SAFETY DATA SHEET

CircuitEtchants

AdvantEdge Cupric Starter

Section 1. Identification of Substance and Supplier

Product Name	AdvantEdge Cupric Starter
Alternative Names	AdvantEdge Cupric Starter – PWB (Max Free Acid – 1.5N) AdvantEdge Cupric Starter – Oxford (Max Free Acid – 0.05N) Cupric Chloride
Recommended Use of Chemical	For use in accordance with technical data sheets.
Use Restrictions	For use in accordance with technical data sheets.
Manufacturer's Information	Micronutrients 1550 Research Way Indianapolis, Indiana 46231 317-486-5880
Emergency Phone Number	CHEMTREC (800)424-9300 Micronutrients (317) 486-5880

Section 2. Hazards Identification

GHS Classification of Substance	Corrosive to metals, Category 1 Acute Toxicity (Oral), Category 3 Skin Irritant, Category 1 Eye Irritant, Category 1 Target Organ Systemic Toxicity, Category 2 Aquatic Toxicity, Category 1 Aquatic Chronic, Category 2	
National or Regional Information	Not Applicable	
GHS Label Elements	DANGER Toxic if swallowed Causes severe skin burns and eye damage May cause damage to organs. Very toxic to aquatic life Toxic to aquatic life with long lasting effects. 	Keep only in original container Absorb spillage to prevent material damage Store in corrosive resistance container with a resistant inner liner Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. If swallowed, rinse mouth and immediately call a poison center. Store locked up Dispose of contents/ container in accordance with applicable regulations. Wear protective gloves / clothing and eye/face protection Do not breathe mist If on skin (or hair) remove contaminated clothing and rinse skin with water. Wash contaminated clothing before reuse.

CircuitEtchants

AdvantEdge Cupric Starter

	If in eyes, rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. If inhaled, remove to fresh air and keep at a rest position comfortable for breathing. Avoid release to the environment Collect spillage
Other Hazards	Not Applicable

Section 3. Composition / Information on Ingredients

Ingredient Name	CAS Number	EC Number	Percent of Total Weight
Cupric Chloride	7447-39-4	231-210-2	27-50%
Hydrochloric Acid	7647-01-0	231-595-7	0.2-5.4%
Water	7732-18-5	231-791-2	<Balance>

Section 4. First Aid Measures

Eye	Immediately irrigate eyes with flowing water continuously for a minimum of 15 minutes, while holding eyes open and washing beneath eyelids. Contacts must be removed before or during flushing. Speed in rinsing eyes after contact is essential to prevent serious injury. Obtain medical attention immediately.
Skin	Immediately flood affected skin area with water (safety shower is preferable) and remove clothing. Wash skin vigorously with flowing water and soap for at least 15 minutes. Do not apply salve or ointment. Continue washing in serious cases until medical help arrives, even for an hour or longer. Clothing should be discarded or washed before re-use. Obtain immediate medical attention.
Ingestion	If victim is alert and not convulsing, rinse mouth with water and give large volumes of water to drink. If spontaneous vomiting occurs, have affected person lean forward with head down. Rinse mouth again, and give more water to drink. Obtain medical attention immediately.
Inhalation	Remove affected person from area to fresh air and provide oxygen if breathing is difficult. Give artificial respiration ONLY if breathing has stopped, and give CPR ONLY if there is no breathing and no pulse. Obtain immediate medical attention.
Note to Physician	Treat patient symptomatically, Endoscopic evaluation of patient may be warranted.

Section 5. Firefighting Measures

Suitable extinguishing media	Dry chemical, Carbon Dioxide, Water Spray or Foam
Fire and Explosion Hazards	Cupric chloride is not considered to be a fire or explosion hazard.
PPE and precautions for firefighters	Avoid breathing vapors and keep upwind of fire. Move containers from area of fire if safely possible. Spray or fog of water is effective on ammonia vapors. Firefighters should use NIOSH-approved self-containing breathing apparatus (SCBA) with positive pressure full-face piece and wear impervious protective clothing.

CircuitEtchants

AdvantEdge Cupric Starter

Section 6. Accidental Release Measures

Suggested PPE, Equipment and Procedures	Avoid contact with skin, eyes and clothing. Wear protective clothing, gloves and eye protection. Keep unauthorized personnel away from the area.
Environmental Precautions	Do not dump in to any sewers, on the ground, or in to any water body.
Methods and materials for containment and cleanup	Dike spills with sand or inert solid, and place in to drums or other containers that can be sealed. Very small spills may be flushed with large quantities of water and diluted.

Section 7. Handling and Storage

Handling Precautions	Avoid contact with skin, eyes and clothing. Wear proper protective clothing, gloves and eye protection. Wash thoroughly after handling this product. Avoid breathing vapor or mist by using respiratory protective equipment.
Storage Precautions	Store in a cool, well ventilated, dry location. Isolate from incompatible materials.

Section 8. Exposure Controls/Personal Protection

Occupational Exposure Limit Values	Cupric Chloride, (syn. Copper (II) Chloride) OSHA PEL: 1mg (Cu)/m^3 (8 hr TWA) ACGIH TLV: 1mg (Cu)/m^3 (8 hr TWA) NIOSH: 100mg (Cu)/m^3 (IDLH) Hydrochloric Acid OSHA PEL: 5ppm HCL (Ceiling Limit) OSHA PEL: 7mg/m^3 ACGIH TLV: 5ppm
Engineering Controls	Ventilate the work area to avoid vapor and mist problems. Local exhaust is necessary if employees will be exposed to airborne levels that exceed the OSHA exposure limits. Recommended guidance documents include "Industrial Ventilation, A Manual of Recommended Practices," by ACGIH.
Individual Protection Measures	Wear appropriate eye protection such as safety glasses, face shield or splash goggles. Use chemical resistant gloves made of suitable material to prevent skin contact. The use of chemical resistant clothing is recommended. A NIOSH / MSHA approved respirator is necessary if a worker may be exposed to airborne contaminant levels exceeding the exposure limits given. It is the employer's responsibility to ensure that the proper respiratory protection is used and that the worker is properly trained in the use and maintenance of respirators. Safety showers with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool tepid water, should be readily available in all areas where this material is handled or stored.

Section 9. Physical and Chemical Properties

Appearance	Clear, dark green liquid
Odor	Slight hydrochloric acid odor
Odor Threshold	Not Known
pH	0.0 – 2.0
Melting Point / Freezing Point	Not Known
Initial Boiling Point and Boiling Range	Boiling Point >212°F
Flash Point	Not Known

CircuitEtchants

AdvantEdge Cupric Starter

Evaporation Rate	Not Known
Flammability	Non-Flammable
Upper / Lower flammability or explosive limits	Not Known
Vapor Pressure	Not Known
Vapor Density	Not Known
Relative Density	Not Known
Solubility	Soluble in water
Partition Coefficient; n-octanol / water	Not Known
Auto-Ignition Temperature	Not Known
Decomposition Temperature	Not Known

Section 10.Stability and Reactivity

Chemical Stability	Stable at Room Temperature
Possibility of Hazardous Reactions	Hazardous polymerization will not occur.
Conditions to Avoid	Avoid contact with incompatible materials.
Incompatible Materials	Keep away from incompatible materials, avoid contact with oxidizing agents and sulfides.
Hazardous Decomposition Products	Emits toxic fumes of copper, hydrogen chloride or chlorine when heated to decomposition.

Section 11.Toxicological Information

Exposure Routes	Dermal absorption, Inhalation, Ingestion
Delayed Effects	Hydrogen chloride and hydrochloric acid have no known or suspected carcinogenic activity.
Acute Effects	**Eye hazards**: Direct eye contact may cause redness, pain, blurred vision and severe tissue damage leading to temporary or permanent injury, including corneal or conjunctival ulceration. Significant potential for corrosive burns to the entire eye. Blindness may result. **Skin Hazards**: Acute exposure may cause irritation, redness and burning of the skin. **Ingestion Hazards**: Ingestion of large amounts of copper may be toxic. Causes excessive salivation, nausea, vomiting, and corrosive burning of the gastrointestinal tract, including perforation. Repeated and prolonged ingestion may cause liver, kidney, or spleen damage. Lesser effects include sore throat, vomiting, metallic taste, hemorrhagic gastritis, and diarrhea. **Inhalation Hazards**: Corrosive overexposure causes burning, irritation and destruction of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, sneezing, mucous production and sinus congestion. **Other** indications of overexposure are headache, nausea, vomiting, low grade fever, and shortness of breath.
Chronic Effects	Chronic exposure to this product may cause skin rashes, pain and discoloration of the skin. Repeated exposure may lead to allergic contact dermatitis. Chronic inhalation may result in permanent damage to the upper respiratory tract, particularly the lungs. Sub chronic (target organ effects) are observed for both cupric chloride and hydrochloric acid. Target organs for cupric chloride include eyes, skin, respiratory system, liver and kidneys. Target organs for hydrochloric acid are eyes, skin and the respiratory system.

CircuitEtchants

AdvantEdge Cupric Starter

Acute Toxicity Estimates	This product is a liquid solution, however, for reference, the oral toxicity (rat) of solid crystalline Cupric Chloride ($CuCl_2$), expressed as the LD_{50} is 140mg/kg. For hydrochloric acid, the LD_{50} oral toxicity (rabbit (is 900 mg/kg.

Section 12.Ecological Information

Ecotoxicity	The ecotoxicity of this product has not been established. Cupric chloride is known to cause substantial negative ecological effects, both acute and chronic.
Persistence and degradability	Not Known
Bioaccumulative potential	Not Known
Mobility in soil	Not Known
Other adverse effects	None Identified

Section 13.Disposal Considerations

Description of waste residues	Waste residues may consist of unused, expired product, spill residues, and commercial packaging.
Safe Handling and Disposal methods	Material that cannot be used or chemically reprocessed and empty containers should be disposed of in accordance with all applicable regulations. Product containers should be thoroughly emptied before disposal. Generators of waste material are required and are solely responsible for evaluating all waste for compliance with RCRA and any local disposal procedures and regulations.

Section 14.Transport Information

UN Number	UN 3264
UN Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s. (hydrochloric acid, copper chloride solution)
Transport Hazard Class(es)	8 - Corrosive
Packing Group	PG II
Marine Pollutant	Yes
Special Precautions	RQ (Reportable Quantity) notation may be required. (Cupric Chloride = 10 pounds, Hydrochloric Acid RQ = 5,000 lbs.). DOT Emergency Response Guidebook Number 154. Except when transported by vessel, non-bulk packaging and bulk packaging may be exempt from "Marine Pollutant" markings (See 49 CFR 171.4 and 172.332.

Section 15.Regulatory Information

Applicable Regulations	**US Regulatory Information** TSCA: This product has been reported to the EPA Office of Toxic Substances in accordance with the requirements of the Toxic Substances Control Act (40 CFR 710). EPCRA: The following ingredients of this product are subject to reporting under SARA Title III, Section 313: Cupric Chloride (as copper compounds), Hydrochloric Acid SARA: Acute Health Hazard based on Hydrochloric Acid and Copper Compounds SARA Hazard Classes: Acute Health Hazard SARA Title III, Section 313 Supplier Notification This product contains the following constituent in concentrations at or above de minimus levels and which is listed as a toxic chemical in 40 CFR Part 372 pursuant to the requirements of Section 313 of Superfund Amendments and Reauthorization Act of 1986 (SARA). The act also requires that this notice accompany the SDS in all redistributions and may not be detached or omitted from future copies. Cupric Chloride (Syn. Copper (II) Chloride (7447-39-4) 27-50%

	Hydrochloric Acid (7647-01-0) 0.2-5.4% **Ingredient(s) U.S. Regulatory Information** Cupric Chloride (syn. Copper (II) Chloride SARA Title III – Section 313 Form "R" TRI Reportable Chemical SARA – Acute Health Hazard **Hydrochloric Acid** SARA Title III – EPA Part 355, Extremely Hazardous Substance SARA Title III – Section 313 Form "R" / TRI Reportable Chemical Clean Air Act 112 (r) Toxic Substance OSHA Process Safety Management – 1910.119, App A Hazardous Chemical SARA – Acute Health Hazard SARA – Reactivity Hazard. **Other International Regulations** For regulatory requirements outside the United States of America, check with the appropriate regulatory agencies.

Section 16.Other

Disclaimer	Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).
SDS preparer	Steve Lucas, Carla Jackson
SDS revision date	May 1,2014