SAFETY DATA SHEET

CircuitEtchants

AdvantEdge Alkaline Starter

Section 1. Identification of Substance and Supplier

Product Name	AdvantEdge Starter
Alternative Names	Max Etch 20 Starter Final Etch 5 Starter High Speed Hub Etch Starter AdvantEdge TF Starter UltraEtch FL Make Up UltraEtch Make Up ACD Copper Ammonium Chloride
Recommended Use of Chemical	For use in accordance with directions only.
Use Restrictions	For use in accordance with directions only.
Manufacturer's Information	Micronutrients USA LLC 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, Category 4 Eye Irritant, Category 1 Skin Irritant, Category 2 Aquatic Toxicity, Category 2	
National or Regional Information	Not Applicable	
GHS Label Elements	DANGER May be corrosive to metals Harmful if swallowed Harmful in contact with skin Harmful if inhaled Causes severe eye damage Causes skin irritation 	Keep only in original container Absorb spillage to prevent material damage Store in corrosive resistant container with a resistant inner liner Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling If swallowed, immediately rinse mouth and contact a poison center. Store locked up Dispose of contents / containers in accordance with applicable regulations. Wear protective gloves / clothing and eye / face protection Do not breathe mist If on skin (or hair) Remove clothing, and shower. Wash contaminated clothing before reuse.

	If in eyes; Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing and immediately contact a poison center. If swallowed: Rinse mouth. Do not induce vomiting. If inhaled: Remove to fresh air and keep at rest in a position comfortable for breathing. Avoid release to the environment Collect spillage.
Other Hazards	None Known

Section 3. Composition / Information on Ingredients

Ingredient Name	CAS Number	EC Number	Percent of Total Weight
Tetraamine Copper Dichloride (As copper compounds)	10534-87-9	Not Identified	20-35%
Ammonium Hydroxide	1336-21-6	215-647-6	3-8%
Ammonium Chloride	12125-02-9	235-186-4	2-6%
Ammonium Carbonate	506-87-6	208-058-0	1-4%
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. Gastric lavage may be preferable to inducing vomiting due to corrosive effects of Ammonium Hydroxide. Dilution with milk or water may help. Endoscopic evaluation of the patient may be warranted.

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Section 5. Firefighting Measures

Suitable extinguishing media	Dry chemical, Carbon Dioxide, Water Spray or Foam
Fire and Explosion Hazards	Flammable vapors may be given off when exposed to heat, especially in closed containers. Vapors may form an explosive mixture with air.
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.

Section 6. Accidental Release Measures

Required 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. Isolate spill or leak area for at least 50 meters (150 ft.) for liquids.
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 that is protected from physical damage, heat, or direct sunlight which may cause the product to partially decompose. Keep from freezing. Do not apply heat to thaw. If frozen, allow the product to thaw at room temperature and mix in drum before using.

Section 8. Exposure Controls / Personal Protection

Occupational Exposure Limit Values	**Ammonium Carbonate**: OSHA PEL: Not established for this material **Ammonium Chloride:** OSHA PEL: Not established for this material ACGIH TLV (Fumes): 10mg/m^3 (8 Hr. TWA), 20mg/m^3 (STEL) **Ammonium Hydroxide** OSHA PEL: 50ppm (8 Hr. TWA for NH_3) ACGIH TLV: 25ppm (8 Hr. TWA for NH_3), 35ppm (15 min STEL for NH_3)
Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended 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. For concentrations of ammonia vapors up to 300ppm, use an air purifying respirator (APR) with ammonia cartridge. APRs must not be worn when there is insufficient oxygen in the workplace. Ammonia concentrations at or above 300ppm require the use of a self-containing breathing apparatus (SCBA) or equivalent. 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, deep blue liquid
Odor	Distinctive odor of ammonia
Odor Threshold	Pungent ammonia odor at 5ppm.
pH	8.0 - 10.2
Melting Point / Freezing Point	Not Known Product components crystallize from solution when temperature falls below 45°F.
Initial Boiling Point and Boiling Range	Boiling Point >212°F
Flash Point	None
Evaporation Rate	Not Known
Flammability	Non-Flammable
Upper / Lower flammability or explosive limits	Lower Explosive Limit: 15% (Ammonia Vapor in Air) Upper Explosive Limit: 28% (Ammonia Vapor in Air)
Vapor Pressure	20-28 mm Hg
Vapor Density	<1
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	Do not heat Ammonium Hydroxide solutions. Avoid direct sunlight. Protect from freezing. Use in a closed and contained system with proper ventilation.
Incompatible Materials	Highly reactive with metals and metal compounds. Avoid strong acids, oxidizing agents, halogens, nitrates and other nitrosating agents. Ammonium chloride reacts with lead and silver salts to form a fulminating compound. Ammonium chloride reacts with ammonium compounds, bromine pentaflouride, bromine trifluoride, hydrogen cyanide, iodine hepataflouride, nitrates (potentially explosive combinations may be formed) and potassium chloride.
Hazardous	Nitrogen oxides, copper oxides and ammonia vapor. Ammonia vapors are emitted when liquid is

Decomposition Products	exposed to air in an open vessel or by spraying.

Section 11. Toxicological Information

Exposure Routes	Dermal absorption, Inhalation, Ingestion
Delayed Effects	None Known
Acute Effects	Eye hazards: This product is strongly irritating to eyes. Direct eye contact may cause blurred vision, tearing, and severe tissue damage leading to temporary or permanent injury, including blindness. Skin Hazards: Causes irritation and burns to skin. Ingestion Hazards: Causes excessive salivation, nausea, vomiting, and corrosive burning of the gastrointestinal tract, including perforation. 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	Repeated exposure may result in permanent damage to the upper respiratory tract, particularly the lungs.
Acute Toxicity Estimates	Ammonium Chloride Oral LD_{50} (Rat): 1,650mg/kg Ammonium Chloride Oral LD_{50} (Rabbit): 100mg/kg, Intramuscular LD_{50} (Rat): 30mg/kg, Intraperitoneal LD_{50} (Mouse): 485mg/kg Subcutaneous LD_{50} (Mouse): 500mg/kg Intravenous LD_{50} (Rabbit): 78mg/kg Severe Eye Irritation (Rabbit) 500mg/24 hrs. Ammonium Hydroxide Oral LD_{50} (Rat) 350mg/kg Ammonia LC_{50} (rat, one hour) 7,338 ppm.

Section 12. Ecological Information

Ecotoxicity	The ecological toxicity of this product is not known. Due care should be taken to prevent uncontrolled releases of this product to surface water, soil, groundwater or air.
Persistence and degradability	Information concerning persistence and degradability is not known.
Bioaccumulative potential	The bioaccumulative potential for this product is not known.
Mobility in soil	Information pertaining to mobility in soil is not known.
Other adverse effects	None Known.

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 3266
UN Proper	Corrosive liquid, basic, inorganic, N.O.S. (Ammonium Hydroxide, Ammonium Chloride)

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Shipping Name	
Transport Hazard Class(es)	8 - Corrosive
Packing Group	PG II
Marine Pollutant	No
Special Precautions	RQ (Reportable Quantity) notation may be required. (Ammonium Hydroxide RQ = 1,000 pounds, Ammonium Chloride RQ = 5,000 pounds) DOT Emergency Response Guidebook Number 154

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: Ammonia SARA: Acute Health Hazard based on Ammonia, Ammonium Hydroxide, and Ammonium Chloride. SARA: Chronic Health Hazard determination based on Ammonia. SARA Section 313 Notification This product contains Ammonia 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. **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).
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