96 hr
Sodium Chloride	EC50 402.6 mg/l 48 hr Daphnia magna
Tris (hydroxymethyl) aminomethane	EC50 19.793 mg/ℓ 48 hr
Avian Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	EC50 163.053 mg/l 96 hr
B. Persistency and Degradability Persistency	
Sodium Chloride	log Kow -0.46
Tris (hydroxymethyl) aminomethane Degradability	log Kow -1.56 (estimated)
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane C. Bioconcentration	No Information
Concentration	
Sodium Chloride	BCF 3.162
Tris (hydroxymethyl) aminomethane Biodegradability	BCF 3
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane D. Soil Mobility	No Information
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane E. Other Toxic Effects	No Information
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	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.
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.
14. Transport Information A. UN No.	
Sodium Chloride	No classification information.
Tris (hydroxymethyl) aminomethane	No classification information.

B. Proper Shipping Name	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
C. Shipping Hazard Classification	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
D. Container Classification	Not Applicable
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
E. Marine Pollutant	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
F. Special Safety Measures for Users Regarding Sl	nipping or Shipping Measures
Fire Emergency Measures	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Release Emergency Measures	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
15. Regulatory Status	
A. Industrial Safety and Health Regulation	
Sodium Chloride	No. Information
	No Information
Tris (hydroxymethyl) aminomethane	No Information
B. Hazardous Chemical Management Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
C. Dangerous Material Management Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
	NO IIIOIIIation
D. Waste Management Regulation	
Sodium Chloride	No Information
Tris (hydroxymethyl) aminomethane	No Information
E. Other Domestic and International Regulations	
Domestic Regulation	
Residual Organic Contaminant Management	
Regulation	
0	Not Appliable
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
International Regulations	
OSHA Regulation	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
CERCLA Regulation	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
EPCRA 302 Regulation	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
EPCRA 304 Regulation	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
	Not Applicable
EPCRA 313 Regulation	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Rotterdam Convention Substance	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Stockholm Convention Substance	•••
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable
Montreal Protocol Substance	
Sodium Chloride	Not Applicable
Tris (hydroxymethyl) aminomethane	Not Applicable

EU Classification (Confirmed Classification Result) Sodium Chloride Not Applicable Tris (hydroxymethyl) aminomethane Not Applicable EU Classification (Risk Phrases) Sodium Chloride Not Applicable Tris (hydroxymethyl) aminomethane Not Applicable EU Classification (Safety Phrases) Sodium Chloride Not Applicable Tris (hydroxymethyl) aminomethane 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(<u>http://ull.chemistry.uakron.edu/erd</u>) (B. Odor) The Chemical Database, The Department of Chemistry at the University of Akron(<u>http://ull.chemistry.uakron.edu/erd</u>) (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(<u>http://csi.micromedex.com</u>) (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/cgibin/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(<u>http://csi.micromedex.com</u>) (Target Organ Toxicity (Single Exposure)) Corporate Solution From Thomson Micromedex(<u>http://csi.micromedex.com</u>) (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(<u>http://ull.chemistry.uakron.edu/erd</u>) (Form) The Chemical Database, The Department of Chemistry at the University of Akron(<u>http://ull.chemistry.uakron.edu/erd</u>) (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/cgibin/sis/htmlgen?HSDB) (E. Freezing/Melting Point) National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgibin/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(<u>http://ull.chemistry.uakron.edu/erd</u>) (K. Vapor Pressure) National Library of Medicine/Hazardous Substances Data Bank(NLM/HSDB)(http://toxnet.nlm.nih.gov/cgibin/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/cgibin/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/) 2011-06-30 B. Initial Issue Date C. Revision Count and Latest Revision Date **Revision Count** 0 Latest Revision Date 0 D. Other

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