



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name Buffered Oxide Etchant 6:1
Version # 07
Revision date 08-06-2010
Product code 408-200468, 408-1869720011Y4, 408-186972001108, 408-200299, 408-062071
Manufacturer/Supplier KMG Electronic Chemicals, Inc.
9555 W. Sam Houston Parkway South
Suite 600
Houston, Texas 77099 US
Phone Number: 713-600-3800
Emergency 866-706-3266

2. Hazards Identification

Physical state Liquid.
Appearance Colorless liquid.
Emergency overview DANGER

Toxic by inhalation, in contact with skin and if swallowed. Corrosive. Causes skin and eye burns. Irritating to respiratory system. Prolonged exposure may cause chronic effects.

OSHA regulatory status This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects

Routes of exposure

Inhalation. Ingestion. Skin contact. Eye contact.

Eyes

This product causes eye burns. Risk of serious damage to eyes. Do not get this material in contact with eyes.

Skin

Toxic in contact with skin. Causes skin burns. Do not get this material in contact with skin.

Inhalation

Toxic by inhalation. Irritating to respiratory system. Do not breathe dust/fume/gas/mist/vapors/spray.

Ingestion

Toxic if swallowed. Components of the product may be absorbed into the body by ingestion. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Do not ingest.

Target organs

Eyes. Respiratory system. Skin. Gastro-intestinal tract

Chronic effects

Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

Signs and symptoms

Symptoms can include irritation, redness, scratching of the cornea, and tearing.

Potential environmental effects This material is not expected to be harmful to aquatic life.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Ammonium fluoride	12125-01-8	30 - 40
Hydrofluoric acid	7664-39-3	5 - 10

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Cover wound with sterile dressing. A physician should be consulted for all exposures. Burns covering an area greater than fifty-two square centimeters (8 square inches) require immediate treatment by a medical doctor. Remove contaminated clothing. With gloved hand apply 2.5% calcium gluconate gel to the burn area.

Inhalation Following inhalation exposure, a 2.5% calcium gluconate solution can be given by nebulizer. If breathing is difficult, give oxygen. Immediately call a poison control center or doctor for treatment advise. Move person to fresh air. If breathing has ceased, start mouth-to-mouth artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Ingestion Immediately call a poison control center or doctor for treatment advise. If ingested give milk or calcium gluconate by mouth. Administer several vials of 10% aqueous calcium gluconate orally. (Calcium carbonate or an antacid containing calcium carbonate or magnesium carbonate or hydroxide may also be used.) Do not give anything by mouth to an unconscious person. Do not induce vomiting unless told to do so by a poison control center or doctor. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration.

Notes to physician Treatment : This advice is provided to the attending physician because of the specific properties of hydrogen fluoride and hydrofluoric acid. All cases of ingestion and airway exposure, and skin burns with hydrofluoric acid >20% should be regarded as potentially fatal. Patients who have burns and pain within minutes of exposure can be assumed to have been exposed to concentrated acid and are at risk of rapid clinical deterioration and death. Burns can be accompanied by absorption of fluoride through the skin with sequestration of circulating calcium leading to hypocalcemia and hyperkalemia from the release of cell contents. Fatal cardiac dysrhythmias may ensue. A person who has HF burns greater than 25 square inches or who has been burned with concentrated HF should be admitted immediately to an intensive care unit and carefully monitored by EKG for 24 to 48 hours. Blood sampling should be taken to monitor circulating fluoride, potassium and calcium levels. Hemodialysis may be necessary for fluoride removal and correction of hyperkalemia.

General advice In case of shortness of breath, give oxygen. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Keep victim warm. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

5. Fire Fighting Measures

Flammable properties The product is not flammable.

Extinguishing media

Suitable extinguishing media Dry chemical, foam, carbon dioxide.

Unsuitable extinguishing media Reacts with water. Do not use water as an extinguisher.

Specific methods In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

6. Accidental Release Measures

Personal precautions Use Personal Protective Equipment recommended in Section 8 of the MSDS. Local authorities should be advised if significant spillages cannot be contained. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering. Keep unnecessary personnel away. Stay upwind. Keep out of low areas.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up Should not be released into the environment.

Large Spills: Dike far ahead of liquid spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Small Spills: Absorb spill with vermiculite or other inert material. Clean contaminated surface thoroughly. After removal flush contaminated area thoroughly with water.

Never return spills to original containers for re-use.

7. Handling and Storage

Handling

Use Personal Protective Equipment recommended in section 8 of the MSDS. Handle and open container with care. Use only with adequate ventilation. Avoid prolonged exposure. Wash thoroughly after handling.

Storage

Keep in a well-ventilated place. Keep container tightly closed. Keep this material away from food, drink and animal feed. Keep out of the reach of children. Use care in handling/storage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Ammonium fluoride (12125-01-8)	TWA	2.5 mg/m ³
Hydrofluoric acid (7664-39-3)	Ceiling	2 ppm
	TWA	.5 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Ammonium fluoride (12125-01-8)	PEL	2.5 mg/m ³
Hydrofluoric acid (7664-39-3)	Ceiling	6 ppm
	TWA	3 ppm

Engineering controls

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Personal protective equipment

Eye / face protection

Do not get this material in contact with eyes. Wear face shield if there is risk of splashes. Wear chemical goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin protection

Wear appropriate chemical resistant gloves. Wear appropriate chemical resistant clothing. Protective shoes or boots. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations. Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent). Do not get this material in contact with skin. Do not get this material on clothing. Wear chemical protective equipment that is specifically recommended by the Personal Protective Equipment manufacturer.

Respiratory protection

Do not breathe dust/fume/gas/mist/vapors/spray. In case of inadequate ventilation or risk of inhalation of vapors, use suitable respiratory equipment.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product. Remove and isolate contaminated clothing and shoes. Handle in accordance with good industrial hygiene and safety practice. Launder contaminated clothing before reuse.

9. Physical & Chemical Properties

Appearance	Colorless liquid.
Color	Colorless.
Odor	Pungent.
Odor threshold	Not available.
Physical state	Liquid.
Form	Liquid.
pH	Not available.
Melting point	Not available.
Freezing point	Not available.
Boiling point	> 212 °F (> 100 °C)
Flash point	Not available.
Evaporation rate	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	10.2 mmHg

Vapor density	Not available.
Specific gravity	1.119 (water = 1)
Solubility (water)	Completely soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
VOC	Not available.
Density	1.0111 g/cm ³ (69.857 lb/ft ³)
Percent volatile	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Stable at normal conditions.
Conditions to avoid	Not available.
Incompatible materials	Metals. Reducing agents. Alkalies.
Hazardous decomposition products	Ammonia. Hydrogen fluoride.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Test Results
Ammonium fluoride (12125-01-8)	Acute Oral LD50 Rat: 50 mg/kg
Hydrofluoric acid (7664-39-3)	Acute Inhalation LC50 Rat: 1278 mg/l 1 Hours

Acute effects This material is toxic. Corrosive to eyes and skin.

Local effects Toxic by inhalation, in contact with skin and if swallowed. Causes burns.

US ACGIH Threshold Limit Values: Skin designation

Hydrofluoric acid (CAS 7664-39-3) Can be absorbed through the skin.

Sensitization Not available.

Chronic effects Hazardous by OSHA criteria. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

Ammonium fluoride (CAS 12125-01-8) A4 Not classifiable as a human carcinogen.

Hydrofluoric acid (CAS 7664-39-3) A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Ammonium fluoride (CAS 12125-01-8) 3 Not classifiable as to carcinogenicity to humans.

Hydrofluoric acid (CAS 7664-39-3) 3 Not classifiable as to carcinogenicity to humans.

Epidemiology Not available.

Mutagenicity Not available.

Neurological effects Not available.

Reproductive effects Not available.

Teratogenicity Not available.

12. Ecological Information

Ecotoxicity Harmful effect due to pH shift.

Environmental effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability Not available.

Bioaccumulation / Accumulation No data available.

Mobility in environmental media No data available.

Partition coefficient (n-octanol/water) Not available.

13. Disposal Considerations

Waste codes

US RCRA Hazardous Waste U List: Reference

Hydrofluoric acid (CAS 7664-39-3) U134

Disposal instructions Dispose of this material and its container at hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies. Dispose in accordance with all applicable regulations.

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Dispose of in accordance with local regulations.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN2922
Proper shipping name CORROSIVE LIQUID, TOXIC, N.O.S. (Hydrofluoric acid, Ammonium fluoride)
Hazard class 8
Subsidiary hazard class 6.1
Packing group II
Labels required 8, 6.1

Additional information:

Special provisions B3, IB2, T7, TP2
Packaging exceptions 154
Packaging non bulk 202
Packaging bulk 243
ERG number 154

DOT BULK

Basic shipping requirements:

UN number 2922
Proper shipping name CORROSIVE LIQUID, TOXIC, N.O.S. (Hydrofluoric acid, Ammonium fluoride)
Hazard class 8
Packing group II

Additional information:

ERG number 154

IATA

Basic shipping requirements:

UN number 2922
Proper shipping name CORROSIVE LIQUID, TOXIC, N.O.S. (Hydrofluoric acid, Ammonium fluoride)
Hazard class 8
Subsidiary hazard class 6.1
Packing group II

Additional information:

ERG code 8P

IMDG

Basic shipping requirements:

UN number 2922
Proper shipping name CORROSIVE LIQUID, TOXIC, N.O.S. (Hydrofluoric acid, Ammonium fluoride), MARINE POLLUTANT

Hazard class 8
Subsidiary hazard class 6.1
Packing group II
Environmental hazards

Marine pollutant No
EmS No. F-A, S-B



DOT



DOT BULK



IATA



IMDG

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

Hydrofluoric acid (CAS 7664-39-3) 100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

Hydrofluoric acid (CAS 7664-39-3) 100 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Ammonium fluoride (CAS 12125-01-8) 1.0 %

Hydrofluoric acid (CAS 7664-39-3) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Ammonium fluoride (CAS 12125-01-8) Listed.

Hydrofluoric acid (CAS 7664-39-3) Listed.

CERCLA (Superfund) reportable quantity (lbs)

Ammonium fluoride 100

Hydrofluoric acid 100

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes

Delayed Hazard - Yes

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - Yes

Section 302 extremely hazardous substance

No

Section 311 hazardous chemical

No

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Ammonium fluoride (CAS 12125-01-8) Listed.

Hydrofluoric acid (CAS 7664-39-3) Listed.

US - Massachusetts RTK - Substance: Listed substance

Ammonium fluoride (CAS 12125-01-8) Listed.

Hydrofluoric acid (CAS 7664-39-3) Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

Hydrofluoric acid (CAS 7664-39-3) 100 LBS

500 LBS

US - New Jersey RTK - Substances: Listed substance

Ammonium fluoride (CAS 12125-01-8) Listed.

Hydrofluoric acid (CAS 7664-39-3) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Ammonium fluoride (CAS 12125-01-8) Listed.

Hydrofluoric acid (CAS 7664-39-3) Listed.

16. Other Information

Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 3*

Flammability: 0

Physical hazard: 2

NFPA ratings

Health: 3

Flammability: 0

Instability: 0

Special hazards: W

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

Issue date

08-06-2010

This data sheet contains changes from the previous version in section(s):

First Aid Measures: Inhalation
First Aid Measures: General advice