

# MATERIAL SAFETY DATA SHEET – Lattice Etch

## ***Advanced Chemical Solutions, LLC***

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### **LATTICE ETCH® NON-AQUEOUS ISOTROPIC ETCHANT**

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#### **1. GENERAL INFORMATION**

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**PRODUCT NAME:** Lattice Etch

**TRADE NAME (COMMON NAME):** Hydrofluoric Acid, Electronic and Reagent Grades

**CHEMICAL NAME AND/OR SYNONYM:** Hydrofluoric Acid, in organic solvents

**MANUFACTURER:** *Advanced Chemical Solutions, LLC*  
P.O. Box 911537  
Saint George, UT 84791-1537  
800-587-0264

**EMERGENCY PHONE NUMBER:** CHEM TREC – account number: 217357  
800-424-9300 (International: 011 703-527-3887)

**Current Issue Date:** January 2013

#### **2. COMPOSITION/INFORMATION ON INGREDIENTS**

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<b><u>MATERIAL OR COMPONENT</u></b>	<b><u>CAS NUMBER</u></b>	<b><u>WEIGHT %</u></b>	<b><u>HAZARD DATA</u></b>
Hydrogen Fluoride	7664-39-3	< 35	TWA/TLV 3 ppm Corrosive
Proprietary Organic Solvent	Not Applicable	< 50	TWA/TLV 10 ppm Teratogenic
Proprietary Organic Solvent	Not Applicable	< 50	No TLV established Skin irritant, possible Teratogen

#### **3. HAZARDS INFORMATION**

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##### **POTENTIAL HEALTH HAZARDS**

**INHALATION:** Mild exposure: Can irritate nose, throat and respiratory system. Severe exposure: Can cause nose and throat burns, lung inflammation and pulmonary edema. Also depletes calcium levels in the body if not promptly treated, resulting in death due to hypocalcaemia.

**INGESTION:** Can cause severe mouth, throat and stomach burns. Can affect kidney function and be fatal if swallowed. Profound and possibly fatal hypocalcaemia is likely to occur unless medical treatment is promptly initiated.

**SKIN:** Both liquid and vapor can cause severe burns that may not be immediately painful or visible. HF will penetrate skin and attack underlying tissues and bone. Large burns (over 25 square inches) may also cause hypocalcaemia that, in rare instances, has been fatal. Solutions as dilute as 2% or lower may cause burns.

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**EYES:** Both liquid and vapor can cause irritation or corneal burns or conjunctivitis. Solutions as dilute as 2% or lower may cause burns.

**CHRONIC EXPOSURE:** Intake of more than 6 mg of fluorine per day may result in fluorosis, bone and joint damage.

**AGGRAVATION OF PRE-EXISTING CONDITIONS:** Persons with pre-existing skin disorders, eye problems or impaired kidney or respiratory function may be more susceptible to the effects of this substance.

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#### 4. FIRST AID MEASURES

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##### SKIN:

- a. Remove the person from the contaminated area and immediately place under a safety shower or wash with a water hose, whichever is available.
- b. Remove all contaminated clothing.
- c. Keep washing with large amounts of water for a minimum of 15 to 20 minutes.
- d. Have someone make arrangements for medical attention while you continue flushing the affected area with water.
- e. If available, after thorough washing, the burned area should be immersed in a solution of 0.2% iced aqueous Hyamine 1622 or 0.13% iced aqueous Zephiran Chloride. If immersion is not practical, towels should be soaked with one of the above solutions and used as compresses for the burned area. Ideally, compresses should be changed every 2 minutes. It is recommended to keep 10 - 15 liters of solution available for use. Solutions are replaced annually if not used.\*
- f. An alternative treatment to 1(e) is for the physician to inject sterile 10% aqueous calcium gluconate solution subcutaneously beneath, around and in the burned area. Initially use no more than 0.5cc per square centimeter and do not distort appearance of the skin. If pain is not completely relieved, additional treatment is indicated.
- g. Seek medical attention as soon as possible for all burns, regardless of how minor they may appear initially.

\*Hyamine 1622 is a trade name for benzethonium chloride, Merck Index monograph 1072, a quaternary ammonium compound sold by Rohm and Haas, Philadelphia, PA. Zephiran Chloride is a trade name for benzalkonium chloride, Merck Index monograph 1055, also a quaternary ammonium compound, sold by Winthrop Laboratories, NYC.

##### EYES:

- a. Irrigate eyes for at least 15 minutes with copious quantities of water, keeping eyelids apart and away from eyeballs during irrigation.
- b. Get competent medical attention immediately, preferably an eye specialist.
- c. If a physician is not immediately available, apply 1-2 drops of 0.5% Pontocaine Hydrochloride solution followed by a second irrigation for 15 minutes. Do not use any of the solutions described for skin treatment. Use no oils or greases unless instructed to do so by a physician.\*

\*Pontocaine Hydrochloride is a trade name for Tetracaine Hydrochloride, Merck Index monograph 8904, sold by Winthrop Laboratories, NYC.

##### INGESTION:

- a. Drink large amounts of water to dilute. Do not induce vomiting.
- b. Several glasses of milk or several ounces of milk of magnesia may be given for their soothing effect.
- c. Get immediate medical attention.

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### INHALATION:

- Move person to fresh air. Keep person lying down, quiet and warm.
- Get competent medical attention immediately.
- If breathing has stopped, start artificial respiration at once.
- Oxygen should be administered to a person having difficulty breathing, by a qualified person only.
- Do not give stimulants unless instructed to do so by a physician.
- Do not permit person to become active for at least 24 hours. Person should be examined by a physician and held under observation for at least this 24-hour period.

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## 5. FIRE FIGHTING MEASURES

### FLAMMABLE PROPERTIES

FLASH POINT:	145° F
AUTOIGNITION TEMPERATURE:	Not applicable
UPPER FLAME LIMIT (volume % in air):	Not determined
LOWER FLAME LIMIT (volume % in air):	Not determined

### UNUSUAL FIRE AND EXPLOSION HAZARDS:

Reaction with certain metals generates flammable and potentially explosive hydrogen gas. Considerable heat is evolved when contacted with many substances. Heat increases pressure and may explode container. Will react violently with water.

### FIRE EXTINGUISHING AGENTS RECOMMENDED:

Dry chemical, carbon dioxide, and alcohol foam. Water spray may not be effective.

### FIRE EXTINGUISHING AGENTS TO AVOID:

Do not use solid water streams near ruptured tanks or spills of HF. Acid reacts violently with water and can splatter acid onto personnel.

### SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Wear NIOSH-approved, self-contained breathing apparatus and full protective clothing (see section 8). Use water spray to keep non-leaking, fire-exposed containers cool.

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## 6. ACCIDENTAL RELEASE MEASURES

### SPILL OR LEAK: (See Section 8 for recommended personal protective equipment).

Wear full protective equipment as described in Section 8. Contain spill and cautiously dilute with a large excess of water. Neutralize carefully with alkali such as soda ash or lime. Provide good ventilation. Flush residue in accordance with applicable disposal regulations. Attempt to keep un-neutralized products out of sewer. Any release of these products to the environment may be subject to Federal and/or State reporting requirements. Check with appropriate agencies.

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## 7. HANDLING AND STORAGE

### NORMAL HANDLING: (See Section 8 for recommended personal protective equipment).

Do not breathe vapor or mist. Use only with adequate ventilation. Avoid all contact with skin, eyes and clothing, even with dilute solutions. Do not add water to acid. Instead, dilute by adding acid to water cautiously and with

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agitation. Employees should be thoroughly trained in safety procedures and undergo periodic medical surveillance for fluoride. To prevent ignition of hydrogen gas that may be present from contact with metals, smoking, flames and sparks should not be permitted in storage areas.

### STORAGE RECOMMENDATIONS:

Store only in approved containers, avoiding glass and most metals. Store below 52° C (125.6° F), preferably below 38° C (100.4° F), in a well-ventilated area. Protect from physical damage and keep tightly closed. Flammable hydrogen gas can be generated inside unlined metal storage containers. Unlined steel tanks in HF service are subject to indiscriminate hydrogen blistering and should, therefore, be routinely inspected and repaired if needed. Containment for spills and leakage of storage tanks is recommended.

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## 8. EXPOSURE CONTROL/PERSONAL PROTECTION

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### VENTILATION:

**HEAVY HANDLING (e.g. cases of bottles/carboys/drums/pallets of cases/tank trucks):** Sufficient to reduce acid mists below permissible TLV levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems.

**SPECIALIZED HANDLING (e.g. bottles):** Handling should be done in a closed ventilated system (e.g. exhausted hood). This system must be of corrosion-resistant materials.

### PERSONAL PROTECTIVE EQUIPMENT

#### HEAVY HANDLING

**SKIN:** For routine product use, wear acid-resistant jacket, trousers, boots and gauntlet gloves. For increased protection, use supplied-air acid suit.

**EYES:** As a minimum, wear hardhat, chemical safety goggles, full-face plastic shield. Do not wear contact lenses. For increased protection, use supplied-air acid suit.

**RESPIRATORY PROTECTION:** Where required, use a NIOSH-approved respirator for HF gas or mists, as applicable. Some exposure levels may require a NIOSH-approved self-contained breathing apparatus or supplied-air respirator.

**OTHER:** Provide eyewash stations and quick-drench shower facilities.

#### SPECIALIZED HANDLING

**SKIN:** As a minimum, wear acid-resistant gloves (Neoprene or PVC). For leak, spill or other emergency, use full protective clothing as described in HEAVY HANDLING section.

**EYES:** As a minimum, wear safety glasses with non-perforated side shields. Add a face shield if pouring liquid. For leak, spill or other emergency, use chemical safety goggles and face shield. Do not wear contact lenses.

**RESPIRATORY PROTECTION:** Generally not required. For leak, spill or other emergency, use a NIOSH-approved respirator for HF as described in HEAVY HANDLING.

**OTHER:** Provide eyewash stations and quick-drench shower facilities.

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### EXPOSURE GUIDELINES

PERMISSIBLE CONCENTRATION: AIR

3 ppm (HF as F)

\*Threshold Limit Value (TLV): 3 ppm (equivalent to 2.5 mg/m<sup>3</sup>) as F

BIOLOGICAL

mg (F)/liter of urine

7 (post-shift) 4 (pre-shift)

\*TLV from the ACGIH 1984/85 list "Threshold Limit Values for Chemical Substances..."

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:

Colorless, fuming liquid

CHEMICAL FORMULA:

HF in proprietary organic solvents

ODOR:

Sharp, pungent odor

SPECIFIC GRAVITY (water = 1):

1.1 - 1.2

SOLUBILITY IN WATER:

Complete

BOILING POINT:

103 - 110° C

MELTING POINT:

~ -35° C

VAPOR PRESSURE:

Not determined

VAPOR DENSITY:

Not determined

% VOLATILES (by volume):

Not determined

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### 10. STABILITY AND REACTIVITY

STABILITY:

Stable under normal conditions.

INCOMPATIBILITIES (MATERIALS TO AVOID):

- (1) Glass, concrete and other silicon-bearing materials: yield silicon tetra-fluoride gas. Pressure build-up from this process has been known to blow up glass containers.
- (2) Carbonates, sulfides and cyanides: yield toxic gases: carbon dioxide, hydrogen sulfide and hydrogen cyanide.
- (3) Alkalis, some oxides, fluorine and other water-reactive materials: cause strong exothermic reactions that can be violent.
- (4) Common metals: yield hydrogen gas, a fire, explosive and reactive hazard.
- (5) Corrosive to many materials, including rubber, leather and certain organic materials.

HAZARDOUS DECOMPOSITION PRODUCTS:

HF gas and mist

HAZARDOUS POLYMERIZATION:

No hazardous polymerization expected.

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### 11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

LC50 (inhalation-animal) range from 456 to 1774 ppm/1 H

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### UNUSUAL CHRONIC EFFECTS:

Embryo toxic in rats at 0.47-4.98 mg/cu.m./4 hr. daily for the duration of gestation

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## 12. ECOLOGICAL INFORMATION

### DEGRADABILITY/AQUATIC TOXICITY:

Aquatic Toxicity = 60 ppm/\*fish/lethal/fresh water \*time period not specified

### OCTANOL/WATER PARTITION COEFFICIENT:

Not Determined

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## 13. DISPOSAL CONSIDERATIONS

**WASTE DISPOSAL METHODS:** (Disposer must comply with Federal, State and Local disposal or Discharge Laws)  
As waste disposal methods may vary, contact the supplier for specific recommendations. Treat small amounts by adding an excess of water and neutralize with a lime slurry, limestone, soda ash or other alkali. Add to water and neutralize cautiously as reaction is immediate and can be violent. Considerable amounts of harmful vapors may be released. Good ventilation is required. Dispose of residue (or slurry) by removal to an approved chemical waste landfill or by an approved disposal contractor.

**RCRA: RCRA STATUS OF UNUSED MATERIAL IF DISCARDED**  
EPA Hazardous Waste

**RCRA NUMBER**  
U134 (Hydrofluoric Acid)

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## 14. TRANSPORT INFORMATION

**PROPER SHIPPING NAME:** HYDROFLUORIC ACID (WITH NOT MORE THAN 60% STRENGTH)  
**US DOT HAZARD CLASS:** 8; 6.1  
**UN/NA:** UN1790  
**PACKING GROUP:** II

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## 15. REGULATORY INFORMATION

### TOXIC SUBSTANCES CONTROL ACT (TSCA)

**TSCA INVENTORY STATUS:** All ingredients listed on the TSCA Inventory  
**OTHER TSCA ISSUES:** None

### SARA TITLE III/CERCLA

"Reportable Quantities" (RQ) and "Threshold Planning Quantities" (TPQ) exist for the following ingredients:

<u>INGREDIENT NAME</u>	<u>SARA/CERCLA RQ (lb)</u>	<u>SARA EHS TPQ (lb)</u>
Hydrofluoric acid	100	100

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

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**SECTION 311 HAZARD CLASS:** Immediate

**SARA 313 TOXIC CHEMICALS:**

The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percentages are included in Section 2.

<u>INGREDIENT NAME</u>	<u>COMMENT</u>
Hydrofluoric acid	None

**STATE RIGHT-TO-KNOW**

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes:

<u>INGREDIENT NAME</u>	<u>WEIGHT %</u>	<u>COMMENT</u>
No ingredients listed in this section		

**ADDITIONAL REGULATORY INFORMATION:**

None listed.

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