SAFETY DATA SHEET

This Safety Data Sheet (SDS) complies with the requirements of the U.S. Federal Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200, as updated in 2012), the American National Standards Institute (Z400.1, 1998), and equivalent state Standards. It has also been developed in accordance with the Canadian Workplace Hazardous Materials Standard and the United Nations Globally Harmonized System of Classification of Chemicals, as well as European Union requirements under REACH (Registration, Evaluation, Authorization and Restriction of Chemical substances, per EC 1907/2006) and Directive 91/155/EC. Refer to Section 16 of this document for the definition of terms and abbreviations.

SECTION 1: IDENTIFICATION of the Substance/Mixture and of the Company/Undertaking

1.1 PRODUCT IDENTIFIER:

- PRODUCT NAME: **BATTERNS SOLDERING FLUX**
- SYNONYMS: Not Applicable
- CHEMICAL NAME/CLASS: Aqueous Inorganic Salt Solution
- PRODUCT CODE: 54.400-54.410

1.2 RELEVANT IDENTIFIED USES OF THE MIXTURE OR USES ADVISED AGAINST

- IDENTIFIED USE: Welding and Soldering
- USES ADVISED AGAINST: None Specified

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

- DISTRIBUTED BY: **GROBET FILE CO. OF AMERICA, INC.**
- ADDRESS 750 Washington Ave.; Carlstadt, NJ 07072
- BUSINESS PHONE: 201-939-6700; Toll Free – 800-847-4188 (USA only)
- EMERGENCY PHONE: 1-800-255-3924 (9 am – 5 pm EST)

1.4 OTHER PERTINENT INFORMATION

- This product is used as part of soldering and welding processes in relatively small volume (128 oz and less in size). This SDS has been developed to address safety concerns affecting small volume handling situations and those involving warehouses and other workplaces where large numbers of these items are stored or distributed.

SECTION 2: HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

REGULATION	CLASSIFICATION
OSHA HAZARD COMMUNICATION (GHS)	Acute Toxicity – Oral -Category 4; Skin Corrosion/Irritation-Category 2; Eye Damage/Irritation – Category 2A.; Reproductive Toxicity – Category 2
REACH/CLP (GHS)	Acute Toxicity – Oral -Category 4; Skin Corrosion/Irritation-Category 2; Eye Damage/Irritation – Category 2A; Reproductive Toxicity – Category 2

SECTION 2: HAZARDS IDENTIFICATION (Continued)

2.2 LABEL ELEMENTS:

- OSHA/CLP – BASED ON GLOBALLY HARMONIZED SYSTEM

Symbol: To the right.

Signal Word: WARNING.

Hazard statement(s)

- H303+H315+H319: Harmful if swallowed. Causes serious eye and skin irritation.
- H361: Suspected of damaging fertility or the unborn child.

Precautionary statement(s)

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P264: Wash thoroughly after handling.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P305+P351+P337+P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. If eye irritation persists, see a physician.
- P332 + P313: If skin irritation occurs: Get medical advice, attention.
- P312: Call a POISON CENTER/doctor if you are unwell.
- P308+313: If exposed or concerned Get medical advice/attention.
- P362 + P364: Take off contaminated clothing and wash it before reuse.
- P405: Store locked up.
- P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 OTHER PERTINENT DATA ON CHEMICAL AND PHYSICAL HAZARDS:

- **EMERGENCY OVERVIEW:**

PHYSICAL DESCRIPTION: This product is a green, odorless liquid.

HEALTH HAZARDS: The product can mildly to severely irritate the skin and eyes, depending on point of contact and duration of exposure. It may be harmful if swallowed. Boric Acid/ Sodium Tetraborate Decahydrate, components of this product, may cause adverse effects on the reproductive system.

FIRE HAZARDS: This product is not flammable.

PHYSICALHAZARDS: This product is stable under normal temperatures and pressures.

EVIRONMENTAL HAZARDS: This product may be harmful to contaminated terrestrial and aquatic life-forms if significant volumes are released into the environment.

- **HAZARDOUS MATERIALS IDENTIFICATION SYSTEM**

Health	**2**	HMIS Personal Protective Equipment Rating: Occupational Use situations: B/C; Safety glasses and gloves/ body protection suitable to specific circumstances of use should be considered.
Flammability	**0**	
Physical Hazard	**0**	
Protective Equipment	**B/C**	

- **CANADIAN REGULATORY STATUS**
  - This product is classified as hazardous under Canadian Controlled Products regulations (SOR-88-66). It is classified D2-A: Materials Causing Other Toxic Effects/Very Toxic Material: This SDS contains all the information required by the CPR.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1/3.2 SUBSTANCES/MIXTURES

COMPONENT	CAS NUMBER	EINECS #	GHS Class/Risk Phrases	% (w/w)
Sodium Tetraborate Decahydrate	1303-96-4	215-540-4	**Hazard Class:** Reproductive toxicity (Category 1B) **Hazard Statement:** May damage fertility or the unborn child. (Rated when concentration above 8.5% in solution)	1-5%
Boric Acid	10043-35-3	233-139-2	**Hazard Class**: Reproductive toxicity (Category 2) **Hazard Statement:** Suspected of damaging fertility or the unborn child. (Rated when concentration above 5.5% in solution)	1-10%
Ammonium Chloride	12125-02-9	235-186-4	**Hazard Classes:** • Acute toxicity, Oral (Category 4) • Eye irritation (Category 2A) **Hazard Statements**: • Harmful if swallowed. • Causes serious eye irritation.	35-45%
Aqueous solution in which components are either not hazardous or are below 1.0% in concentration (or below 0.1% in concentration for carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens). All ingredients are listed per the requirements of regulations pertinent to Safety Data Sheet requirements under various regulations.				Balance

SECTION 4: FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

Eyes: Flush with copious amounts of water for 15 minutes. "Roll" eyes during flush. Seek medical attention immediately. **Skin:** Flush area with warm, running water for 15 minutes. **Inhalation**: If sprays or mists of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. I**ngestion:** Contact a Poison Control Center or physician for instructions. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

4.2 MOST IMPORTANT ACUTE AND CHRONIC EXPOSURE SYMPTOMS

- **ACUTE:** CONTACT WITH SKIN or EYES: Contact causes eye irritation and may also be irritating to the skin. Eye contact can cause redness, pain, and tearing and tissue damage. Skin contact may result in redness and irritation. Prolonged or repeated skin contact may result in severe irritation, redness, or dermatitis. SKIN ABSORPTION: No component of this product is reported to be absorbed through intact skin. INGESTION: If the product is swallowed, irritation of the mouth, throat, and other tissues of the gastro-intestinal system will occur. Ingestion of large amounts can cause severe irritation, pain, vomiting, and diarrhea and may damage tissues of the digestive system. Ingestion of large volumes may be fatal. Borates (e.g., Boric Acid**/** Sodium Tetraborate Decahydrate, components of this product) can cause severe, adverse effects if swallowed in large quantities. Swallowing this product can cause gastric disturbances, electrolyte imbalances, and potentially cyanosis (a bluish discoloration of the skin due to deficient oxygenation of the blood). Borate poisoning begins with nausea, vomiting, and diarrhea. There is a red rash followed by exfoliation of rash area and mucous membranes. Kidney injury and central nervous system effects have been observed in cases of severe adult and pediatric exposure cases. INHALATION: Inhalation of mists or sprays of this product causes irritation to the respiratory tract. Symptoms of such exposure can cause coughing, wheezing, and inflammation of the tissues of the nose, throat, and other respiratory system organs. .

SECTION 4: FIRST AID MEASURES (Continued)

- **CHRONIC:** Prolonged or repeated contact to this product can result in dryness, redness, and irritation of exposure tissue. Chronic overexposure to Boric Acid**/**Sodium Tetraborate Decahydrate, components of this product) can result in borism (red, dry skin followed by loss of hair, cracked lips and conjunctivitis). Chronic ingestion of Boric Acid/Sodium Tetraborate Decahydrate in large quantities can damage the liver and kidneys, as well as cause central nervous system effects. Animal testing showed risk of impaired fertility for Boric Acid/ Sodium Tetraborate Decahydrate after exposures to very high doses.
- **TARGET ORGANS:** Acute - eyes, skin, respiratory system. Chronic – skin, respiratory system, reproductive system, liver, kidneys, central nervous system.

4.3 INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

- **RECOMMENDATIONS TO PHYSICIANS**: Treat symptoms and eliminate exposure.
- **MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Disorders associated with the target organs may be aggravated after either acute or chronic exposures.

SECTION 5: FIREFIGHTING MEASURES

5.1 EXTINGUISHING MEDIA

- **RECOMMENDED FIRE EXTINGUISHING MEDIA:** Water Spray, Water Jet, Dry Powder, Foam, Carbon Dioxide, Halon, or any other.
- **UNSUITABLE FIRE EXTINGUISHING MEDIA:** None known.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

- **NFPA FLAMMABILITY CLASSIFICATION:** Not flammable.
- **UNUSUAL HAZARDS IN FIRE SITUATIONS:** This product is non-combustible. This product does not significantly contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire.

NFPA RATING

Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

5.3 ADVICE FOR FIREFIGHTERS

Wear Self Contained Breathing Apparatus and full protective equipment for fire response. Move containers from fire area if it can be done without risk to personnel. Otherwise, use water spray to keep fire-exposed containers cool. Contaminated equipment should be rinsed thoroughly with water before returning to service.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES

- **RESPONSE TO INCIDENTAL RELEASES:** Personnel who have received basic chemical safety training can generally handle small-scale releases (e.g., under 1 gallon). For small releases, the minimum Personal Protective Equipment should be rubber gloves and rubber apron, splash goggles or safety glasses. Use caution during clean-up; avoid stepping into spilled liquid, as contaminated surfaces can be very slippery.
- **RESPONSE TO NON-INCIDENTAL RELEASES:** Generally, releases of this product will be no larger than the loss of one shipment of material (therefore, 1 gallon or less). Subsequently, personnel can follow the instructions for incidental releases. As needed, respond to non-incidental chemical releases of this product (such as the simultaneous destruction of several pallets of this product) by clearing the impacted area and contacting appropriate emergency personnel.

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SECTION 6: ACCIDENTAL RELEASE MEASURES (Continued)

- **RESPONSE PROCEDURES FOR ANY RELEASE**: Absorb spilled liquid with polypads or other suitable absorbent materials. Rise equipment/area thoroughly with water, if necessary.

6.2 ENVIRONMENTAL PRECAUTIONS

- Avoid response actions that can cause a release of a significant amount of the substance (1 liter or more) into the environment.

6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

- **SPILL RESPONSE EQUIPMENT:** Polypad or other absorbent material.

6.4 REFERENCES TO OTHER SECTIONS

- **SECTION 8:** For exposure levels and detailed personal protective equipment recommendations.
- **SECTION 13:** For waste handling guidelines.

SECTION 7: HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

- **HYGIENE PRACTICES:** Keep out of reach of children**.** Follow good chemical hygiene practices. Do not smoke, drink, eat, or apply cosmetics in the chemical use area. Avoid inhalation of dusts. Use in well-ventilated area. Avoid contact with skin or eyes. Remove contaminated clothing promptly. Clean up spilled product immediately.
- **HANDLING RECOMMENDATIONS:** Employees must be appropriately trained to use this product safely as needed. Keep containers closed when not in use.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

- **STORAGE RECOMMENDATIONS:** Ensure all containers are correctly labeled. Store containers away from direct sunlight, sources of intense heat, or where freezing is possible. Store this product away from incompatible chemicals (See Section 10, Stability and Reactivity). Empty containers may contain residual material; therefore, empty containers should be handled with care. Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

7.3 SPECIFIC END USES

- **RECOMMENDATIONS:** Place product away from children and animals.
- **INDUSTRIAL-SECTOR SPECIFIC SOLUTIONS:** PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT -- Follow practices indicated in Section 6 (Accidental Release Measures).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

- **U.S. NATIONAL EXPOSURE LIMITS:**

COMPONENT	ACGIH TLV	OSHA PEL (ppm)	NIOSH REL (ppm)	OTHER
Ammonium Chloride	10 mg/m^3 TWA; 20 mg/m^3 STEL	NE	10 mg/m^3 TWA; 20 mg/m^3 STEL	NE.
Sodium Tetraborate Decahydrate / Boric Acid (as borate compound)	2mg/m^3 TWA; 6 mg/m^3 STEL	NE	NE.	NE.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

- **INTERNATIONAL EXPOSURE LIMITS:**

COMPONENT	Federal Republic of Germany (DFG) Maximum Concentration Values in the Workplace (MAKs)	OTHER
Ammonium Chloride	NE	NE
Sodium Tetraborate Decahydrate / Boric Acid (as borate compound)	10 mg/m^3 TWA (inhalable fraction); 1 mg/m^3 C	NE

- **BIOLOGICAL OCCUPATIONAL EXPOSURE LIMITS:** There are no Biological Exposure Indices (BEIs) for components of this product.
- **DERIVED NO EFFECT LEVEL (DNEL):** Not established.
- **PREDICTED NO EFFECT CONCENTRATION (PNEC):** Not established.

8.2 EXPOSURE CONTROLS

- **ENGINEERING CONTROLS:** Use this product in well-ventilated environment. Safety showers, eye wash stations, and hand-washing equipment should be available.
- **RESPIRATORY PROTECTION:** None needed under normal conditions of use. Use NIOSH approved respirators if ventilation is inadequate to control mists or sprays. For situations in which significant amounts of splashes, sprays, or mists could be generated, wear an air-purifying respirator with a high-efficiency particulate filter.
- **HAND PROTECTION:** Nitrile or neoprene gloves should be used. If necessary, refer to U.S. OSHA 29 CFR 1910.138, appropriate Standards of Canada, or of the European Economic Community.
- **EYE PROTECTION:** Splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, or the European Standard EN166.
- **BODY PROTECTION:** Use a body protection appropriate to task (e.g., lab coat, coveralls, or apron). Care should be taken to select protection for potentially exposed areas when prolonged exposure could occur in occupational settings.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:

(a) APPEARANCE: Green liquid.
(b) ODOR: Odorless.
(c) ODOR THRESHOLD: Not determined.
(d) pH: Not determined.
(e) MELTING POINT/FREEZING POINT: Approx. 0°C (32 °F).
(f) INITIAL BOILING POINT AND BOILING RANGE: Approximately100°C (212°F).
(g) FLASH POINT: Not applicable.
(h) EVAPORATION RATE (water=1): Appro
(i) FLAMMABILITY: Not flammable.
(j) UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS: Not applicable.
(k) VAPOR PRESSURE (mmHg @ 20˚C): Not applicable.
(l) VAPOR DENSITY: Not applicable.
(m) RELATIVE DENSITY (water=1): 1.06
(n) SOLUBILITY: Soluble in water.
(o) PARTITION COEFFICIENT: N-OCTANOL/WATER: Not determined.
(p) AUTO-IGNITION TEMPERATURE: Not applicable.
(q) DECOMPOSITION TEMPERATURE: Not determined.
(r) VISCOSITY: Not applicable.
(s) EXPLOSIVE PROPERTIES: Not applicable.
(t) OXIDIZING PROPERTIES: Not an oxidizer.

9.2 OTHER INFORMATION

- **VOC (less water & exempt):** Not applicable.
- **WEIGHT% VOC:** Not applicable.

SECTION 10: STABILITY AND REACTIVITY

10.1 REACTIVITY

- Not reactive under typical conditions of use or handling; contact with water can generate some amount of heat.

10.2 CHEMICAL STABILITY

- Normally stable under standard temperatures and pressures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

- This product is not self-reactive or air-reactive.
- This product will not undergo hazardous polymerization**.**

10.4 CONDITIONS TO AVOID

- Avoid contact with incompatible chemicals.

10.5 INCOMPATIBLE MATERIALS

- This product is not compatible with strong oxidizing agents and water-reactive materials.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

- Products of thermal decomposition of this product can include carbon monoxide, carbon dioxide and compounds of nitrogen, boron, and chlorine.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS

- **ACUTE TOXICITY:** The following data are available for hazardous components in this product greater than 1% in concentration**.**

AMMONIUM CHLORIDE
Oral-Rat LD50:1650 mg/kg

SODIUM TETRABORATE DECAHYDRATE
Oral-Rat LD50:4500-5000 mg/kg
Skin-Rabbit LD50: 10,000 mg/kg

BORIC ACID
Skin-Human 15 mg/3D-I Mild irritation effects
Microorganisms-Escherichia coli 17,000 ppm/24H
Sperm Morphology-Rat-Oral 6 mg/kg
Oral-Rat TDLo:45 g/kg (90D male):Reproductive effects
Oral-cld TDLo:500 mg/kg:Gastrointestinal tract effects
Oral-Man LDLo:429 mg/kg:Cardiovascular effects,Systemic effects
Oral-cld TDLo: 500 mg/kg:
Skin-Infant LDLo:1200 mg/kg

BORIC ACID (Continued)
Skin-Child LDLo:4 g/kg/4D
Skin-Man LDLo:2430 mg/kg
Skin-cld LDLo:1500 mg/kg
Subcutaneous-Infant LDLo:1100 mg/kg
Unreported-Man TDLo:170 mg/kg:Gastrointestinal tract effects
Unreported-Man LDLo:147 mg/kg
Oral-Rat LD50:2660 mg/kg
Inhalation-Rat LCLo:28 mg/m3/4H
Inhalation-Rat LCLo:28 mg/m3/4H
Subcutaneous-Rat LD50:1400 mg/kg
Intravenous-Rat LD50:1330 mg/kg
Oral-Mouse LD50:3450 mg/kg
Intraperitoneal-Mouse LDLo:800 mg/kg
Subcutaneous-Mouse LD50:1740 mg/kg
Intravenous-Mouse LD50:1240 mg/kg
Subcutaneous-Dog, adult LDLo:1000 mg/kg
Parenteral-Dog, adult LDLo:1 g/kg

- **DEGREE OF IRRITATION:** Mild to moderate, depending on duration of exposure.
- **SENSITIZATION:** Not applicable.
- **REVIEW OF ACUTE SYMPTOMS AND EFFECTS:** See Section 2 (Hazards Information) and Section 4 (First-Aid Measures) for further details.
  - **EYES:** Can cause mild to moderate irritation. Prolonged contact may cause severe injury.
  - **SKIN**: Can cause mild to severe irritation, depending on duration of contact.
  - **INHALATION:** Mists/sprays of this product can cause mild to severe nasal irritation.
  - **INGESTION:** Although not anticipated to be a significant route of occupational over-exposures, ingestion of this product may irritate the mouth, throat, and other contaminated tissue and cause other adverse health effects.

SECTION 11: TOXICOLOGICAL INFORMATION (Continued)

- **CHRONIC TOXICITY:**
  - **CARCINOGENICITY STATUS:** The following table summarizes the carcinogenicity listing for the components of this product. "NO" indicates that the substance is not considered to be, or suspected to be, a carcinogen by the listed agency.

CHEMICAL	IARC	NTP	NIOSH	OSHA	OTHER
Ammonium Chlroide	NO	NO	NO	NO	NO
Sodium Tetraborate Decahydrate / Boric Acid (as borate compound)	NO	NO	NO	NO	NO

  - **REPRODUCTIVE TOXICITY INFORMATION:** The components of this product are not reported to cause reproductive effects under typical circumstances of exposure at the concentrations present in this product. The following components have been reported to have reproductive effects in test animals.
    - **BORIC ACID.** Developmental effects were observed in mice, rats and rabbits after oral administration of Boric acid. However, these effects were considered secondary to maternal toxicity (e.g., adverse liver and kidney effects).: Boric acid was found to induce testicular atrophy and effects on spermatogenesis in rats and mice in various studies. Effects occurred at dose-levels (27 mg/kg) without general toxicity. Boric acid has selectively damaged the testes, sperm production and fertility in rats and dogs after ingestion of relatively large doses.
    - **SODIUM TETRABORATE DECAHYDRATE:** Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. Studies with the chemically related boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations. The doses administered were many times in excess of those to which humans would normally be exposed. Human epidemiological studies show no increase in pulmonary disease in occupational populations with cronic exposures to boric acid dust and sodium borate dust. A recent epidemiological study under the conditions of normal occupational eposure to borate dusts indicated no effect on fertility.
  - **MUTAGENIC EFFECTS:** The components of this product may cause mutagenic effects, based on animal testing.
    - **BORIC ACID:** Mutagenic for bacteria and/or yeast.
  - **SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE:** Not applicable.
  - **SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE:** Not applicable.
- **OTHER INFORMATION**
  - **TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None known.
  - **ADDITIONAL TOXICOLOGY:** None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 TOXICITY

- Based on available data, this product can be harmful to contaminated terrestrial plants or animals.
- Based on available data, this product can be harmful or fatal to contaminated aquatic plants or animals.
- There are the following aquatic toxicity data available for components of this product that are over 1 percent in concentration.

BORIC ACID
EC50 (*Daphnia magna*); 48 hours, 133 mg/L
LC50 Fish (*Lepomis machochris-Bluegill*); 96 hours/ > 1021 mg/L

SODIUM TETRABORATE DECAHYDRATE
LC50 - Carassius auratus (goldfish) - 178 mg/l - 72 hours
EC50 - Daphnia magna (Water flea) - 1,085 - 1,402 mg/l - 48 hours
IC50 - Desmodesmus subspicatus (green algae) - 158 mg/l - 96 hours

AMMONIUM CHLORIDE
LC50 - Cyprinus carpio (Carp) - 209.00 mg/l - 96 hours
LC50 - Oncorhynchus mykiss (rainbow trout) - 3.98 mg/l - 96 hours
NOEC - Oncorhynchus mykiss (rainbow trout) - 57 mg/l - 96 hours
LC50 - Daphnia magna (Water flea) - 161 mg/l - 48 hours
Growth inhibition NOEC - Daphnia magna (Water flea) - 0.1 mg/l - 216 hours

SECTION 12: ECOLOGICAL INFORMATION (Continued)

12.2 PERSISTENCE AND DEGRADABILITY

- When released into the soil, the components of this product are expected to biodegrade, dissipate in soils via oxidation, or otherwise chemically degrade or photo-decompose via solar radiation.

12.3 BIOACCUMULATIVE POTENTIAL

- The components of this product are not anticipated to bioaccumulate in any significant quantities.

12.4 MOBILITY IN SOIL

- It is to be expected this product will have small mobility in soil. Some of the components may get into the soil and, ultimately, the ground water.

12.5 RESULTS OF PBTand vPvB ASSESSMENT

- No data are available.

12.6 OTHER ADVERSE EFFECTS

- ENDROCRINE DISRUPTOR INFORMATION: No component is reported to be an endocrine disruptor.

SECTION 13: DISPOSAL CONSIDERATION

13.1 WASTE TREATMENT METHODS

- **WASTE HANDLING RECOMMENDATIONS:** Prepare, transport, treat, store, and dispose of waste product according to all applicable local, U.S. State and U.S. Federal regulations, the applicable Canadian standards, or the appropriate standards of the nations of the European Community.
- **PRECIOUS METAL RECLAMATION:** When applicable and practical, users of the product may wish to utilize precious metal reclamation services for final disposition of wastes.

13.2 DISPOSAL CONSIDERATIONS

- **EPA RCRA WASTE CODE:** Not applicable **EUROPEAN WASTE CODE:** 11 01 99

SECTION 14: TRANSPORT INFORMATION

- **DEPARTMENT OF TRANSPORTATION HAZARDOUS MATERIALS SHIPPING REGULATIONS:**

UN/NA Number	Proper Shipping Name	Packing Group	Hazard Class	Label	North American Emergency Response Guide #	Marine Pollutant Status
NOT APPLICABLE						

- **CANADIAN TRANSPORTATION INFORMATION**: This product is not regulated by Transport Canada as dangerous goods under Canadian transportation standards. Refer to above information.
- **IATA DESIGNATION**: This product is not regulated as dangerous goods by the International Air Transport Association.
- **IMO DESIGNATION**: This product is not regulated as dangerous goods by the International Maritime Organization.
- **EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):** This product is not considered to be dangerous goods. Use the above information for transport classification.

14.5: ENVIRONMENTAL HAZARDS

- None described, as related to transportation.

14.6: SPECIAL PRECAUTIONS FOR USERS

- Not applicable.

14.7: TRANSPORT IN BULK

- Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1: SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE SUBSTANCE OR MIXTURE.

- **OTHER IMPORTANT U.S. REGULATIONS**
  - **U .S. SARA THRESHOLD PLANNING QUANTITY**: Not applicable.
  - **U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21):** ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No
  - **U.S. CERCLA REPORTABLE QUANTITY (RQ):** Ammonium Chloride = 5000 lb
  - **U.S. TSCA INVENTORY STATUS:** All components of this product are listed on the TSCA Inventory.
  - **US SARA 313:** Not applicable.
  - **CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) STATUS:** Not applicable.
- **INTERNATIONAL REGULATIONS**
  - **CANADIAN DSL/NDSL INVENTORY STATUS:** The listed components of this product are on the DSL/NDSL Inventory.
  - **CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this product are not on the CEPA Priorities Substances Lists.
  - **GERMAN WATER HAZARD CLASSIFICATION:** 1 (no hazard to waters).

15.2: CHEMICAL SAFETY ASSESSMENT.

- No information available.

SECTION 16: OTHER INFORMATION

16.1: INDICATION OF CHANGE.

- **CHANGE INDICATED:** New phone number; volume annotations.
- **ORIGINAL DATE OF ISSUE:** September 10, 2010
- **DATES OF UPDATES:** September 19, 2014

16.2: KEY LITERATURE REFERENCES AND SOURCES FOR DATA

- SAFETY DATA SHEETS FOR COMPONENT PRODUCTS.
- Regulations (EC) No 1907/2006, 1272/2008 & 453/2010 of the European Parliament and of the Council.
- Federal OSHA Hazard Communication Standard: 29 CFR 1910.1200
- SAX – Dangerous Properties of Industrial Materials
- RTECS – Registry of Effects of Toxic Chemicals
- ESIS -European Chemical Substances Information System http://esis.jrc.ec.europa.eu/

16.3: CLASSIFICATION AND PROCEDURE USED TO DERIVE THE CLASSIFICATIONS FOR MIXTURES

- **CLASSIFICATION**: Section 2 (Hazards Information) provides all relevant classification information used for this product. The assignments were based on data available for the component products, calculations, expert judgment, and weight of evidence.

16.4: ABBREVIATIONS AND ACRONYMS.

ALL SECTIONS: OSHA: U.S. Federal Occupational Safety and Health Administration. WHMIS: Canadian Workplace Hazardous Materials Standard. GHS: Globally Harmonized System of Classification of Chemical Substances. REACH: European Union regulation, Registration, Evaluation, Authorization and Restriction of Chemical substances.

SECTION 2: CAS Number: Chemical Abstract Service Number, which is used by the American chemical Society to uniquely identify a chemical. EINECS: European Inventory of Existing Commercial Substances.

SECTION 3: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATING: This is a rating system used by industry to summarize physical and health hazards to chemical users and was originally developed by the National Paint and Coating Association. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 5: NFPA: National Fire Protection Association. NFPA FLAMMABILITY CLASSIFICATION: The NFPA uses the flash point (Fl.P.) and boiling point (BP) to classify flammable or combustible liquids. Class IA: Fl.P. below 73°F and BP below 100°F. Class IB: Fl.P. below 73°F and BP at or above 100°F. Class IC: :Fl.P. at or above 73°F and BP at or above 100°F. Class II: : Fl.P. at or above 100°F and below 140°F. Class IIIA: Fl.P. at or above 140°F and below 200°F. Class IIIB: Fl.P. at or above 200°F. NFPA HAZARDOUS MATERIALS RATING: This is a rating system used to summarize physical and health hazards to firefighters. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 8: NE:Not established.ACGIH: American Conference of Government Industrial Hygienists; TWA: Time-Weighted Average (over an 8-hour work day); STEL: Short-Term Exposure Limit (15 minute average, no more than 4-times daily and each exposure separated by one-hour minimally); C: Ceiling Limit (concentration not to be exceeded in a work environment). PEL: Permissible Exposure Limit. NIOSH: National Institute of Occupational Safety and Health; REL: Recommended Exposure Limit; IDLH: Immediately Dangerous to Life and Health Concentrations. *Note*: In July 1992, a court ruling vacated the more protective PELs set by OSHA in 1989. Because OSHA may enforce the more protective levels under the "general duty clause", both the current and vacated levels are presented in this document. ppm: Parts per Million. mg/m^3: Milligrams per cubic meter. mppcf: Millions of Particles per Cubic Foot. BEI: Biological Exposure Limit. EL: Exposure Limit (United Kingdom). Federal Republic of Germany (DFG) Maximum Concentration Values in the Workplace (MAKs)

SECTION 9: pH: Scale (0 to 14) used to rate the acidity or alkalinity of aqueous solutions. For example, a pH value of 0 indicates a strongly acidic solution, pH of 7 indicates a neutral solution, and a pH value of 14 indicates an extremely basic solution. FLASH POINT: Temperature at which a liquid generates enough flammable vapors so that ignition may occur. AUTOIGNITION TEMPERATURE: Temperature at which spontaneous ignition occurs. LOWER EXPLOSIVE LIMIT (LEL): The minimal concentration of flammable vapors in air which will sustain ignition. UPPER EXPLOSIVE LIMIT (UEL): The maximum concentration of flammable vapors in air which will sustain ignition.≈: Approximately symbol.

SECTION 11: CARCINOGENICITY STATUS: NTP: National Toxicology Program. IARC: International Agency for Research on Cancer. REPRODUCTIVE TOXICITY INFORMATION: Mutagen: Substance capable of causing chromosomal damage to cells. Embryotoxin: Substance capable of damaging the developing embryo in an overexposed female. Teratogen: Substance capable of damaging the developing fetus in an overexposed female. Reproductive toxin: Substance capable of adversely affecting male or female reproductive organs or functions. TOXICOLOGY DATA: LD*xx*or LC*xx*: The Lethal Dose or Lethal Concentration of a substance which will be fatal to a given percentage (*xx*) of exposed test animals by the designate route of administration. This value is used to access the toxicity of chemical substances to humans. TD*xx*or TC*xx*: The Toxic Dose or Toxic Concentration of a substance which will cause an adverse effect to a given percentage (*xx*) of exposed test animals by the designate route of administration.

SECTION 12: TLm – Median Tolerance Limit

SECTION 13: RCRA: Resource Conservation and Recovery Act. The regulations promulgated under this act under Act are found in 40 CFR, Sections 260 ff, and define the requirements of hazardous waste generation, transport, treatment, storage, and disposal. EPA RCRA Waste Codes: Defined in 40 CFR Section 261.

SECTION 15: CERCLA: Comprehensive Environmental Response Compensation and Liability Act (a.k.a. "Superfund") and SARA: (Superfund Amendment and Reauthorization Act). The regulations promulgated under this Act are located under 40 CFR 300 ff. and provide "community right-to-know" requirements. DSL/NDSL: Canadian Domestic Substances and Non-Domestic Substances Lists.