

Ammonium Fluoride Solution

Date of Preparation: September 2003

Revision: 2

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Ammonium Fluoride Solution
Chemical Formula: NH₄F
General Use: Analytical chemistry, glass etching, fluorides, and semi-conductor industry.

Manufacturer: Kanto Corporation, 13424 N. Woodrush Way, Portland, OR 97203
Non-Emergency Contact: Kanto Customer Service, Phone (503) 283-0405, FAX (503) 240-0409

For All Transportation Emergencies Call CHEMTREC at 1-800-424-9300

Section 2 – Composition/ Information on Ingredients

Ingredient Name	CAS Number	% wt
Ammonium Fluoride	12125-01-8	40
De-Ionized Water	7732-18-5	60

Occupational Exposure Limits

	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
Ammonium Fluoride	3 ppm 2.5 mg/m ³ (as F)	Not established	3 ppm 2.5 mg/m ³ (as F)	Not established	3 ppm 2.5 mg/m ³ (as F)	Not established	Not established

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Severe burns to skin, eyes, and respiratory tract irritation with possibility of delayed onset of symptoms. Heat and fire can cause decomposition releasing irritating and poisonous gases. Attacks metals and glass.

HMIS
H 3
F 0
R 0
PPE†
 †Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, eye and skin contact, ingestion.

Target Organs: Respiratory system, skin, eyes, central nervous system, skeletal system, and kidneys.

Acute Effects

Inhalation: Vapors and mists irritate nose, throat, and respiratory tract causing coughing and a sore throat. High concentrations and extended exposure can attack central nervous system, kidneys, skeleton, and cause pulmonary edema.

Eye: Severe burns may cause blindness with possibility of delayed onset of symptoms.

Skin: Severe burns with possibility of delayed onset of symptoms. Can be absorbed through the skin into the body and excreted as fluoride salts in the urine.

Ingestion: Causes burning of mouth, throat, esophagus, and digestive tract. Symptoms may include diarrhea, nausea, vomiting, salivation, muscle weakness, tremors, convulsions, dehydration, and a salty or soapy taste in the mouth.

Carcinogenicity: Not listed

Medical Conditions Aggravated by Long-Term Exposure: Respiratory conditions and bone density.

Chronic Effects: Tooth enamel decay, bone or joint changes, calcification in the tendons and bones, anemia, and respiratory irritation.

Section 4 - First Aid Measures

Eye Contact: Gently lift eyelids and flush immediately and continuously with copious amounts of water for at least 15 minutes. Do not allow the victim to rub or keep eyes tightly shut. Consult an ophthalmologist immediately.

Skin Contact: Rinse with flooding amounts of water, while removing contaminated clothing, for at least 15 minutes. Wash with soap and water. Apply magnesium sulfate or calcium gluconate to contaminated area. Seek medical attention immediately. Wash clothing before reuse.

Ingestion: If victim is conscious, give 1 to 2 glasses of water and consume milk of magnesia or calcium carbonate tablets. Seek medical attention immediately. Never give anything by mouth to an unconscious or convulsing person.

Inhalation: Remove exposed person to an uncontaminated atmosphere and support breathing. For severe exposure, use oxygen if a qualified operator is available and if breathing is difficult. If not breathing, give artificial respiration. Seek medical attention immediately.

After first aid, seek appropriate in-plant, paramedic, or community medical support.

Section 5 - Fire-Fighting Measures

Flash Point: Not applicable

Auto ignition Temperature: Not applicable

LEL: Not applicable

UEL: Not applicable

Flammability Classification: Non combustible

Extinguishing Media: Dry chemical, carbon dioxide, foam or water spray.

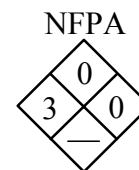
Unusual Fire or Explosion Hazards: At fire temperatures, ammonium fluoride corrodes metal.

Hazardous Combustion Products: Toxic, irritating, and corrosive gases such as hydrogen fluoride, nitrogen oxides, and ammonia may be emitted upon heating.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of the hazard. Consider evacuation.

Wear full body protective clothing with breathing apparatus. Prevent spillage from entering drains or waterways. Use water to control fire and cool adjacent area including fire-exposed containers. Do not approach containers suspected to be hot. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use.

Fire-Fighting Equipment: Because fire produces toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full-face piece operated in pressure-demand or positive-pressure mode.



Section 6 - Accidental Release Measures

Small Spills: Clean up spills immediately. Wear fully protective clothing and if necessary breathing apparatus. Contain spill and absorb with sand, earth, inert material or vermiculite. Collect residues and place in labeled plastic containers. Avoid breathing vapors and contact with skin and eyes.

Large Spills: Contact fire department and tell them location and nature of hazard. Clear area of personnel and move upwind.

Wear full body protective clothing with if necessary breathing apparatus. Prevent spillage from entering drains or waterways if possible. Water spray or fog may be used to disperse vapor. Collect and seal in labeled drums for disposal. Wash spill area with large quantities of water. If contamination of drains or waterways occurs, advise emergency services. After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120) in addition to any state or federal guidelines.

Section 7 - Handling and Storage

Handling Precautions: Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open containers with care. Observe manufacturer's storing and handling recommendations. Transport drums and totes by forklift or powered pallet jack.

Recommended Storage Methods: Do not store in metal drums or near other incompatible substances especially easily oxidized materials. Keep warmer than 32°F. Whenever possible provide containment - store within a bermed area or on a spill containment pallet.

Regulatory Requirements: Follow federal, state, and local regulations and guidelines.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Solution

Appearance and Odor: Colorless to cloudy liquid, odorless to slight odor

Vapor Pressure: 0.3mm Hg at 20°C

Vapor Density (Air=1): Not available

Formula Weight: 37.05

Density: 1.01 g/m³

Specific Gravity (H₂O=1, at 4 °C): 1.11 at 25°C

pH: 7

Water Solubility: 45.3 g/100 ml at 25°C

Other Solubility: Slightly soluble in alcohol

Boiling Point: 109°C (228°F)

Freezing: -30°C (-22°F)

Viscosity: Not available

% Volatile: Not available

Evaporation Rate: Not available

Section 10 - Stability and Reactivity

Stability: Stable under ordinary conditions of use and storage except when exposed to metal or glass.

Polymerization: Hazardous polymerization will not occur.

Chemical Incompatibilities: Hydrogen sulfide, wood, paper, cotton, and similar easily oxidized materials, alkalis, amines, ammonia gas, carbonates, cyanides, diborane, fluorine, phosphine, sulfides, thiocyanates, and acids. Reacts with chlorine trifluoride causing an explosion hazard. Attacks metal and glass.

Conditions to Avoid: Increasing temperatures and direct sunlight, which can cause decomposition.

Hazardous Decomposition Products: Thermal oxidative decomposition of mixture can produce ammonia, ammonium bifluoride, hydrogen fluoride, and nitrogen oxides.

Section 11- Toxicological Information*

Acute Effects:

Rat, inhalation: 1600 µg/m³/6 hour/39 weeks – intermittent

Rat, intraperitoneal, LD₅₀: 31 mg/kg

Frog, subcutaneous: 280 mg/kg

Chronic Effects: Tooth enamel decay; bone or joint changes; respiratory irritation.

Carcinogenicity: None listed

* See NIOSH, RTECS (BQ6300000) for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: Fish, LC₅₀: 100mg/l /96-hour.

Environmental Degradation: Fluorides do not degrade in the environment but change form by forming salts with minerals in the soil. Ammonium fluoride is expected to be harmful to aquatic organisms when released into the environment.

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options. Treat and neutralize before releasing to an approved treatment plant.

Disposal Regulatory Requirement: Follow applicable federal, state and local regulations (40 CFR 261 and 29 CFR 1910).

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: Toxic liquid, inorganic, n.o.s. (ammonium fluoride solution)

Hazard Class: 6.1

ID No.: UN 3287

Packing Group: III

Special Provisions: IB3, T7, TP1, TP28

Packaging Authorizations

a) **Exceptions:** 173.153

b) **Non-bulk Packaging:** 173.203

c) **Bulk Packaging:** 173.241

Quantity Limitations

a) **Passenger, Aircraft, or Railcar:** 60 L

b) **Cargo Aircraft Only:** 220 L

Vessel Stowage Requirements

a) **Vessel Stowage:** A

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Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number (40 CFR 261.22): None

RCRA Hazardous Waste Classification (40 CFR 261.21): None

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CERCLA Hazardous Substance (40 CFR 302.4) listed specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112

CERCLA Reportable Quantity (RQ): 100 lb (45.4 kg)

SARA 311/312 Codes: Acute, Chronic

SARA Toxic Chemical (40 CFR 372.65): Not listed

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed

TSCA: Listed

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Listed (as Fluorides)

Section 16 - Other Information

Revision Notes: Revision to Sections 2, 7, 12, 14, and 15.

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