

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **RoClean L403**

CHEMICAL NAME/CLASS: Not Applicable

SYNONYMS: Not Applicable

PRODUCT USE: Water Treatment

SUPPLIER/MANUFACTURER'S NAME: AVISTA TECHNOLOGIES

ADDRESS: 140 Bosstick Blvd
San Marcos, CA 92069

CHEMTREC EMERGENCY NO.: 1-800-424-9300 (United States)
1-703-527-3887 (International)

BUSINESS PHONE: (760) 744-0536

DATE OF PREPARATION: July 2, 1999, Revised November 22, 2010

2. COMPOSITION and INFORMATION ON INGREDIENTS

| CHEMICAL NAME | CAS # | % w/w | EXPOSURE LIMITS IN AIR | | | | | |
|--|-------------|---------|--|---------------------------|--------------------------|---------------------------|---------------------------|----------------------------------|
| | | | ACGIH-TLVs | | OSHA-PELs | | IDLH mg/m ³ | OTHER mg/m ³ |
| | | | TWA mg/m ³ | STEL mg/m ³ | TWA mg/m ³ | STEL mg/m ³ | | |
| Inorganic Acid | Proprietary | 25 | 1 | 3 | 1 | NE | 1000 | NIOSH REL: TWA= 1 STEL= 3 |
| HEDTA Salt | Proprietary | 13 | NE | NE | NE | NE | NE | NE |
| Hydroxyalkanoic Acid | Proprietary | 10 | NE | NE | NE | NE | NE | NE |
| Alkali hydroxide | Proprietary | 7 | NE | 2 (Ceiling) | 2 | NE | 10 | NIOSH REL: STEL = 2 (Ceiling) |
| Glycine Carboxyamino Salt | Proprietary | < 1 | NE | NE | NE | NE | NE | NE |
| Acetic Acid Sodium Salt | Proprietary | < 1 | 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). | | | | | |

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

NOTE: All WHMIS information is included; it is located in appropriate sections based on the ANSI Z400.1-1998 format.



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



3. HAZARD 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 moderately to severely irritate the skin or eyes, 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, phosphorous oxides, phosphine, and sodium oxide). Emergency responders must wear personal protective equipment (and have appropriate fire-extinguishing protection) suitable for the situation to which they are responding.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product, via route of exposure, are as follows:

INHALATION: If vapors, mists or sprays of this solution are inhaled, symptoms of exposure may include breathing difficulty, irritation of the mucus membranes, coughing, nasal congestion, and a sore throat. Severe inhalation over-exposures can lead to chemical pneumonitis, pulmonary edema, and death.

CONTACT WITH SKIN or EYES: Depending on the duration of skin contact, skin overexposures may cause reddening, discomfort, moderate to severe irritation and chemical burns. Repeated skin overexposures to this product may cause dermatitis (dry, red skin). Repeated overexposure to Citric Acid (a component of this product) may cause sensitization; subsequent exposures to very small amounts may cause allergic reaction. Direct eye contact with the liquid can cause stinging, tearing and redness. Severe eye overexposures may cause burns, pain, reddening, watering, and possibly, blindness.

SKIN ABSORPTION: Skin absorption is not a significant route of exposure for any component of this product.

INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, it may cause irritation or burns of the mouth, throat, esophagus and other tissues of the digestive system. Symptoms of such over-exposure can include nausea, vomiting, and diarrhea. Ingestion of large quantities or frequent ingestion of this product can cause tooth erosion and irritation to the digestive system. Ingestion of large volumes of this product may be fatal.

INJECTION: Accidental injection of this product can cause burning, reddening, and swelling in addition to the wound.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**.

ACUTE: Inhalation exposure may cause coughing, sneezing, and difficulty breathing. Depending on the duration of contact, over-exposures can moderately to severely irritate or burn tissues of the eyes, skin, mucous membranes and any other contaminated tissue. Ingestion may cause stomach pains, cramps, and irritation of the tissues of the digestive system.

CHRONIC: Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Prolonged inhalation of the vapors or mists may lead to respiratory disorders (e.g. bronchitis). Repeated skin overexposure to Citric Acid (a component of this product) may cause sensitization. Repeated ingestion of this product can cause tooth erosion. Refer to Section 11 (Toxicology Information) for additional information on this product's components.

TARGET ORGANS: **Acute:** Skin, eyes, respiratory system. **Chronic:** Skin, respiratory system.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID 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 if adverse effect occurs.




HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

| | | |
|--------|--------|---|
| HEALTH | (BLUE) | 2 |
|--------|--------|---|

| | | |
|--------------|-------|---|
| FLAMMABILITY | (RED) | 0 |
|--------------|-------|---|

| | | |
|------------|----------|---|
| REACTIVITY | (YELLOW) | 0 |
|------------|----------|---|

| | |
|----------------------|---|
| PROTECTIVE EQUIPMENT | C |
|----------------------|---|

| EYES | RESPIRATORY | HANDS | BODY |
|--|---------------|--|--|
|  | SEE SECTION 8 |  |  |

For routine industrial applications

See Section 16 for Definition of Ratings

4. FIRST-AID MEASURES (Continued)

INHALATION: If vapors, mists, or sprays 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 unless direct by medical personnel. 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.

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.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting dermatitis, other skin conditions, and respiratory conditions may be aggravated by exposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower: Not applicable.

Upper: Not applicable.

FIRE EXTINGUISHING MATERIALS: This material will not contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire.

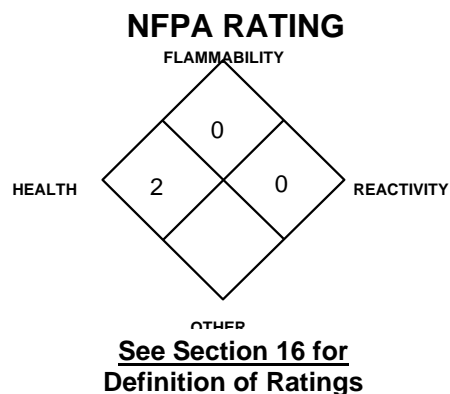
Water Spray: YES Carbon Dioxide: YES
Foam: YES Dry Chemical: YES
Halon: YES Other: Any "ABC" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is corrosive and presents a contact hazard to fire-fighters. When involved in a fire, this product may decompose and produce irritating fumes and toxic gases (e.g., carbon monoxide, carbon dioxide, phosphorous oxides, phosphine, and sodium oxide).

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: Not applicable.

SPECIAL FIRE-FIGHTING PROCEDURES: 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

SPILL AND LEAK RESPONSE: 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. Releases of this material may be slippery.

In the event of an incidental release of this product, personnel should wear gloves and safety glasses (or goggles). In the event of a non-incidental release, Minimum Personal Protective Equipment should be **Level C: triple-gloves, chemical resistant apron, boots, and splash goggles and an Air-Purifying respirator with organic vapor cartridge. Level B, which includes the use of Self-Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown.** Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize spill with neutralizer appropriate for acidic solutions. Decontaminate the area thoroughly. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater. Place all spill residues in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada (see Section 13, Disposal Considerations).

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: 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 mists and sprays of this product. Remove contaminated clothing immediately.

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES: 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. 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 (see Section 10, Stability and Reactivity). Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Storage areas should be made of fire-resistant 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.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). 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 Canadian standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: None needed under normal conditions of use. Use NIOSH approved respirators if ventilation is inadequate to control mists. Maintain airborne contaminate concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). 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 Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, 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., rubber, Neoprene).

BODY PROTECTION: Use body protection appropriate for task (e.g., Tyvek suit, rubber apron) to protect from splashes and sprays.

HMIS PERSONAL PROTECTIVE EQUIPMENT RATING: C

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): < 1

SPECIFIC GRAVITY: 1.3 – 1.4

SOLUBILITY IN WATER: Soluble.

VAPOR PRESSURE, mm Hg @ 20°C: Not available.

ODOR THRESHOLD: Not available.

EVAPORATION RATE (water = 1): Not available.

MELTING/FREEZING POINT: Not available.

BOILING POINT: Not available.

pH: 2.5 – 3.5

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not available.

APPEARANCE, ODOR AND COLOR: This product is a clear, colorless to amber-colored liquid with a light disinfectant odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The color and odor may act as warning properties associated with this product in the event of an accidental release.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product may generate carbon monoxide, carbon dioxide, phosphorous oxides, phosphine and sodium oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong bases, oxidizers, and water reactive materials.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid contact with incompatible chemicals.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology information is available for the product and its components.

PHOSPHORIC ACID:

Standard Draize Test (Skin-Rabbit, adult) 595 mg/24 hours: Severe irritation effects
Standard Draize Test (Eye effects-Rabbit, adult) 119 mg: Severe irritation effects
TDLo (Oral-Man) 1286 mL/kg
LDLo (Unreported-Man) 220 mg/kg
LD₅₀ (Oral-Rat) 1530 mg/kg
LD₅₀ (Skin-Rabbit, adult) 2740 mg/kg
LC₅₀ (Inhalation-Rat) > 850 mg/m³/1 hours

TRISODIUM HEDTA:

(Skin-Rabbit) non-irritating
(Eye-Rabbit) non-irritating

GLYCINE, N,N-BIS(CARBOXYMETHYL)-, TRISODIUM SALT:

LD₅₀ (Oral-rat) 1100 mg/kg: Gastrointestinal: nausea or vomiting
LD₅₀ (Oral-mouse) 681 mg/kg
LD₅₀ (Oral-dog) >5 gm/kg: Gastrointestinal: nausea or vomiting
LD₅₀ (Oral-monkey) 750 mg/kg: Gastrointestinal: nausea or vomiting
LD₅₀ (Intraperitoneal-rat) 254 mg/kg
TDLo (Oral-rat) 180 gm/kg/90 days-continuous: Liver: changes in liver weight; Kidney, Urethra, Bladder: changes in bladder weight; Blood: changes in erythrocyte (RBC) count
TDLo (Oral-rat) 56,305 mg/kg/30 days-intermittent: Kidney, Urethra, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis)
TDLo (Oral-rat) 219 gm/kg/2 years-continuous: Kidney, Urethra, Bladder: other changes in urine composition; Nutritional and Gross Metabolic - changes in metals, not otherwise specified; Related to Chronic Data: death
TDLo (Oral-rat) 70300 mg/kg/2 years-continuous: Tumorigenic: neoplastic by RTECS criteria; Liver: tumors; Kidney, Urethra, Bladder: Kidney tumors

GLYCINE, N,N-BIS(CARBOXYMETHYL)-, TRISODIUM SALT:

TDLo (Oral-rat) 39 gm/kg: male 8 week(s) pre-mating female 8 week(s) pre-mating: 3 week(s) post-birth: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)
TDLo (Oral-rat) 8 gm/kg: male 8 week(s) pre-mating female 8 week(s) pre-mating: 3 week(s) post-birth: Reproductive: Fertility post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)
Specific locus test (Oral-Drosophila melanogaster) 5200 µmol/L
Morphological transformation-rat Embryo: 495 µg/plate
Morphological transformation-mouse Embryo: 2 mg/L
Micronucleus test-hamster Lung: 2 mmol/L
Mutation test systems-not otherwise specified-hamster Lung: 3 mmol/L
Cytogenetic analysis-hamster Lung: 3 mmol/L

CITRIC ACID:

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
LD₅₀ (Oral-Rat) 3 g/kg
LD₅₀ (Oral-Mouse) 5040 mg/kg
LD₅₀ (Intraperitoneal-Rat) 883 mg/kg
LD₅₀ (Intraperitoneal-Mouse) 903 mg/kg
LD₅₀ (Subcutaneous-Rat) 5500 mg/kg
LD₅₀ (Subcutaneous-Mouse) 2700 mg/kg
LD₅₀ (Intraperitoneal-Mouse) LD50:903 mg/kg
LD₅₀ (Intravenous-Rabbit, adult) 330 mg/kg
LD₅₀ (Intravenous-Mouse) 42 mg/kg
LDLo (Oral-Rabbit, adult) 7000 mg/kg

SODIUM HYDROXIDE:

Standard Draize Test (Eye-Monkey) 1%/24 hours: Severe
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Severe
Standard Draize Test (Eye-Rabbit) 400 µg: Mild
Standard Draize Test (Eye-Rabbit) 1%: Severe
Standard Draize Test (Eye-Rabbit) 50 µg/24 hours: Severe
Standard Draize Test (Eye-Rabbit) 1 mg/24 hours: Severe
Rinsed with water (Eye-Rabbit) 1 mg/30 seconds: Severe
LD₅₀ (Intraperitoneal-Mouse) 40 mg/kg
LDLo (Oral-Rabbit) 500 mg/kg
Cytogenetic Analysis (Parenteral-Grasshopper) 20 mg
Cytogenetic Analysis (Hamster-Lung) 10 mmol/L
Cytogenetic Analysis (Hamster-Ovary) 16 mmol/L

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA, and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product can be irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: Citric Acid (a component of this product) may cause sensitization; subsequent exposures to very small amounts may cause allergic reaction

TOXICOLOGICAL SYNERGISTIC PRODUCTS: No information is currently available on toxicologically synergistic products of this material.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Human mutation data are available for Sodium Hydroxide and Sodium Nitrilotriacetate (components of this product); these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of Sodium Sulfate (a component of this product) provided teratogenic data.

Reproductive Toxicity: This product is not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Sodium Sulfate and Sodium Nitrilotriacetate (components of this product) provided reproductive toxicity data.

11. TOXICOLOGICAL INFORMATION (Continued)

A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An *embryotoxin* is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A *teratogen* is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURES INDICES (BEIs): Currently, there are no Biological Exposure Indices (BEIs) for any component of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product will decompose into other organic and inorganic compounds over time under normal environmental conditions. Additional environmental data are available as follows:

SODIUM HYDROXIDE:

Water Solubility = 9 g/0.9 ml water

BOD: None.

Octanol/Water Partition Coefficient: SRP4: Too low to be measured (or possibly virtually 0)

Persistence: Can persist for extended periods of time.

PHOSPHORIC ACID:

Food Chain Concentration Potential: Very Low

Chronic Hazard Level: The abundance of phosphates threatens algal blooms in fresh and some salt waters

Waterfowl toxicity: No data available

Biological Oxygen Demand (BOD): None

Water solubility: 548 g/ 100 cc (cold).

Persistence: If released to bodies of water, while acidity may be reduced readily by natural water hardness minerals, the phosphate may persist indefinitely.

If released to soil, the acid will be neutralized to some degree with adsorption of the proton and phosphate ions also possible. However, significant amounts of acid will remain for transport down toward the groundwater table.

Mobility/Soil Adsorption: When spilled onto soil, phosphoric acid will infiltrate downward, the rate being greater with lower concentration because of reduced viscosity. During transport through the soil, phosphoric acid will dissolve some of the soil material, in particular, carbonate-based materials. Phosphoric acid will be partially neutralized; however, some will remain to leach to groundwater. Upon reaching the groundwater table, the acid will continue to move in the direction of groundwater flow. A contaminated plume will be produced with dilution and dispersion serving to reduce the acid concentration.

CITRIC ACID:

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.

SODIUM NITRILOTRIACETATE:

Solubility: Soluble.

Biodegradation: Sodium Nitrilotriacetate is readily decomposed by soil microorganisms under anaerobic conditions. Sodium Nitrilotriacetate converts to nitrate under aerobic conditions, indicating use of detergents containing this compound can lead to the nitrate enrichment of water resources. A Nitrilotriacetate (NTA) -degrading pseudomonas species was shown to degrade calcium, magnesium, manganese, copper, zinc, cadmium, iron and sodium chelates of Nitrilotriacetate at nearly equal rates when the appropriate metal concentration are low enough to avoid toxicity from the freed metal. In an aerated sewage lagoon, Sodium Nitrilotriacetate breakdown was temperature dependent: 15% at 15°C, 47% at 5°C and 22% at 0.5°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful to animal life if large volumes of it are released into the environment. Refer to section 11 (Toxicological Information) for information on the effects of components of this product on test animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful to contaminated aquatic life (especially if large volumes of it are released into an aquatic environment. Additional aquatic toxicity data are available as follows:

SODIUM HYDROXIDE:

Acute Hazard Level:

Lethal pH (goldfish) = 10.9

Lethal pH (bluegill) = 10.5

LC₁₀₀ (*Cyprinus carpio*) 24 hours = 180 ppm/ 25°C

TL_m (mosquito fish) 96 hours = 125 ppm/ fresh water

TL_m (bluegill) 48 hours = 99 mg/L/ tap water

TRISODIUM HEDTA:

EC₅₀ (*Daphnia*) 48 hours = > 100 mg/L

EC₅₀ (Algae) 728 hours = 10-100 mg/L

LC₅₀ (*Leuciscus idus*) 96 hours = > 500 mg/L

PHOSPHORIC ACID:

TL_m (mosquito fish) = 138 mg/L 24-96 hours in turbid water at 22-24°C (conditions of bioassay not specified)

12. ECOLOGICAL INFORMATION (Continued)

EFFECT OF CHEMICAL ON AQUATIC LIFE (continued):

SODIUM NITRILOTRIACETATE:

LC₀ (*Palaemonetes vulgaris*, grass shrimp, adult) 168 hours = 1000 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₀ (*Pagurus longicarpus*) 168 hours = 1000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
LC₀ (*Mercenaria mercenaria*, quahog) 168 hours = 10,000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
LC₀ (*Fundulus heteroclitus*, mummichog) 168 hours = 4000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
LC₀ (*Morone saxatilis*, striped bass, sub-adult) 168 hours = 3000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
LC₀ (*Nereus virens*, adult worm) 168 hours = 3000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Nereus virens*, adult worm) 24-168 hours = 5500 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Nassarius obsoletus*, american mud snail) 96 hours = 5500 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Mercenaria mercenaria*, quahog mollusc) 24-168 hours = > 10,000 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Mytilus edulis*, blue mussel mollusc) 96 hours = 6100 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Palaemonetes vulgaris*, grass shrimp, adult) 96 hours = 4100 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Homarus americanus*, northern lobster, sub-adult) 96 hours = 3800 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Pagurus longicarpus*) 96 hours = 5500 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Stenotomus chrysops*, scup) 96-168 hours = 5500 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Fundulus heteroclitus*, mummichog) 24-168 hours = 5500 mg/L (seawater @ 20°C, pH 8, static bioassay)
LC₅₀ (*Morone saxatilis*, striped bass, juvenile) 24-168 hours = 5500 mg/L (seawater @ 20°C, static bioassay)
LC₁₀₀ (*Crangon allmani*) 24 hours = 240 mg/L (seawater @ 20°C, static bioassay)
LC₁₀₀ (*Artemia salina*, brine shrimp) 24 hours = 230 mg/L (seawater @ 20°C, static bioassay)
LC₁₀₀ (*Artemia salina*, brine shrimp) 24 hours = 240 mg/L (seawater @ 20°C, static bioassay)
LC₁₀₀ (*Copepoda copepods*) 24 hours = 120 mg/L (seawater @ 20°C, static bioassay)
LC₁₀₀ (*Anguilla rostrata* american eel) 24 hours = 250-260 mg/L (seawater @ 20°C, static bioassay) (seawater, static bioassay)
LC₁₀₀ (*Anguilla rostrata* american eel) 24 hours = 300 mg/L (brackish water @ 20°C, static bioassay) (seawater, static bioassay)
Embryo Development (*Crassostrea gigas* pacific oyster) 48 hours = 1000 mg/L-92.4% abnormal (seawater, static bioassay)
Embryo Development (*Crassostrea gigas* pacific oyster) 48 hours = 800 mg/L-33% abnormal (seawater, static bioassay)
Embryo Development (*Crassostrea gigas* pacific oyster) 48 hours = 400 mg/L-3.3% abnormal (seawater, static bioassay)
Embryo Development (*Protothaca staminea* littleneck clam) 48 hours = 800 mg/L-100% abnormal (seawater, static bioassay)
Embryo Development (*Protothaca staminea* littleneck clam) 48 hours = 400 mg/L-21.6% abnormal (seawater, static bioassay)
Growth (*Cyclotella nana* algae) 24-72 hours = 5 mg/L-stimulation (seawater, @ 20°C, pH 8.2, 26% salinity, static bioassay)
Growth (*Cyclotella nana* algae) 24hours = 5 mg/L-26% decrease (seawater, @ 20°C, pH 8.2, 26% salinity, static bioassay)
Growth (*Cyclotella nana* algae) 72 hours = 2.5 mg/L-45% decrease (seawater, @ 20°C, pH 8.2, 26% salinity, static bioassay)
Growth (*Cyclotella nana* algae) 72 hours = 5 mg/L-60% decrease (seawater, @ 20°C, pH 8.2, 26% salinity, static bioassay)
Kidney Histology (*Fundulus heteroclitus*, mummichog) 168 hours = > 1000 mg/L-abnormal (seawater @ 20°C, pH 8, static bioassay)
Kidney Histology (*Morone saxatilis*, striped bass, juvenile) 168 hours = > 3000 mg/L-abnormal (seawater @ 20°C, pH 8, static bioassay)
Intestine Histology (*Fundulus heteroclitus*, mummichog) 168 hours = > 1 mg/L-abnormal (seawater @ 20°C, pH 8, static bioassay)
Digestive Diverticulum Histology (*Palaemonetes vulgaris*, grass shrimp, adult) 168 hours = > 1000 mg/L-100% abnormal (seawater @ 20°C, pH 8, static bioassay)
Histology (*Nereus virens*, adult worm) 168 hours = 1000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
Histology (*Mercenaria mercenaria*, quahog) 168 hours = 1000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
Histology (*Pagurus longicarpus*) 168 hours = 1000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
Histology (*Homarus americanus*, northern lobster, sub-adult) 168 hours = 1000 mg/L-normal (seawater @ 20°C, pH 8, static bioassay)
mg/L

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada. 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.

EPA WASTE NUMBER: Not applicable to wastes consisting only of this product.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not Regulated
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
DOT LABEL(S) REQUIRED: Not Applicable
PACKAGING GROUP: Not Applicable
NORTH AMERICAN RESPONSE GUIDEBOOK NUMBER (1996): Not Applicable
NATIONAL MOTOR FREIGHT CLASSIFICATION: LTL: 100; T: 70
MARINE POLLUTANT: No component of this product is listed as a marine pollutant by the D.O.T. (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS NOT CONSIDERED AS DANGEROUS GOODS. Use above information for Canadian Shipments.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

| COMPONENT | SARA 302 (40 CFR 355, Appendix A) | SARA 304 (40 CFR Table 302.4) | SARA 313 (40 CFR 372.65) |
|----------------|--------------------------------------|----------------------------------|-----------------------------|
| Inorganic Acid | No | No | Yes |

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Phosphoric Acid = 5,000 lbs (2,270 kg); Sodium Hydroxide 1,000 lbs (45.4 kgs).

U.S. TSCA INVENTORY STATUS: All components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: Components of this product are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: Sodium Hydroxide, Phosphoric Acid.

California - Permissible Exposure Limits for Chemical Contaminants: Sodium Hydroxide, Phosphoric Acid.

Florida - Substance List: Sodium Hydroxide, Phosphoric Acid.

Illinois - Toxic Substance List: Sodium Hydroxide, Phosphoric Acid.

Kansas - Section 302/313 List: Sodium Hydroxide, Phosphoric Acid.

Massachusetts - Substance List: Sodium Hydroxide, Phosphoric Acid, Nitrotriacetic Acid Trisodium.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: Sodium Hydroxide, Phosphoric Acid.

Missouri - Employer Information/Toxic Substance List: Sodium Hydroxide, Phosphoric Acid.

New Jersey - Right to Know Hazardous Substance List: Sodium Hydroxide, Phosphoric Acid.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: Sodium Hydroxide, Phosphoric Acid.

Pennsylvania - Hazardous Substance List: Sodium Hydroxide, Phosphoric Acid.

Rhode Island - Hazardous Substance List: Sodium Hydroxide, Phosphoric Acid.

Texas - Hazardous Substance List: Sodium Hydroxide, Phosphoric Acid.

West Virginia - Hazardous Substance List: Sodium Hydroxide, Phosphoric Acid.

Wisconsin - Toxic and Hazardous Substances: Sodium Hydroxide, Phosphoric Acid.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 lists.

ANSI LABELING (Z129.1): **WARNING!** MAY CAUSE SKIN AND EYE IRRITATION OR BURNS. MAY BE IRRITATING IF INHALED. HARMFUL IF SWALLOWED. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing mists or sprays. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, and suitable body protection if necessary. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention if any adverse effects occur. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material and place in suitable container. Consult Material Safety Data Sheet for additional information.

15. REGULATORY INFORMATION

ENVIRONMENTAL HAZARDS: Do not discharge effluent containing this product into streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

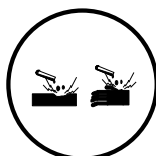
ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are listed on the DSL/NDSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: Not applicable.

CANADIAN WHMIS SYMBOLS: **Class E:** Corrosive Material



This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

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DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each compound.

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.

OSHA - U.S. Occupational Safety and Health Administration.

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. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health

Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL 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 and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). 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.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - 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/m³** 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. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **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. Other measures of toxicity include **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. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDSL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label.