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: **JAX ALUMINUM BLACKENER**
- SYNONYMS: None
- CHEMICAL NAME/CLASS: Inorganic Solution

1.2 RELEVANT IDENTIFIED USES OF THE MIXTURE OR USES ADVISED AGAINST

- IDENTIFIED USE: Metal Finishing
- USES ADVISED AGAINST: None Specified

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

- MANUFACTURER/ SUPPLIER: **JAX Chemical Company**
- ADDRESS 640 South Fulton Avenue, Mount Vernon, NY 10550
- BUSINESS PHONE: 914-668-1818
- EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC; 24 hours)
  +1-703-527-3887 **(**CHEMTREC, International and Maritime)

1.4 OTHER PERTINENT INFORMATION

- This product is used as part of metal finishing and polishing processes in relatively small volume. 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** *(Based on manufacturer test data)*
OSHA HAZARD COMMUNICATION (GHS)	Acute Toxicity, Oral (Category 4); Acute Toxicity, Inhalation (Category 4); Skin Corrosion/Irritation (Category 2); Eye Damage/Irritation (Category 2A); Respiratory Sensitization (Category 1); Skin Sensitization (Category 1); Carcinogenicity (Category 2); Reproductive Toxicity (Category 1B); Specific Target Organ Toxicity – repeated exposure, inhalation (Category 1).
REACH/CLP (GHS)	Acute toxicity, Oral (Category 3); Acute toxicity, Inhalation (Category 3); Acute aquatic toxicity (Category 3); Skin Corrosion/Irritation (Category 2); Eye Damage/Irritation (Category 2A); Respiratory Sensitization (Category 1); Skin Sensitization (Category 1); Carcinogenicity (Category 2); Reproductive Toxicity (Category 1B); Specific Target Organ Toxicity – repeated exposure, inhalation (Category 1). Chronic aquatic toxicity (Category 4)
EU DIRECTIVES 67/548/EEC; 1999/45/EC	None specifically assigned. The following classification developed based on available data – T [Toxic], Xi [Irritant]

SECTION 2: HAZARDS IDENTIFICATION (Continued)

2.2 LABEL ELEMENTS:

- OSHA/CLP – BASED ON GLOBALLY HARMONIZED SYSTEM

Symbol: To the right.
Signal Word: Danger.

Hazard statement(s)

- H302 + H331: Harmful if swallowed or if inhaled.
- H315+H319: Causes skin and serious eye irritation.
- H317: May cause an allergic skin reaction.
- H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H351: Suspected of causing cancer.
- H360: May damage fertility or the unborn child.
- H372: Causes damage to organs through prolonged or repeated exposure if inhaled.
- H413: May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P260: Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
- P264: Wash thoroughly after handling
- P270: Do not eat, drink or smoke when using this product.
- P272 Contaminated work clothing should not be allowed in the workplace.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P284 In case of inadequate ventilation, wear respiratory protection.
- P301 + P310 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
- P302: IF ON SKIN: Wash with plenty of water.
- P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
- P308 + P313: IF exposed or concerned: Get medical advice/ attention.
- P333 + P313: If skin irritation or rash occurs: Get medical advice or attention.
- P337+P313: If eye irritation persists: Get medical advice or attention.
- P342 +P311: If experiencing respiratory systems: Call a POISON CENTER or doctor/ physician.
- P362+P364: Take off contaminated clothes and wash before reuse.
- P405: Store locked up.
- P501 Dispose of contents/ container to an approved waste disposal plant.

- EC DIRECTIVE SYMBOLS, RISK AND SAFETY PHRASES

Symbol: T [Toxic]; Xi [Irritant]. **See symbols to right.**

Risk Phrases: [R20/22] Harmful by inhalation and if swallowed. [R36/38] Irritating to skin and eyes. [R43] May cause sensitization by skin contact. [R49] May cause cancer by inhalation. [R48/23] Toxic: danger of serious damage to health by prolonged exposure through inhalation. [R52/53] Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. [R61] May cause harm to the unborn child.

Safety Phrases [S2] Keep out of the reach of children. [S20/21] When using do not eat, drink or smoke. [S24/25] Avoid contact with skin and eyes. [S28] After contact with skin wash immediately with plenty of water and soap. [S29] Do not empty into drains. [S36/37] Wear suitable protective clothing and gloves. [S45] In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). [S46] If swallowed seek medical advice immediately and show container or label. [S51] Use only in well-ventilated area. [S53] Avoid exposure - obtain special instructions before use. [S60] This material and its container must be disposed of as hazardous waste. [S61] Avoid release to the environment. Refer to special instructions/Safety data sheets.

SECTION 2: HAZARDS IDENTIFICATION (Continued)

2.3 OTHER PERTINENT DATA ON CHEMICAL AND PHYSICAL HAZARDS:

- **EMERGENCY OVERVIEW:**

PHYSICAL DESCRIPTION: This is a green odorless solution.

HEALTH HAZARDS: This product is harmful; overexposures may moderately to severely irritate the skin, eyes, and respiratory system or cause burns, depending on the duration and concentration of exposure. Exposure to sensitive skin and mucous membranes can be very irritating to exposed tissue. Nickel Sulfate, a component of this product, is a sensitizer: allergic skin and/or respiratory reactions may occur after repeated exposures to this solution. Nickel sulfate is also a carcinogen and reproductive toxin; over-exposures may result in cancer or harm to the unborn child.

FIRE HAZARDS: No known fire hazard.

PHYSICALHAZARDS: Negligible under typical circumstances of use or reasonably anticipated emergency response situations.

EVIRONMENTAL HAZARDS: This product may be harmful to contaminated terrestrial and aquatic lifeforms, especially if large quantities are released into the environment.

- **HAZARDOUS MATERIALS IDENTIFICATION SYSTEM**

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

HMIS Personal Protective Equipment Rating: Occupational Use situations: C = Safety glasses and gloves, and body protection suitable to specific circumstances of use. **E =** Under certain circumstances of use, consider respiratory protection. ***** Chronic hazard.

- **CANADIAN REGULATORY STATUS**
  - This product is classified as hazardous under Canadian Controlled Products
  - It is classified as D2A: Very Toxic Material Causing Other Toxic Effects. D2B - Materials Causing Other Toxic Effects. See symbol to right.
  - 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 #	EC Class/Risk Phrases	% (w/w)
Fluorboric Acid	16872-11-0	240-898-3	**Classification:** At concentrations between 10-25% - Xi **Risk Phrases:** [R36/38] Irritating to eyes and skin. .	Less than 0.05%
Selenious Acid	7783-00-8	231-974-7	None specifically assigned. **Classification (for 100%):** T; N **Risk Phrases:** [R23/25] Toxic by inhalation and if swallowed [R33] Danger of cumulative effects [R51/53]: Toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment.	Less than 1.0%
Nickel (II) Sulfate Heptahydrate *("Nickel Sulfate" in the remainder of this document)*	10101-98-1	232-104-9	**Classification:** A concentrations between 1-2% - T **Risk Phrases:** [R43] May cause sensitization by skin contact. [R49] : May cause cancer by inhalation. [R48/23] Toxic: danger of serious damage to health by prolonged exposure through inhalation. [R52/53] Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. [R61] May cause harm to the unborn child.	1-2 %
Sodium Chloride	16872-11-0	231-598-3	Not Established	10-15
Aqueous solution, with components that 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. **Inhalation:** Obtain fresh air. **Ingestion:** Contact a Poison Control Center or physician for instructions.

4.2 MOST IMPORTANT ACUTE AND CHRONIC EXPOSURE SYMPTOMS

- **ACUTE:** Depending on the duration of contact, overexposures may mildly to severely irritate the eyes, skin, mucous membranes, and any other exposed tissue. If swallowed, the product may cause gastrointestinal irritation causing nausea and vomiting (especially if large volumes are swallowed).
- **CHRONIC:** Chronic over-exposures via inhalation may cause a variety of irreversible effects. Chronic exposure to selenium may cause central nervous system effects, digestive tract disturbances, pallor, and garlic breath. Chronic exposure to selenium may cause pallor, garlic breath, metallic taste, anemia, liver and spleen damage. Chronic selenium poisoning is characterized by loss of hair and nails, skin lesions, and abnormalities of the nervous system. Nickel Sulfate, a component of this product, is a sensitizer: allergic skin and/or respiratory reactions may occur after repeated exposures to this solution. Nickel sulfate is also a carcinogen and reproductive toxin; over-exposures may result in cancer or harm to the unborn child.
- **TARGET ORGANS:** Acute: Eyes, skin. Chronic: Skin, central nervous system, liver and spleen, respiratory system, reproductive system.

4.3 INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

- **RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.
- **MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Pre-existing skin or respiratory conditions after chronic contact exposures. Though not likely to occur to due volume and nature of use of product, chronic exposures via inhalation or contact can cause central nervous system, liver, and kidney disorders to be aggravated. May cause cancer. May cause harm to the unborn child.

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 RATING

NFPA FLAMMABILITY CLASSIFICATION: Not flammable.

UNUSUAL HAZARDS IN FIRE SITUATIONS: When involved in a fire, this material may produce irritating vapors and toxic gases (e.g., oxides of selenium, nickel, sulfur).

Explosion 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 liter). Wear gloves, safety glasses when cleaning-up spills. Use caution during clean-up; contaminated floors and items may be slippery.
- **RESPONSE TO NON-INCIDENTAL RELEASES:** In the event of a non-incidental release (more than 1 liter), 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 or in spill areas that are enclosed or that have extremely poor ventilation.** Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with sodium bicarbonate or other neutralizing agent for acids. Ensure that the contaminated area is neutralized (pH 5-9) before releasing the area for regular occupational use.
- **RESPONSE PROCEDURES FOR ANY RELEASE**: Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue or any potentially contaminated item with sodium bicarbonate or sodium bicarbonate solution.

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. Sodium bicarbonate, as needed, to neutralize area.

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 vapors, mists and sprays. 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.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMAPTIBILITIES

- **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).

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
Fluoroboric Acid (as Fluorides)	TWA= 2.5 mg/m^3	TWA= 2.5 mg/m^3	TWA= 2.5 mg/m^3	NE
Selenious Acid (Selenium compounds, as Se).	TWA= 0.2 mg/m^3	TWA= 0.2 mg/m^3	TWA= 0.2 mg/m^3	NE
Nickel Sulfate (as Nickel, soluble compounds)	TWA= 0.1 mg/m^3	1 mg/m3, as Ni	TWA= 0.0.05 mg/m^3	NE
Sodium Chloride	NE	NE	NE	NE

- **INTERNATIONAL EXPOSURE LIMITS:**

COMPONENT	Federal Republic of Germany (DFG) Maximum Concentration Values in the Workplace (MAKs)	OTHER
Fluoroboric Acid (as Fluorides)	2.5 mg/m^3 (Irritant, Ceiling, Skin)	**United Kingdom Workplace Exposure limits:** 2.5 mg/m^3
Selenious Acid (Selenium compounds, as Se).	0.2 mg/m^3 (as Selenium, Inorganic Compounds) (Irritant, Ceiling, Skin)	**United Kingdom Workplace Exposure limits:** 0.1 mg/m^3
Nickel Sulfate (as Nickel, soluble compounds)	Sensitization of airway and skin.	**United Kingdom Workplace Exposure limits:** 0.1 mg/m^3
Sodium Chloride	NE	NE

- **BIOLOGICAL OCCUPATIONAL EXPOSURE LIMITS:** The following BEIs have been established for the components of this product:
  - **Fluoroboric Acid (as Fluorides):** Fluorides in urine = 2 mg/L prior to shift or 3 mg/L at end of shift; (Repeated measurements recommended.)
- **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. Maintain airborne contaminate concentrations below guidelines listed in Section 3 (Composition and Information on Ingredients). If respiratory protection is needed, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EC member states. For additional guidance, the following values from NIOSH for Nickel and its compounds are provided:
  - **At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:** (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
  - (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
  - **Escape:** (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

- **HAND PROTECTION:** Neoprene gloves should be used. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. If necessary, refer to U.S. OSHA 29 CFR 1910.138, appropriate Standards of Canada, or appropriate Standards of the European Economic Community.
- **EYE PROTECTION:** Splash goggles or safety glasses. If more than 1 gallon of this product is to be used, a face shield should be considered. 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 splashes, sprays, or 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: None.
(c) ODOR THRESHOLD: Not determined.
(d) pH: 2.2.
(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): Approx. 1.
(i) FLAMMABILITY: Not flammable.
(j) UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS: Not applicable.
(k) VAPOR PRESSURE (mmHg @ 20˚C): Not determined.
(l) VAPOR DENSITY: Not determined.
(m) RELATIVE DENSITY (water=1): Approx. 1.
(n) SOLUBILITY: Soluble.
(o) PARTITION COEFFICIENT: N-OCTANOL/WATER: Not determined.
(p) AUTO-IGNITION TEMPERATURE: Not determined.
(q) DECOMPOSITION TEMPERATURE: Not determined.
(r) VISCOSITY: Not determined.
(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.

10.2 CHEMICAL STABILITY

- Normally stable under standard temperatures and pressures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

- This product is not self-reactive, water-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 oxidizers, strong bases, powdered metals and water-reactive materials.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

- Products of thermal decomposition of this product can include carbon monoxide and carbon dioxide.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS

- **ACUTE TOXICITY:**
  - **TOXICOLOGY DATA:** The following data are available for the hazardous components in this product listed in Section 3 (Composition/Information on Ingredients).

SELENIOUS ACID
LD_{50} (Intravenous-Mouse) 11 mg/kg
LDLo (Oral-Rat) 25 mg/kg
LDLo (Intraperitoneal-Rat) 10 mg/kg
TDLo (Subcutaneous-Rabbit) 4800 ug/kg/14 days-intermittent: Behavioral: food intake (animal); Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Nutritional and Gross Metabolic: weight loss or decreased weight gain

FLUOROBORIC ACID
LD_{50} (Oral, Rat) 100 mg/kg

NICKEL SULFATE
LD_{50} (Oral, Rat) 264 mg/kg

SODIUM CHLORIDE
LD_{50} (Oral, Rat) 3000 mg/kg
LD_{50} (Skin, Rabbit) > 10000 mg/kg
LC_{50} (Inhalation, Rat) > 42000 mg/m^3

  - **DEGREE OF IRRITATION:** Moderate to severe especially after prolonged exposure.
  - **SENSITIZATION:** Not reported to have skin or respiratory sensitization effects.
  - **REVIEW OF ACUTE SYMPTOMS AND EFFECTS:** See Section 2 (Hazards Information) and Section 4 (First-Aid Measures) for details.
    - **EYES:** May cause moderate to severe eye irritation, depending on duration of exposure.
    - **SKIN**: May cause moderate to severe skin irritation, depending on duration of exposure.
    - **INHALATION:** May cause mild to severe irritation of membranes of nose, mouth, throat.
    - **INGESTION:** May cause severe irritation of gastrointestinal system; ingestion of large quantities can be fatal.
- **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
FLUOROBORIC ACID (as Fluoride)	IARC-3: Unclassifiable as to Carcinogenicity in Humans	NO	NO	NO	TLV-A4: Not Classifiable as a human carcinogen
SELENIOUS ACID	IARC-3: Unclassifiable as to Carcinogenicity in Humans	NO	NO	NO	EPA-D: Not classifiable as to human carcinogenicity.
NICKEL SULFATE	IARC-1 Known to be a Human Carcinogen	NTP-1 Known to be a Human Carcinogen	Carcin-ogen	NO	MAK: Substances that can cause cancer in man.
SODIUM CHLORIDE	NO	NO	NO	NO	NO

  - **REPRODUCTIVE TOXICITY INFORMATION:** Nickel sulfate may potentially cause harm to the unborn. Human reproductive effects for sodium chloride have also been reported, but they are related to dietary exposures.
  - **MUTAGENIC EFFECTS** The components of this product are not reported to cause mutagenic effects under typical circumstances of exposure. The following mutagenicity data have been reported for components of this product under laboratory conditions:
    - **NICKEL SULFATE:** Germ cell mutagenicity: - Genotoxicity in vitro; Hamster/Other cell types/ Morphological transformation.
    - **SODIUM CHLORIDE:** In experimental animals, sodium chloride has caused delayed effects on newborns, has been fetotoxic, and has caused birth defects and abortions in rats and mice
  - **SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE:** Not applicable.
  - **SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE:** Due to the presence of selenious acids, exposure to large quantities for prolonged period of time may cause damage to organs (liver, kidneys) through prolonged or repeated exposure. Additionally, exposures to Nickel Sulfate via repeated inhalation/skin exposure can cause allergic respiratory/skin reactions

SECTION 11: TOXICOLOGICAL INFORMATION (Continued)

- **OTHER INFORMATION**
  - **TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None known.
  - **ADDITIONAL TOXICOLOGY:** Selenious acid is the most toxic form of selenium, ingestion is almost invariably fatal. Stupor, respiratory depression, hypotension, and death can result several hours post ingestion. Severe hypotension develops secondary both to decreased contractility from a toxic cardiomyopathy and to inappropriately low peripheral vascular resistance. Laboratory abnormalities include thrombocytopenia, moderate hepatorenal dysfunction, and elevated serum kinase levels.

SECTION 12: ECOLOGICAL INFORMATION

12.1 TOXICITY

- Based on available data, this product may be harmful to contaminated terrestrial plants or animals.
- Based on available data, this product may be harmful to to contaminated aquatic plants or animals.
- The following aquatic toxicity data are available for components of this product:

NICKEL SULFATE
EC50 (freshwater algae) = 0.75 mg/L for 72 hours
LC50 (Brachydanio rerio) > 100 mg/L for 24 hours
LC50 (Oncorhynchus mykiss) = 1.28 mg/L for 96 hours)
EC50 (water flea) = 1 mg/L for 48 hours

SODIUM CHLORIDE
LC50 (Ceriodaphnia dubia) = 280000 ug/L for 7 day /total/
EC50 (Ceriodaphnia dubia); Conditions: freshwater; renewal; Concentration: (95% confidence limit: > 1500 to < 2000 mg/L) for 192 hours; Effect: reproduction, progeny /total/

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

- **SELENIOUS ACID:** Bioconcentration: It is known that selenium accumulates in living tissues. For example, the selenium content of human blood is about 0.2 ppm. This value is about 1,000 times greater than the selenium found in surface waters on the planet earth. It is clear that the human body does accumulate or concentrate selenium with respect to the environmental levels of selenium. Selenium has been found in marine fish meal at levels of about 2ppm. This amount is around 50,000 times greater than the selenium found in seawater. It seems obvious that marine fish are efficient concentrators of selenium.
- **FLUOROBORIC ACID:** Fluorides can bioaccumulate, impacting bone and dentition.

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. Product spreads on the water surface.

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.

13.2 DISPOSAL CONSIDERATIONS

- **EPA RCRA WASTE CODE:** U204, D010
- **EUROPEAN WASTE CODE:** 11 01 06*

SECTION 14: TRANSPORT INFORMATION

14.1,2,3,4: DANGEROUS GOODS BASIC DESCRIPTION AND OTHER TRANSPORT INFORMATION

- **MANUFACTURER'S RECOMMENDATION FOR THE TRANSPORT OF THIS MATERIAL:**

UN/NA Number	Proper Shipping Name	Packing Group	Hazard Class	Label	North American Emergency Response Guide #	Marine Pollutant Status
UN3264	Corrosive liquids, acidic, inorganic, n.o.s. (selenious acid)	III	8	Corrosive	154	Not applicable.

- **Limited Quantity Exceptions [49 CFR 173.154(b)(2)]**: Limited quantities for Class 8, Packing Group III materials have inner packagings not over 5.0 L [1.3 gal] (liquids) net capacity each, packed in strong outer packaging.
- **CANADIAN TRANSPORTATION INFORMATION**: Use the above information.
- **IATA DESIGNATION**: Use the above information.
- **IMO DESIGNATION**: Use the above information.

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**: Selenious Acid = 454/4540 kg (1000/10,000 lb)
  - **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):** Selenious Acid = 4.54 kg (10 lb). Nickel Sulfate = 45.5 kg (100 lb). Pursuant to the requirements of 40 CFR part 355.
  - **U.S. TSCA INVENTORY STATUS:** All components of this product are listed on the TSCA Inventory.
  - **SARA 313 COMPONENTS:** The following components are subject to reporting levels established by SARA Title III, Section 313 – Nickel Sulfate.
  - **CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) STATUS:** WARNING: This product contains a chemical known to the state of California to cause cancer.
- **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 (low hazard to waters).

15.2: CHEMICAL SAFETY ASSESSMENT.

- No information available.

SECTION 16: OTHER INFORMATION

16.1: INDICATION OF CHANGE.

- **CHANGE INDICATED:** Update of OSHA Hazard Communication Standard (29 CFR 1910.1200)
- **ORIGINAL DATE OF ISSUE:** October 18, 1989
- **DATES OF UPDATES:** April 18, 2014

16.2: 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 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.

16.3: 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/

16.4: 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.