RoClean L811
High pH RO Membrane Cleaner - Liquid

avista technologies

Performance:

RoClean L811 offers critical performance benefits:

* Compatible with the thinfilm elements.
* Contains a proprietary blend of buffers and low foaming surfactants and chelants to speed the dissolution of sulfate scale.
* Superior results to generic cleaners.
* Highly buffered to resist pH changes during the cleaning process.
* Can be used in conjunction with other applicable cleaners as shown in the Avista cleaner selection guide.
* Temperature compensated to maintain optimum pH over a wide temperature range.

Avista Technologies Inc.
133 North Pacific Street
San Marcos, CA 92069 USA
Phone: 760 744-0536
Fax: 760 744-0619
www.avistatech.com

RoClean L811 is a high pH liquid cleaner developed to remove calcium, barium and strontium sulfate scales from spiral wound thinfilm elements.

This formulation is temperature compensated to ensure that the cleaning solution remains in the effective pH range regardless of variations in solution temperature.

Use Instructions:

Below is a summary of the RoClean L811 cleaning guidelines. For detailed procedures, please consult the Avista technical bulletin entitled "Cleaning of Spiral Wound Membrane Systems".

1. Fill the cleaning tank to the desired volume with RO permeate or DI water. Heat the solution to 50°C as this will dramatically increase the cleaning efficiency. Add the RoClean L811 to the tank at a rate of approximately 1 gallon per 50 gallons of water. Recycle the solution through the cleaning tank to ensure adequate mixing.

2. Recirculate the cleaning solution through each RO system stage, one at a time, for a minimum of 60 minutes at the flow rate recommended by the membrane manufacturer. If that rate is not known, use the guidelines listed below:

Element Diameter (Inches)	Flowrate per Vessel GPM (LPM)
4	10 (38)
6	23 (87)
8	40 (151)

3. If the membranes are heavily fouled and the recirculated cleaning solution becomes discolored or turbid, discard as much as 15% of the solution volume. Heavily fouled elements may also benefit from a soak period (up to 8 hours).

4. Monitor the pH of the solution during the cleaning process. If the pH remains in the desired range above 10 (at 50°C) and the solution is not turbid, it may be used to clean subsequent stages. In the unlikely event that the pH drops below 10, prepare a new batch and repeat steps 1-4.

5. When the clean is completed, rinse the membranes by recirculating RO permeate through each pressure vessel. The system can then be returned to service.

Dilution:

For moderate to severe fouling, RoClean L811 should be mixed at a rate of approximately 1 gallon of chemical to 50 gallons of water. For milder fouling, a dilution of 0.5 gallons of chemical to 50 gallons of water may be sufficient.

Packaging:

RoClean L811 is available in 45 pound pails.

Properties:

Appearance:	Colorless to amber colored liquid
Specific Gravity:	1.2 – 1.3
pH:	10.4 – 11.1 (2% solution at 25°C)

Kansas Water Technologies

11 Whirlwind Court

Valley Center, KS 67147

Client Cylinder – Husky Corrosion Coupon- April 2019

Customer	Location	Coupon #	Date In	Date Out	Initial Wt	Final Wt	Wt Loss	Density	Area	K Factor	Corr Rate mpy	Days Exposed
Customers Name	Husky	E24875	7/1/ 2018	4/10/2019	9.07	8.55	0.5223	8.89	3.38	534000	1.36	283

Coupon – Pre cleaning

Coupon Post Cleaning

Service Report

Tuesday, April 23, 2019 2:19 PM CDT

Customer Information Here

Recorded By: **Aaron Terry**
(316) 322-5151
aaron@kansaswatertech.com

On-Site Time: **2:18 PM CDT to 2:18 PM CDT**

Water Treatment Plant - Nanofilters

Inventory

Vitec 4000	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Antiscalant	1522.4 500			2.2667	<610 Days	Gallons
K-BAC 1020	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Biocide	2323.74 600			53.0433	<51 Days	Gallons
Sodium Bisulfite	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
SBS	964.92 900			5.0133	<226 Days	Gallons
Citric Acid	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Citric Acid	546.88 900			38.5200	<26 Days	Gallons
Sulfuric Acid 66 Baume	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Sulfuric Acid	7870.75 7290	2732.625	5317.5	29.8958	<263 Days	Gallons
Sodium Hypochlorite 15%	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Bleach	7256.535 4250			53.4108	<239 Days	Gallons
Sodium Hydroxide 50%	*Amount*	*Previous*	*Delivery*	*Est. Daily Usage*	*Est. Remaining*	*Unit*
Caustic	1455.33 600			46.2783	<55 Days	Gallons

RoClean® P112
SAFETY DATA SHEET

1. Company and Product Identification

1.1	Identification – Product Name:	**RoClean® P112**
1.2	Other means of identification Synonym:	Organic and Inorganic Salts Mixture, none
1.3	Recommended Use of the Chemical and Restrictions on Use:	Membrane filtration or ultrafiltration process 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) 1-703 527-3887 (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 white, free flowing powder. This product can irritate contaminated skin, eyes, mucous membranes, and any other exposed tissues. This product is neither reactive nor flammable. Thermal decomposition of this product produces irritating vapors and toxic gases (e.g., carbon oxides, phosphorus oxides, and sodium oxides). 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	Skin Corrosion/Irritation - Category 21C Serious Eye Damage Eye Irritation - Category 2A Specific Target Organ Toxicity, Single Exposure (resp) 3
Potential Ecological Effects Summary	None

2.1 Classification of Product

U.S. OSHA classification	Skin Corrosion/Irritation - Category 1C Serious Eye Damage Eye Irritation - Category 2A Specific Target Organ Toxicity, Single Exposure (resp) 3

Classification as per EC 1272/2008 (CLP/GHS)	Skin Corrosion/Irritation - Category 1C Serious Eye Damage Eye Irritation - Category 2A Specific Target Organ Toxicity, Single Exposure (resp) 3
WHMIS classification	Skin Corrosion/Irritation - Category 1C Serious Eye Damage Eye Irritation - Category 2A Specific Target Organ Toxicity, Single Exposure (resp) 3

Hazardous Materials Information System (HMIS) Rating

Health	**2**
Flammability	**0**
Physical Hazard	**0**
Protective Equipment	**C**

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	DANGER	
Hazard statements	H315	Causes skin irritation
	H315 + H320	Causes serious eye damage
	H319	May cause respiratory irritation
Precautionary statements	P305+P351+ P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
	P261	Avoid breathing dust
	P280	Wear protective gloves/protective clothing/eye protection/face protection
	P271	Use only outdoors or in a well-ventilated area.
	P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
	P302+P352	If eye irritation persists: Get medical advice/attention.
	P337 + P313	Store in a closed container.

Hazard pictograms - GHS

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**
Silicate compound Proprietary Proprietary	60-70	Skin Corrosion/Irritation Cat 2	Skin Corrosion/Irritation Cat 2	Skin Corrosion/Irritation Cat 2
Citrate compound Proprietary Proprietary	15-20	Eye Irrit. 2 Skin Irrit. 2; Eye damage 1 STOT SE 3 (Resp)	Eye Irrit. 2 Skin Irrit. 2; Eye damage 1 STOT SE 3 (Resp)	Eye Irrit. 2 Skin Irrit. 2; Eye damage 1 STOT SE 3 (Resp)
Polyphosphate Proprietary Proprietary	10-15	Skin Corrosion/Irritation Cat 2; Serious Eye damage/Eye irritation Cat 2A; Specific Target Organ Toxicity, Single Exposure (resp) 3	Skin Corrosion/Irritation Cat 2; Serious Eye damage/Eye irritation Cat 2A; Specific Target Organ Toxicity, Single Exposure (resp) 3	Skin Corrosion/Irritation Cat 2; Serious Eye damage/Eye irritation Cat 2A; Specific Target Organ Toxicity, Single Exposure (resp) 3
Surfactant Proprietary Proprietary	1-5	Serious Eye damage/Eye irritation Cat 1	Serious Eye damage/Eye irritation Cat 1	Serious Eye damage/Eye irritation Cat 1
PRODUCT CLASSIFICATION	100	Skin Corrosion/Irritation Cat 1C Serious Eye damage/Eye irritation Cat 2A Specific Target Organ Toxicity, Single Exposure (resp) 3		

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 dusts 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.

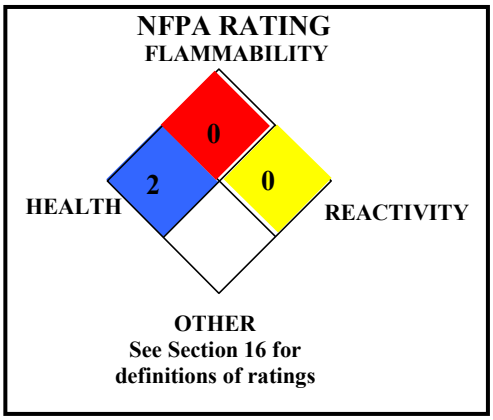
4.3 Indication Of Immediate Medical Attention And Special Treatment Needed, If Necessary:

TARGET ORGANS: Acute: Skin, eyes. Chronic: Skin.

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 SDS to physician or health professional with victim.

5. FIRE-FIGHTING MEASURES

Flammable properties: Non-flammable solid



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:

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, phosphorous oxides, 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 kg), clean up spilled solid wearing gloves, goggles, faceshield, and suitable body protection. The minimum Personal Protective Equipment recommended for response to non-incidental releases (more than 20 kg) 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 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	Moisten to suppress dust. Shovel up solids into plastic container for recovery/disposal. Neutralize residue with sodium bicarbonate or other neutralizing agent for weak caustics. 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 solid; 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 at temperatures less than 45°C (113°F). 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. Store in original shipping container. 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, caustics. It may react with metals to generate pressure.

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/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	IDLH mg/m³	mg/m³
Silicate compound	Proprietary	60-70	NE	NE	NE	NE	NE	NE
Citrate compound	Proprietary	15-20	NE	NE	NE	NE	NE	NE
Polyphosphate	Proprietary	10-15	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 practical. 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).
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 white, free flowing powder.		
Odor	None	Odor Threshold	N/A
Melting Point °C	NE	pH (1% aqueous solution)	12.0-12.9
Initial Boiling Point °C	NE	Boiling Point Range °C	N/A
Flammability	Non-flammable	Evaporation Rate (water = 1)	N/A
Vapor Density (air = 1)	N/A	Vapor Pressure mm Hg @ 20°C:	N/A
Solubility (in water)	Soluble	Relative density (water = 1)	NE
Viscosity	Flowing solid	Oil-Water Partition Coefficient	N/A
Decomposition Temperature	NE		
How To Detect This Substance (Warning Properties):	Litmus paper will turn blue when in contact with solutions of this product.		

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, caustics. It may react with metals to generate pressure.
10.6	Hazardous Decomposition Products	Thermal decomposition of this product may generate carbon monoxide, carbon dioxide, phosphorous oxides and nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Toxicity data for hazardous ingredients	Oral LD_{50} mg/kg	Dermal LD_{50} mg/kg	Inhalation LD_{50} mg/kg
Silicate compound	LD_{50} (Oral, rat) 1153	N/A Skin irritation (24 hr) severe	N/A
Citrate compound	LD_{50} (Oral-Rat) 3 g/kg LD_{50} (Oral-Mouse) 5040 mg/kg LD_{50} (Intraperitoneal-Rat) 883 mg/kg LD_{50} (Intraperitoneal-Mouse) 903 mg/kg LD_{50} (Subcutaneous-Rat) 5500 mg/kg LD_{50} (Subcutaneous-Mouse) 2700 mg/kg LD_{50} (Intraperitoneal-Mouse LD50: 903 mg/kg LD_{50} (Intravenous-Rabbit, adult) 330 mg/kg LD_{50} (Intravenous-Mouse) 42 mg/kg LDLo (Oral-Rabbit, adult) 7000 mg/kg	LD_{50} (dermal, rabbit) > 2000 mg/kg	N/A
	Standard Draize Test (Skin-Rabbit, adult) 500 mg/24 hours: Moderate irritation effects Standard Draize Test (Eye-Rabbit, adult) 750 mg/24 hours: Severe irritation effects		
Polyphosphate	LD_{50} (oral, rat) > 7400 mg/kg LDLo (Intravenous-Rabbit, adult) 1580 mg/kg	LDLo (skin, rabbit) > 300 mg/kg	N/A
	Sex Chromosome Loss and Nondisjunction (Oral-Drosophila melanogaster) 11 pph Standard Draize Test (Skin-rabbit) > 300 mg/kg		
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
Silicate compound			
	Aquatic	LC_{50} (Mosquitofish) = 530 mg/L LC_{50} (Waterflea) 48 hours = 113 mg/L LC_{50} (Scud) 96 hours = 160 mg/L LC_{50} (Polycheate) 28 days = 210-250 □g/L TLm (Mosquitofish) 96 hours = 2320 ppm (fresh water)	NE
	Terrestrial	NE	NE
Citrate compound			
	Aquatic	Water Solubility = 59.2% (20□C); 84% (100□C) Biological Oxygen Demand (BOD): 40%, 5 days; 60%, 10-20 days. Food Chain Concentration Potential: Very Low Experimental Log P = -1.64 Persistence: Can ferment on standing. Biodegrades quite rapidly. It is dangerous to aquatic life in high concentrations. Lowers pH in water but does not dissociate to any great extent. LC_{50} fish/96h: 18-32 g/L	EC_{50} (daphnia/48h) = 5.6-10 g/L EC_{50} (chlorella vulgaris/5d) = >18-32 g/L EC_{10} (pseudomonas putita/16h) = EC50/8h ps. fluorescens: >1.800-3.2 g/L
	Terrestrial	NE	NE
Polyphosphate			
	Aquatic	LC_{50} 28.5 (Gambusia affinis (Western mosquito fish, adult female)	NE
	Terrestrial	NE	NE
Surfactant			
	Aquatic	NE	NE
	Terrestrial	NE	NE
12.3	Bioaccumulative Potential	Most components of this product are not expected to bioaccumulate. There is limited information available on the environmental fate and effects of the silicate salt, if released to the environment. This salt has exhibited moderate to high toxicity to aquatic organisms and moderate toxicity to terrestrial organisms. The salt will persist in aquatic and terrestrial systems. Significant releases could have an adverse impact on the pH of an aquatic system.	
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	This product is not a hazardous waste as shipped. If spilled, the spill residue may exhibit the D002 hazardous waste characteristic.

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	UN3262
14.2	UN Proper Shipping Name	Corrosive solid, basic, inorganic, n.o.s. (Sodium metasilicate, sodium triphosphate)
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 (2016)	154
14.6	Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)	Not applicable
14.7	Special Transport Precautions	Not applicable
	National Motor Freight Classification	#70

International Air Transport Association

14.8	UN Number	UN3262
	UN Proper Shipping Name	Corrosive solid, basic, inorganic, n.o.s. (Sodium metasilicate, sodium triphosphate)
	Transport Hazard Class(es)	8 (Corrosive)
	Transport label(s) required	Corrosive Class 8
	Packing Group	II
	Packaging Instructions	822

International Maritime Organization

14.9	UN Number	UN3262
	UN Proper Shipping Name	Corrosive solid, basic, inorganic, n.o.s. (Sodium metasilicate, sodium triphosphate)
	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 (2016)	154
	Transport in Bulk (Annex II of MARPOL 73/78 and IBC Code)	Not applicable

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

PROGRAM	Silicate compound	Citrate compound	Polyphosphate	Surfactant
US EPA PROGRAMS				
Clean Air Act Hazardous Air Pollutants	NO	NO	NO	NO
Safe Drinking Water Act	NO	NO	NO	NO
RCRA F, K, P, U or D-lists	NO	D001	NO	NO
SARA 302 RQ	NO	NO	NO	NO
SARA 302 TPQ	NO	NO	NO	NO
SARA 313 LISTED	NO	NO	NO	NO
SARA CHEMICAL CATEGORIES				
SARA 311/312 ACUTE	YES	YES	NO	YES

SARA 311/312 CHRONIC	YES	YES	NO	NO
SARA 311/312 FIRE	NO	NO	NO	NO
SARA 311/312 PRESSURE	NO	NO	NO	NO
SARA 311/312 REACTIVITY	NO	YES	NO	NO
EPA EXTREMELY HAZARDOUS SUBSTANCE	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	NO	NO	NO
PSM	NO	NO	NO	NO
CHEMICAL SECURITY PROGRAMS				
DHS CFATS	NO	NO	NO	NO
CHEMICAL WEAPONS CONVENTION				
	NO	NO	NO	NO
US DRUG ENFORCEMENT ADMINISTRATION				
DEA Controlled Substances	NO	NO	NO	
CHEMICAL INVENTORY PROGRAMS				
WHMIS	YES	YES	YES	YES
DSL	YES	YES	YES	YES
REACH Pre-registered List	YES	YES	YES	YES
TSCA	YES	YES	YES	YES
TSCA Reset Rule	All ingredients in this product comply with the U.S. EPA TSCA Inventory Notification Requirements Rule (40 CFR 710 Subpart B.)			
European Inventory of Existing Commercial Chemical Substances (EINECS)	YES	YES	YES	YES
EU No-Longer Polymers List (NLP)	N/A	N/A	N/A	N/A
EEC Classification Packaging, and Labeling of Dangerous Substances (Annex 1)	YES	YES	YES	YES
Philippines	YES	YES	YES	YES
Japan	YES	YES	YES	YES
Australia	YES	YES	YES	YES
Korea	YES	YES	YES	YES
China	YES	YES	YES	YES
New Zealand Inventory of Chemicals	YES	YES	YES	YES

16. OTHER INFORMATION

16.1	Original Preparation	January 5, 2009
16.2	Revision History	GHS 11 Dec 2013 October 7, 2016 Content corrections, June 27, 2018 Logo Revision; 5 Nov 2018 TSCA Reset Rule Update, Hazard classification update
16.3	Prepared by	ADVANCED CHEMICAL SAFETY, Inc. PO Box 152329 San Diego, CA 92195 (858)-874-5577
16.4	Date of Printing	February 4, 2019

DEFINITIONS OF TERMS

16.5	A large number of abbreviations and acronyms appear on an SDS. 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