RoClean L211
SAFETY DATA SHEET

1. Company and Product Identification

1.1	Identification – Product Name:	**RoClean L211**
1.2	Other means of identification Synonym:	Organic Amine salt Mixture, none
1.3	Recommended Use Of The Chemical and Restrictions On Use:	Reverse osmosis membrane cleaner Use only as directed on the label.
1.4	Name, Address, And Telephone Number Of The Manufacturer, Or Other Responsible Party:	**AVISTA TECHNOLOGIES** 140 Bosstick Street San Marcos, CA 92069 (760) 744-0536
	Competent Person email address	klindsey@avistatech.com
1.5	24 Hour Emergency No.:	1-800-424-9300 (United States) 1-202-483-7616 (International Collect)

DRINKING WATER TREATMENT ADDITIVES CLASSIFIED BY NSF INTERNATIONAL TO ANSI/NSF 60 AS STANDARD DRINKING WATER TREATMENT CHEMICAL FOR USE OFF-LINE IN REVERSE OSMOSIS SYSTEMS.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: *This product is a clear, colorless to amber colored, corrosive solution with a light, disinfectant odor. Depending on the duration of contact, over-exposures can severely irritate the skin or eyes and respiratory system, or cause burns. This product is neither reactive nor flammable. Thermal decomposition of this product produces irritating vapors and toxic gases (e.g. carbon monoxide, carbon dioxide, oxides of nitrogen and sodium). Emergency responders must wear personal protective equipment (and have appropriate fire-extinguishing protection) suitable for the situation to which they are responding.*

Physical Hazards Summary	None
Potential Health Hazards Summary	Eye Irritant, Category 2A Acute toxicity, oral, Category 3 Acute toxicity, dermal, Category 3 Skin sensitizer, Category 1
Potential Ecological Effects Summary	None

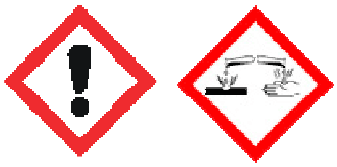
2.1 Classification Of Product

U.S. OSHA classification	Corrosive, Skin, eye irritant, sensitizer
Classification as per EC 1272/2008 (CLP/GHS)	Eye Irritant, Category 2A Acute toxicity, oral, Category 3 Acute toxicity, dermal, Category 3 Skin sensitizer, Category 1 Xi Irritant
WHMIS classification	E, corrosive

Hazardous Materials Information System (HMIS) Rating

Health	**3**
Flammability	**0**
Physical Hazard	**0**
Protective Equipment	**D**

2.2 Label Elements OSHA/GHS

General Warnings	P101	If medical advice is needed, have product container or label at hand.
	P102	Keep out of reach of children.
	P103	Read label before use
	P403	Store in a well-ventilated place.
	P233	Keep container tightly closed
Signal Word	WARNING!	
Hazard statements	H319	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P305 + P351 + P338	
	H317	May cause an allergic skin reaction
	H 312	Harmful in contact with skin
	H332	Harmful if inhaled
	H314	Causes severe skin burns and eye damage
Precautionary statements	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	P305	IF IN EYES: rinse extensively with large amounts of water
	P351	Rinse cautiously with water for several minutes.
	P338	Remove contact lenses, if present and easy to do. Continue rinsing.
	P310	F INGESTED or INHALED Immediately call a POISON CENTER or doctor/physician.
Hazard pictograms		

2.3 Unclassified Hazards None

2.4 Ingredients with unknown acute toxicity None

3. COMPOSITION and INFORMATION ON INGREDIENTS

Chemical name CAS # EINECS #	% w/w	US OSHA	GHS/EU CLP	WHMIS
Chelate Agent Proprietary Proprietary	20 - 30	Irritant	Eye Irritant, Category 2A H319 P305 + P351 + P338	Class D2B: Toxic Material at > 1% 
Organic Amine Proprietary Proprietary	20 - 30	Corrosive, Combustible liquid	Skin sensitizer, Category 1 Acute toxicity, oral, Category 3 H317 Acute toxicity, dermal, Category 3	B3 Combustible E Corrosive
Glycol Wetting Agent Proprietary Proprietary	1 - 5	Low hazard	Not regulated	Not regulated
Chelate Agent 2 Proprietary Proprietary	1 - 5	Toxic	Acute toxicity, oral, Category 3 Acute toxicity, dermal, Category 3	D2B Other toxic effects
Surfactant Proprietary Proprietary	1 - 5	Corrosive, Combustible liquid	Skin sensitizer, Category 1 Acute toxicity, oral, Category 3 Acute toxicity, oral, Category 3	B3 Combustible E Corrosive

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.

4. FIRST-AID MEASURES

4.1 Description of Necessary Measures

Skin exposure: If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim should seek immediate medical attention if any adverse exposure symptoms develop.

Eye exposure: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek medical attention.

Inhalation: If mist of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

Ingestion: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING. Have victim rinse mouth with water, if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention.

4.2 Most Important Symptoms/Effects: Immediate: Inhalation exposure may cause coughing or sneezing. Symptoms of skin and eye contact may include redness and irritation. Ingestion may cause stomach pains, cramps, and gastritis.

Delayed: Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Symptoms may include tingling, redness, and visible injury.

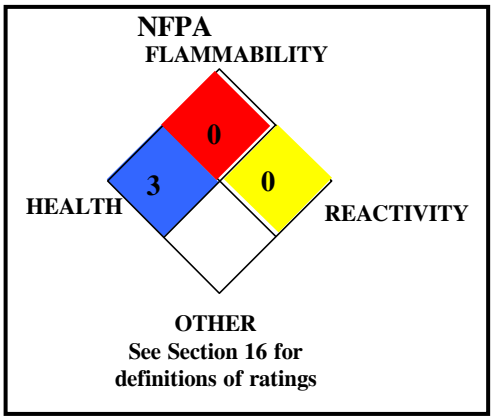
4.3 Indication Of Immediate Medical Attention And Special Treatment Needed, **TARGET ORGANS:** Acute: Skin, eyes, respiratory system. Chronic: Skin, eyes, respiratory system

If Necessary:

Victims of chemical exposure must be taken for medical attention if any adverse effects occur. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to physician or health professional with victim.

5. FIRE-FIGHTING MEASURES

Flammable properties — Non-flammable aqueous solution



Flash Point °C: Not applicable.

Autoignition Temperature °C: Not applicable.

Flammable Limits (in air by volume, %):
Upper: Not applicable.
Lower: Not applicable.

5.1 Suitable And Unsuitable Extinguishing Media: This material will not contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire.

Water spray	YES	Carbon dioxide	YES
Foam	YES	Dry chemical	YES
Halon	YES	Other	YES

5.2 Specific Hazards Arising From Chemical: When involved in a fire, this material may decompose and produce irritating fumes and toxic gases (e.g., carbon monoxide, carbon dioxide, and nitrogen oxides).

Explosion Sensitivity to Mechanical Impact: Not applicable.
Explosion Sensitivity to Static Discharge: Not applicable.

5.3 Special Protective Equipment And Precautions For Fire-Fighters: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people.

Protective equipment: For small releases (< 20 L), clean up spilled liquid wearing gloves, goggles, faceshield, and suitable body protection. The minimum Personal Protective Equipment recommended for response to non-incidental releases (more than 20 L) should be Level C: triple-gloves (neoprene gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and full-face respirator with Amine and HEPA filter.

Emergency procedures: Monitoring must indicate that exposure levels are below those provided in Section 8 (Exposure Controls-Personal Protection) and that oxygen levels are above 19.5% before anyone is permitted in the area without Self-Contained

Breathing Apparatus.

6.2 Methods and Materials for Containment and Cleaning Up

Vacuum or soak- up solids liquid for recovery/disposal. Neutralize residue with citric acid or other neutralizing agent for dilute amines. Decontaminate the area thoroughly. Test area with litmus paper to ensure neutralization. Place all spill residues in a suitable plastic container. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate local standards (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE

7.1 Precautions for Safe Handling

All employees who handle this material should be trained to handle it safely. Open containers carefully on a stable surface. Empty containers may contain residual liquid; therefore, empty containers should be handled with care.

As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid generating dust of this product. Remove contaminated clothing immediately.

During equipment maintenance follow practices indicated in Section 6 (Accidental Release Measures) to decontaminate equipment or clean-up small spills. Make certain that application equipment is locked and tagged-out safely if necessary. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or appropriate local standards.

7.2 Conditions For Safe Storage

Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials. Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Keep container tightly closed when not in use. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

Incompatibilities: Strong acids, oxidizers

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

8.1 Control Parameters

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLVs		OSHA-PELs			OTHER
			TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Chelate Agent	Proprietary	20 - 30	NE	NE	NE	NE	NE	NE
Organic Amine	Proprietary	20 - 30	7.5	15	8	15	30 ppm	NIOSH RELs: TWA = 8 STEL = 15 DFG MAKs: TWA = 5.1 PEAK = 2 MAK, 5 minutes, momentary value (Danger of cutaneous absorption) MAK Pregnancy Risk Group Classification: C
Glycol Wetting Agent	Proprietary	1 - 5	NE	NE	NE	NE	NE	NE
Chelate Agent 2	Proprietary	1 - 5	NE	NE	NE	NE	NE	NE
Surfactant	Proprietary	1 - 5	NE	NE	NE	NE	NE	NE
Water and other components which are present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers and mutagens).		Balance	None of the other components contribute significant additional hazards at the concentration present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).					

8.2 Appropriate Engineering Controls.

Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in this Section or as low as reasonably achievable. Ensure

eyewash/safety shower stations are available near areas where this product is used.

8.3 Personal Protective Equipment

Respiratory protection:	None needed under normal conditions of use. Use NIOSH approved respirators if ventilation is inadequate to control mists or vapor. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the applicable local standards. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-face piece pressure/demand SCBA or a full-face piece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).
Eye protection:	Use approved safety goggles or safety glasses, as described in OSHA 29 CFR 1910.133. Splash goggles with a faceshield may be needed if splash hazards exist.
Hand protection:	Wear chemical impervious gloves (e.g., Solvex™, Neoprene).
Body protection:	If needed, use body protection appropriate for task (e.g., Tyvek suit, rubber apron) to protect from splashes and sprays.

9. PHYSICAL and CHEMICAL PROPERTIES

Appearance	This product is a clear, colorless to amber-colored liquid.		
Odor	Light disinfectant odor	Odor Threshold	NE
Freezing Point ^{o}C	< 0	pH (2% solution at 25^{o}C)	10.5 – 11.5
Initial Boiling Point ^{o}C	> 100	Boiling Point Range ^{o}C	N/A
Flammability	Non-flammable	Evaporation Rate (water = 1)	Similar to water
Vapor Density (air = 1)	N/A	Vapor Pressure mm Hg @ 20°C:	18 - 20
Solubility (in water)	Soluble	Relative density (water = 1)	1.07 ± 0.1
Viscosity	Similar to water	Oil-Water Partition Coefficient	N/A
Decomposition Temperature	NE		
How To Detect This Substance (Warning Properties):	Litmus paper will turn blue in contact with solutions of this solid.		

10. STABILITY and REACTIVITY

10.1	Reactivity	Not considered reactive.
10.2	Chemical Stability	Stable
10.3	Possibility of hazardous reactions	Hazardous polymerization will not occur.
10.4	Conditions to avoid	Avoid mixing with incompatible materials.
10.5	Incompatible Materials	Strong acids, oxidizers
10.6	Hazardous Decomposition Products	Thermal decomposition of this product may generate nitrogen oxides, carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Toxicity data for hazardous ingredients	Oral LD_{50} mg/kg	Dermal LD_{50} mg/kg	Inhalation LD_{50} mg/kg
Chelate Agent	LD_{50} (Intraperitoneal-Rat) 1548 mg/kg: Behavioral: convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: cyanosis; Gastrointestinal: changes in structure or function of salivary glands	N/A	N/A
	Standard Draize Test (Skin-Rabbit, adult) 500 mg/24 hours: Moderate irritation effects Standard Draize Test (Eye -Rabbit, adult) 1900 mg Standard Draize Test (Eye-Rabbit, adult) 100 mg/24 hours: Moderate irritation effects		
Organic Amine	LD_{50} (Oral-Rat) 1720 mg/kg LD_{50} (Oral-Mouse) 700 mg/kg: Behavioral: somnolence (general depressed activity); Behavioral: muscle contraction or spasticity;	LD_{50} (Subcutaneous-Rat) 1500 mg/kg LD_{50} (Skin-Rabbit) 1 mL/kg LD_{50} (Subcutaneous-Rat) 1500 mg/kg LD_{50} (Skin-Rabbit) 1 mL/kg	LC (Inhalation-Mouse) > 2420 mg/m^3/2 hours LC (Inhalation-Cat) > 2420 mg/m^3/2 hours TCLo (Inhalation-Rat) 66 ppm/24 hours/30 days-

	Lungs, Thorax, or Respiration: dyspnea LD_{50} (Oral-Rabbit) 1 gm/kg LD_{50} (Oral-Guinea Pig) 620 mg/kg LD_{50} (Intraperitoneal-Rat) 67 mg/kg LD_{50} (Intraperitoneal-Mouse) 50 mg/kg LD_{50} (Intravenous-Rat) 225 mg/kg: Behavioral: somnolence (general depressed activity), muscle contraction or spasticity; Lungs, Thorax, or Respiration: dyspnea LD_{50} (Intramuscular-Rat) 1750 mg/kg LDLo (Oral-Mammal-Species Unspecified) 1400 mg/kg TDLo (Oral-Rat) 115 gm/kg/90 days-continuous: Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in bladder weight; Related to Chronic Data: death TDLo (Oral-Rat) 105 mg/kg/30 weeks-intermittent: Liver: liver function tests impaired, changes in liver weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain TDLo (Oral-Rat) 500 mg/kg: female 6-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death, Specific Developmental Abnormalities: musculoskeletal system TDLo (Oral-Rat) 4500 mg/kg: female 6-15 day(s) after conception: Reproductive: Maternal Effects: other effects TDLo (Oral-Rat) 500 mg/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: urogenital system	TDLo (Skin-Rat) 2250 mg/kg: female 6-15 day(s) after conception: Reproductive: Maternal Effects: other effects	continuous: Behavioral: somnolence (general depressed activity); Skin and Appendages: dermatitis, irritative (after systemic exposure); Related to Chronic Data: death TCLo (Inhalation-Rat) 400 mg/m^3/5 hours/26 weeks-intermittent: Lungs, Thorax, or Respiration: respiratory depression; Liver: liver function tests impaired; Kidney, Ureter, Bladder: proteinuria TCLo (Inhalation-Rat) 300 mg/m^3/5 hours/26 weeks-intermittent: Kidney, Ureter, Bladder: proteinuria, other changes in urine composition; Nutritional and Gross Metabolic: weight loss or decreased weight gain TCLo (Inhalation-Dog) 102 ppm/24 hours/30 days-continuous: Behavioral: somnolence (general depressed activity); Skin and Appendages: dermatitis, irritative (after systemic exposure); Related to Chronic Data: death TCLo (Inhalation-Guinea Pig) 75 ppm/24 hours/24 days-continuous: Behavioral: somnolence (general depressed activity); Skin and Appendages: dermatitis, irritative (after systemic exposure); Related to Chronic Data: death
	Open irritation test (skin-Rabbit) 505 mg: Moderate Standard Draize test (Skin-Rabbit) 250 µg: Severe	Cytogenetic analysis (Human-Lymphocyte) 100 µmol/L Sister chromatid exchange (Human-Lymphocyte) 1 mmol/L	
Glycol Wetting Agent	LD_{50} (Oral-Rat): 20 g/kg LD_{50} (Oral-Mouse) 22 g/kg LD_{50} (Oral-rabbit) 18500 mg/kg LD_{50} (Oral dog) 22 gm/kg LD_{50} (Oral-guinea pig) 18350 mg/kg LD_{50} (Oral-quail) > 2080 mg/kg TDLo (Oral-Child) 79 g/kg/56 weeks-intermittent: Central nervous system effects, BRN TDLo (Parenteral-Infant) 10 g/kg/3 days-continuous: Systemic effects LD_{50} (Intraperitoneal-Rat) 6660 mg/kg LD_{50} (Intraperitoneal-Mouse) 9718 mg/kg LD_{50} (Intravenous-Rat) 6423 mg/kg LD_{50} (Intravenous-Mouse) 6630	Skin-Human 500 mg/7 days Mild irritation effects Skin-Human 104 mg/3 days-intermittent Moderate irritation effects Skin-man: 10%/2 days LD_{50} (Skin-rabbit) 20800 mg/kg LD_{50} (Subcutaneous-Rat) 22,500 mg/kg LD_{50} (Subcutaneous-Mouse) 17,370 mg/kg LDLo (Subcutaneous-guinea pig) 15500 mg/kg	TCLo Inhalation-rat) 2180 mg/m^3/6 hours/90 days-intermittent: Behavioral: food intake (animal); Endocrine: changes in spleen weight; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

	mg/kg LD_{50} (Intravenous-rabbit) 6500 mg/kg LD_{50} (Intravenous-dog) 26 gm/kg LDLo (Intravenous-chicken) 27 gm/kg: Vascular: other changes LD_{50} (Intramuscular-Rat) 14 g/kg TDLo (Intraperitoneal-Mouse) 100 mg/kg (15 days preg): Teratogenic effects TDLo (Intraperitoneal-Mouse) 100 mg/kg (11 days preg): Reproductive effects LDLo (Intramuscular-rabbit) 6300 mg/kg: Behavioral: somnolence (general depressed activity); Behavioral: coma; Lungs, Thorax, or Respiration: respiratory stimulation		
	Eye effects-Rabbit, adult 100 mg Mild irritation effects Eye effects-Rabbit, adult 500 mg/24 hours Mild irritation effects	DNA Inhibition (Mouse-Subcutaneous) 8000 mg/kg Cytogenetic Analysis (Subcutaneous-Mouse) 8000 mg/kg Cytogenetic Analysis (Hamster-fibroblast) 32 g/L	
Chelate Agent 2	N/A	N/A	N/A
Surfactant	N/A	N/A	N/A

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

12.1	Ecotoxicity	LC_{50}, mg/L	EC_{50}, mg/L
	Organic amine		
	Aquatic	LC_{50} (goldfish) 24 hours = 190 mg/L (@ pH 10.1) LC_{50} (goldfish) 96 hours = 170 mg/l (@ pH 10.1) LC_{50} (goldfish) 24 hours = > 5,000 mg/L (@ pH 7) LC_{50} (goldfish) = > 5000 mg/L, 24 hours K_{OW} = -1.31 (est.) Biodegradation: Biological oxygen demand (BOD): 78%, 5 days; (theoretical) 0%, 5 days; 64%, 20 days. Persistence: Biodegrades at moderate rate. Aquatic Fate: If released to water, Organic amine should undergo biodegradation. The half-life in water is expected to be from a few days to weeks, depending on the acclimatization in the aquatic system. Atmospheric Fate: If released to the atmosphere, Organic amine is expected to exist entirely in the vapor phase. The primary mechanism of removal from the atmosphere would be by reaction with photochemically generated hydroxyl radicals, with an expected half-life of 4 hours. The complete solubility if Organic amine suggests that it will also be removed by precipitation.	EC_0 (*Pseudomonas putida* bacteria) 16 hours = 6,300 mg/L EC_0 (*Microcystis aeruginosa* algae) 8 days = 1.6 mg/L EC_0 (*Scenedesmus quadricauda* green algae) 7 days = 0.75 mg/L EC_0 (*Entosiphon sulcatum* protozoa) 72 hours = 300 mg/L EC_0 (*Uronema parduczi* Chatton-Lwoff protozoa) = 2,945 mg/L
	Terrestrial	If released to soil, Organic amine is expected to biodegrade fairly rapidly following acclimatization, with a half-life on the order of days to week. Organic amine will leach in soil to groundwater. Volatilization is not a significant fate process from the soil.	NE
	Glycol Wetting Agent		
		LC_{50} (*Lebistes reticulatus*, guppy) 48 hours > 10,000 mg/L LC_{50} (*Carassius auratus*) 24 hours = > 5,000 mg/L LC_{50} (*Salmo gairdneri*) 24 hours = 50,000 mg/L LC_{50} (*Pimephales promelas*) 96 hours = 54,900 mg/L	EC_{50} (*Photobacterium phosphoreum*, bacteria) 30 minutes = 26,800 mg/L TD (*Chlorella pyrenoidosa*, algae) = 92,000 mg/L EC_0 (*Daphnia magna*, crustacean) 48 hours = < 4,295 mg/L

		LC_{50} (Artemia salina) 24 hours = >10,000 mg/L LC_{100} (*Pimephales promelas*) 96 hours = 65,610 mg/L NOEC (*Pimephales promelas*) 96 hours < 47,829 mg/L fingerling trout: at 50,000 mg/l at 10°C: no mortality or apparent signs of stress were produced during a 25-hr exposure period (static bioassay) Log K_{ow} = -0.30-1.41 Biodegradation: Standard dilution BOD water, 5-day 64% theoretical biochemical oxygen demand, sewage inocula. Warburg respirometer, 40-day 78% theoretical biochemical oxygen demand, sewage inocula. Nutrient broth, 100% degradation in 4 days (aerobic conditions), 100% degradation in 4-9 days (anaerobic conditions), activated sludge, or digester sludge inocula, no significant degradation in sterile controls. Standard dilution BOD water, 5-day 2.2% theoretical biochemical oxygen demand, 10-day 56.7% theoretical biochemical oxygen demand, 50-day 80% theoretical biochemical oxygen demand, sewage inocula. Standard dilution BOD water, 5-day 62% theoretical biochemical oxygen demand, 20-day 79% theoretical biochemical oxygen demand, sewage inocula; synthetic seawater dilution, 5-day 55% theoretical biochemical oxygen demand, 20-day 83% theoretical biochemical oxygen demand, raw wastewater inocula. Sewage die-away, 74.5% theoretical biochemical oxygen demand in 5 days.	EC_{50} (*Daphnia magna*, crustacean) 48 hours = 34,400 mg/L EC_{100} (*Daphnia magna*, crustacean) 48 hours = 50,000 mg/L EC_{50} (*Daphnia magna*, crustacean) 24 hours = > 10,000 mg/L EC_{100} (*Daphnia magna*, crustacean) 24 hours = > 10,000 mg/L EC_{50} (*Nitocra spinipes*, crustacean) 96 hours = > 10,000 mg/L
	Chelate Agent		
		LC_{100} (*Cyprinus carpio*) 24 hours = 180 ppm/ at 25°C TLm (mosquito fish) 96 hours = 125 ppm/ (fresh water) TLm (bluegill) 48 hours = 99 mg/L/ (tap water) LC_{50} (*Lepomis macrochirus* bluegill) 96 hours = 486 mg/L LC_{50} (*Lepomis macrochirus* bluegill) 96 hours = 490-1030 mg/L (static bioassay) LC_{50} (*Lepomis macrochirus* bluegill) 96 hours = > 500 mg/L LC_{50} (*Leuciscus Idus*) 96 hours = > 500 mg/L LC_{50} (Algae) 72 hours = 10-100 mg/L LC_{50} (*Daphnae*) 24 hours > 100 mg/L Biological Oxygen Demand = 20 mg O_2/g product, Chemical Oxygen Demand = 575 mg O_2/g product.	
12.2	Persistence and Degradability	The components of this product decompose in soil and water.	
12.3	Bioaccumulative Potential	This product is not expected to bioaccumulate	
12.4	Mobility in Soil	When spilled onto soil, this product will infiltrate downward, the rate being greater with lower concentration because of reduced viscosity.	
12.5	Other Adverse Ecological Effects	This product may be harmful to aquatic life if large volumes of it are released into an aquatic environment.	

13. DISPOSAL CONSIDERATIONS

Preparing Wastes of this Product for Disposal	Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with local regulations. This product, if unaltered by the handling, may be disposed of by treatment at a permitted facility or as advised by your local waste regulatory authority.
Disposal of Contaminated Packaging	Cleaned containers can be recycled or disposed of as non-contaminated waste, if authorized by your local authorities. Dispose of containers as required by local regulations.
U.S. EPA Waste Number	Not applicable as supplied.

14. TRANSPORT INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

14.1	UN Number	UN 2735
14.2	UN Proper Shipping Name	Amines, liquid, corrosive, n.o.s. (Ethanolamine)
14.3	Transport Hazard Class(es)	8 (Corrosive)
	Transport label(s) required	Corrosive Class 8
14.4	Packing Group	II
14.5	Marine Pollutant	Not applicable
	NA Emergency Response Guide Number (2012)	154
14.6	Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)	Y3/D3
14.7	Special Transport Precautions	Not applicable
	National Motor Freight Classification	#70

International Air Transport Association

14.8	UN Number	UN 2735
	UN Proper Shipping Name	Amines, liquid, corrosive, n.o.s. (Ethanolamine)
	Transport Hazard Class(es)	8 (Corrosive)
	Transport label(s) required	Corrosive Class 8
	Packing Group	II
	Packaging Instructions	850/854

International Maritime Organization

14.9	UN Number	UN 2735
	UN Proper Shipping Name	Amines, liquid, corrosive, n.o.s. (Ethanolamine)
	Transport Hazard Class(es)	8 (Corrosive)
	Transport label(s) required	Corrosive Class 8
	Packing Group	II
	Marine Pollutant	Not applicable
	NA Emergency Response Guide Number (2012)	154
	Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)	Y3/D3

15. SAFETY, HEALTH and ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE PRODUCT

PROGRAM	Chelate	Organic amine	Glycol Wetting Agent	Chelate Agent 2	Octyl dimethylamine Oxide	
US EPA PROGRAMS						
Clean Air Act Hazardous Air Pollutants	NO	NO	NO	NO	NO	
Safe Drinking Water Act	NO	NO	NO	NO	NO	
RCRA F, K, P, U or D-lists	NO	NO	NO	NO	NO	
EPA Priority Pollutant	NO	NO	NO	NO	NO	
SARA 302 RQ	NO	NO	NO	NO	NO	
SARA 302 TPQ	NO	NO	NO	NO	NO	
SARA 313 LISTED	NO	NO	NO	NO	NO	
SARA CHEMICAL CATEGORIES						
SARA 311/312 ACUTE	NO	YES	NO	NO	NO	
SARA 311/312	NO	YES	NO	NO	NO	

CHRONIC						
SARA 311/312 FIRE	NO	NO	NO	NO	NO	
SARA 311/312 PRESSURE	NO	NO	NO	NO	NO	
SARA 311/312 REACTIVITY	NO	NO	NO	NO	NO	
EPA EXTREMELY HAZARDOUS SUBSTANCE	NO	NO	NO	NO	NO	
CALIFORNIA SAFE DRINKING WATER ACT (Proposition 65)						
This product does not contain any chemical listed on the California Safe Drinking Water Act list (Proposition 65)						
US OSHA PROGRAMS						
PEL	NO	8 mg/m^3	NO	NO	NO	
PSM	NO	NO	NO	NO	NO	
CHEMICAL SECURITY PROGRAMS						
DHS CFATS	NO	NO	NO	NO	NO	
CHEMICAL WEAPONS CONVENTION						
	NO	NO	NO	NO	NO	
US DRUG ENFORCEMENT ADMINISTRATION						
DEA Controlled Substances	NO	NO	NO	NO	NO	
CHEMICAL INVENTORY PROGRAMS						
WHMIS	NO	E	NO	NO	D2B	
DSL	YES	YES	YES	YES	YES	
NDSL	N/A	N/A	N/A	N/A	N/A	
REACH Pre-registered List	YES	YES	YES	NO	YES	
TSCA	YES	YES	YES	YES	YES	
European Inventory of Existing Commercial Chemical Substances (EINECS)	YES	YES	YES	YES	YES	
EU No-Longer Polymers List (NLP)	N/A	N/A	N/A	N/A	N/A	
EEC Classification Packaging, and Labeling of Dangerous Substances(Annex 1)	NO	Xi Harmful	NO	NO	Xi Harmful	
Philippines	YES	YES	YES	YES	YES	
Japan	YES	YES	YES	YES	YES	
Australia	YES	YES	YES	YES	YES	
Korea	YES	YES	YES	YES	YES	
China	YES	YES	YES	YES	YES	
New Zealand Inventory of Chemicals	YES	YES	YES	YES	YES	

16. OTHER INFORMATION

16.1	Original Preparation	Jan 5, 2009
16.2	Revision History	28 June 2013; GHS update
16.3	Prepared by	ADVANCED CHEMICAL SAFETY, Inc. PO Box 152329 San Diego, CA 92195 (858)-874-5577
16.4	Date of Printing	April 28, 2015

DEFINITIONS OF TERMS

16.5	A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:	
	Section 2	**GHS**: Global Harmonization System **OSHA:** U.S. Occupational Safety and Health Administration. **CLP**: Classification and Packaging **WHMIS**: Workplace Hazardous Materials Information System **STOT**: Specific Target Organ Toxicity
	Section 3	**CAS #:** Chemical Abstract Service index number **EINECS #:** European Chemical Substances Information System index number
	Section 5	**NFPA:** Nation Fire Protection Association **Health Hazard: 0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). **Flammability Hazard** **Reactivity Hazard:** Refer to definitions for "Hazardous Materials Identification System". **Flash Point**: Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL:** The lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL**: The highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.
	Section 8	**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV -** Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered **PEL -** Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order. **IDLH -** Immediately Dangerous to Life and Health **-** This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**REL**s). When no exposure guidelines are established, an entry of **NE (Not Established)** is made for reference.
	Section 11	**LD_{50}** : Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** : Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm:** Concentration expressed in parts of material per million parts of air or water; **mg/m^3** : Concentration expressed in weight of substance per volume of air; **mg/kg:** Quantity of material, by weight, administered to a test subject, based on their body weight in kg **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.
	Section 12	**LC_{50}:** The lowest concentration in water which kills 50% of the test subjects. **EC_{50}:** The Effect Concentration in water at which 50% of the test species if affected.
	Section 13	**US EPA Hazardous Waste Codes**: refer to 40 CFR 261.20
	Section 14	**DOT**: US Department of Transportation **IATA**: International Air Transport Association **IMO**: International Maritime Organization **MARPOL:** International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978 **IBC Code** : Merchant Shipping Code
	Section 15	**RCRA**: US Resource Conservation and Recovery Act **SARA:** US Superfund Amendments and Reauthorization Act **PSM**: US OSHA Process Safety Management **CFATS:** US Department of Homeland Security Chemical Facility Anti-terrorism Standard **DSL:** Canadian Domestic Substances List **NDSL:** Canadian Non-Domestic Substances List **REACH**: European Registration, Evaluation, Authorization and Restriction of Chemicals list **TSCA:** US Toxic Substances Control Act