



NEWAY SINOPHC TECH. LIMITED

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Safety Data Sheet (MSDS) - Ammonium Fluoride

According to: GB/T 16483, GB/T 17519, GHS Rev.9, UN GHS
Product Name: Ammonium Fluoride
CAS Number: 12125-01-8
Product Number: AF-20260220
Brand: SIGALD
Revision Date: 20 FEB 2026
Supplier: NEWAY SINOPHC TECH. LIMITED
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SECTION 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Identifiers

- Product Name: Ammonium Fluoride
- CAS-No.: 12125-01-8
- MDL No.: MFCD00011420
- Synonyms: Ammonium monofluoride; Fluorure d'ammonium (French)
- Product Number: AF-20260220
- Form: White hygroscopic crystalline powder (Industrial Grade)

1.4 Relevant Identified Uses and Uses Advised Against

- **Identified Uses:** Electronic etching agent; chemical synthesis raw material; metallurgical flux; glass etching agent; laboratory analytical reagent.
- **Uses Advised Against:** Not for food, feed and cosmetic use; not for medical and pharmaceutical use; do not use in metal/glass containers without anti-corrosion treatment; do not mix with strong acids/bases directly.

SECTION 2: Hazards Identification

2.1 GHS Classification

- Skin corrosion, Category 1B - H314
- Serious eye damage, Category 1 - H318
- Acute aquatic toxicity, Category 1 - H400
- Chronic aquatic toxicity, Category 1 - H410

2.2 GHS Label Elements

- Hazard Pictogram: (Corrosive) (Aquatic Toxic)
- Signal Word: **Danger**
- **Hazard Statements:**
 - H314: Causes severe skin burns and eye damage
 - H318: Causes serious eye damage
 - H400: Very toxic to aquatic life
 - H410: Very toxic to aquatic life with long-lasting effects
- **Precautionary Statements:**
 - P260: Do not breathe dust/fume/gas/mist/vapors/spray
 - P264: Wash hands thoroughly after handling
 - P270: Do not eat, drink or smoke when using this product
 - P273: Avoid release to the environment
 - P280: Wear protective gloves/eye protection/face protection/protective clothing
 - P301+P330+P331: If swallowed: Rinse mouth. Do NOT induce vomiting
 - P303+P361+P353: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
 - P304+P340: If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 - P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
 - P310: Immediately call a POISON CENTER/doctor

- P321: Specific treatment (see supplemental first aid notes)
- P363: Wash contaminated clothing before reuse
- P391: Collect spillage
- P501: Dispose of contents/container in accordance with local/regional/national/international regulations

2.3-2.6 Hazards Summary

- **Physical/Chemical Hazards:** Strongly hygroscopic, deliquesces in humid air; decomposes at >100°C to produce toxic ammonia (NH₃) and hydrofluoric acid (HF) gas; reacts with strong acids to release HF gas, reacts with strong bases to release NH₃ gas; corrosive to glass, metal and concrete.
- **Health Hazards:** Severe corrosive to skin and eyes, causes chemical burns and permanent eye damage; inhalation of dust causes respiratory tract irritation and corrosion; accidental ingestion causes severe gastrointestinal burns and fluoride ion poisoning.
- **Environmental Hazards:** Very toxic to aquatic life with acute and chronic effects; difficult to biodegrade in water, accumulates in aquatic organisms and causes long-term ecological damage; fluoride ions pollute soil and groundwater, inhibit plant and soil microorganism growth.
- **Other Hazards:** No explosion or flammability hazards under normal conditions.

SECTION 3: Composition/Information on Ingredients

- **Substance/Mixture:** Pure inorganic compound (no hazardous additives)
- **Active Ingredient:** Ammonium Fluoride (100% w/w; CAS:12125-01-8; Molecular Weight:37.04 g/mol)
- **Impurities:** Trace chloride, sulfate, iron and fluorosilicate (all meet industrial grade limits, non-hazardous alone)
- **Hazardous Components:** Ammonium Fluoride (100%) - GHS Classification: H314, H318, H400, H410

SECTION 4: First Aid Measures

4.1 Description of First-Aid Measures

- **If Inhaled:** Remove the victim to fresh air immediately, keep warm and at rest. Ensure unobstructed breathing; if breathing is difficult, give oxygen (no mouth-to-mouth resuscitation). Call a poison center/doctor immediately.
- **In Case of Skin Contact:** Take off all contaminated clothing, gloves and shoes immediately. Rinse the affected area with **plenty of running water** for 15~20 minutes (even if mild contact). Do not use neutralizer without medical guidance. Call a poison center/doctor immediately.
- **In Case of Eye Contact:** Do not rub eyes; pry open upper and lower eyelids and rinse with plenty of running water/neutral saline for 20~30 minutes (rinse from inner to outer corner). Remove contact lenses if present and easy to do. Call a poison center/ophthalmologist immediately (severe eye damage risk).
- **If Swallowed:** Rinse mouth with water immediately, **do not induce vomiting** (may cause esophageal and gastric re-burn). Drink a small amount of milk or egg white (binds fluoride ions). Call a poison center/doctor immediately; prepare calcium gluconate (antidote for fluoride poisoning) for medical use.

4.2 Most Important Symptoms and Effects

- **Acute Effects:** Severe skin redness, blistering and chemical burns; severe eye pain, redness, corneal damage and permanent vision loss; cough, chest tightness, respiratory tract burning from inhalation; nausea, vomiting, severe abdominal pain and gastrointestinal burns from ingestion; hypocalcemia (muscle spasm, convulsion) caused by fluoride ion poisoning.
- **Delayed Effects:** Scarring of skin burns; permanent eye damage/vision loss; chronic bronchitis from respiratory tract corrosion; fluorosis (teeth and bone) from long-term low-dose exposure.

- **Antidote:** Calcium gluconate (intravenous injection for systemic fluoride poisoning; topical application for skin/eye burns under medical guidance).

4.3 Immediate Medical Attention

Get medical attention immediately in all cases of contact, inhalation or ingestion. Inform the physician of the product name (Ammonium Fluoride) and hazards (corrosive, fluoride poisoning) for targeted treatment (e.g., calcium gluconate administration, burn treatment).

SECTION 5: Firefighting Measures

5.1 Extinguishing Media

- **Suitable:** Water spray, carbon dioxide (CO₂), dry powder, foam.
- **Unsuitable:** No limitations of extinguishing agents; do not use high-pressure water jet directly (may splash corrosive solution).

5.2 Special Hazards Arising from the Substance or Mixture

- Non-flammable and non-explosive; decomposes at high temperature (>100°C) or in fire to produce **toxic ammonia (NH₃)** and **corrosive hydrofluoric acid (HF)** gas; the gas is irritating and corrosive to respiratory tract, and forms hydrofluoric acid mist with water vapor.
- Corrosive to fire-fighting equipment (metal, glass); fluoride ions in fire water cause environmental pollution.

5.3 Advice for Firefighters

- Wear **full set of positive pressure self-contained breathing apparatus (SCBA)** and chemical anti-corrosion fire-fighting suit (acid and alkali resistant); avoid contact with fire debris and fire water.
- Cool the burning and surrounding containers with water spray to prevent further decomposition and gas release; fight the fire from the upwind direction.
- Collect fire water in a sealed container for centralized treatment (avoid environmental discharge); after the fire, ventilate the fire scene thoroughly to remove residual toxic gas.

SECTION 6: Accidental Release Measures

6.1 Personal Precautions

- Wear **level C anti-corrosion PPE** (SCBA, chemical protective clothing, nitrile rubber gloves, face shield); no unprotected personnel enter the spill area.
- Cut off all heat sources in the spill area; ensure good ventilation (exhaust fan for indoor spill); eliminate static electricity; set up a warning zone with "Corrosive Hazard" signs.

6.2 Environmental Precautions

- **Strictly prevent spilled powder or washing water from flowing into sewers, rivers, lakes, soil or groundwater** (very toxic to aquatic life). Use sand/bags to block the overflow immediately if necessary.
- Do not flush the spill with a large amount of water directly; collect all contaminated water and soil for centralized treatment.

6.3 Containment and Cleaning Up

- **Small Spill:** Sweep up the powder with a dry plastic shovel (no metal/glass tools) into a sealed HDPE plastic container; do not use a vacuum cleaner (avoid dust inhalation). Wipe the spill area with a small amount of water-moistened HDPE cloth, and put the cloth into the same container.
- **Large Spill:** Contain the powder with sand bags/dikes; transfer it to a sealed HDPE plastic drum with a dry anti-corrosion pump/shovel; label the drum with "Ammonium Fluoride - Corrosive, Aquatic Toxic". Collect contaminated soil/sand into a sealed container for hazardous waste disposal.
- Decontaminate the spill area with a small amount of lime water (neutralize fluoride ions), then rinse with a small amount of water; collect all rinsing water for centralized treatment.

SECTION 7: Handling and Storage

7.1 Precautions for Safe Handling

- Operate in a **dry, well-ventilated, anti-corrosion operation area** (HDPE floor, acid and alkali resistant wall); install local exhaust ventilation at the operation point to collect dust.
- Use only dry, anti-corrosion HDPE tools and equipment (no metal/glass/wood tools); avoid generating dust during handling (e.g., slow pouring, sealed transfer).
- Prepare emergency equipment at the operation site: emergency eye wash, safety shower, lime water (neutralizer), sealed HDPE containers, and first aid kit (calcium gluconate).
- **Hygiene Measures:** Wash hands and face with plenty of water after handling; do not eat, drink or smoke in the operation area; provide dedicated hand washing and shower facilities; do not take contaminated clothing home.
- Do not mix with strong acids, strong bases, metals, oxidizing agents and food/feed during any operation.

7.2 Safe Storage Conditions

- **Temperature & Humidity:** Store in a dry, cool warehouse at 0~30°C; relative humidity ≤60%; install dehumidifier and exhaust fan to keep the warehouse dry.
- **Packaging:** Keep in the original sealed HDPE plastic container (double-sealed for bulk); ensure no air and water contact to prevent hygroscopy and deliquescence.
- **Incompatibilities:** Strong acids (HCl, H₂SO₄, HNO₃), strong bases (NaOH, KOH), metals (Fe, Al, Zn), oxidizing agents (H₂O₂, KMnO₄), glass, concrete, food and feed.
- **Storage Class:** Corrosive chemical (Class 8); store in a dedicated corrosive chemical warehouse in accordance with GB 15603; separate from other chemicals with isolation distance ≥1.5m.
- **Shelf Life:** 12 months (unopened, under specified dry and sealed storage conditions); use within 1 month after opening, reseal tightly and add desiccant (silica gel, sealed in HDPE bag).
- **Other:** The storage area is equipped with emergency eye wash, safety shower and neutralizer (lime water); set up obvious "Corrosive", "No Smoking" and "Protect from Moisture" warning signs; no metal/glass shelves (use HDPE/FRP shelves).

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

- **Occupational Exposure Limit (OEL):**
 - China (MAC): 2 mg/m³ (as F⁻, 8h TWA)
 - US OSHA (PEL): 2.5 mg/m³ (as F⁻, 8h TWA)
 - EU (ELV): 2 mg/m³ (as F⁻, 8h TWA); 5 mg/m³ (STEL)
- **Biological Exposure Limit:** Urine fluoride: 15 mg/L (post-shift, 8h exposure)

8.2 Exposure Controls

- **Engineering Controls:** Install **local exhaust ventilation (LEV)** with HDPE ducting at the operation point (airflow rate ≥1.5 m/s); use sealed transfer equipment for bulk handling; the operation area is equipped with dehumidification and ventilation systems.
- **Personal Protective Equipment (PPE):**
 - Eye/Face: Chemical splash goggles + face shield (mandatory for all operations).
 - Skin: Acid and alkali resistant nitrile rubber gloves (thickness ≥0.2mm), anti-corrosion chemical protective clothing (HDPE/FRP), acid and alkali resistant boots, protective apron (for large-scale handling).
 - Respiratory: N95 dust mask (for normal dry handling); positive pressure SCBA (for spill, dust generation or poor ventilation).
 - Other: Protective cap, chemical resistant hand cover (for long-term operation).
- **Biological Monitoring:** Conduct urine fluoride testing for long-term operators every 6 months; conduct occupational health check (skin, eyes, respiratory tract, bones) every year.

SECTION 9: Physical and Chemical Properties

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Property	Value
Physical State	White crystalline powder
Odor	Odorless (decomposes to release pungent NH ₃ /HF gas when heated/humid)
Taste	Not applicable (toxic/corrosive, no tasting)
Molecular Weight	37.04 g/mol
Empirical Formula	NH ₄ F
Melting Point	No melting point (sublimes under vacuum at ~240°C, decomposes at >100°C)
Boiling Point	Not applicable (decomposes first)
Flammability	Non-flammable
Flash Point	Not applicable
Autoignition Temperature	Not applicable
Decomposition Temperature	>100°C (releases NH ₃ and HF gas)
pH Value (5% aq. solution, 25°C)	4.0 ~ 6.0
Solubility	83 g/100mL (water, 25°C); slightly soluble in ethanol; insoluble in acetone/ether
Density (25°C, solid)	1.009 g/cm ³
Vapor Pressure (25°C)	<0.001 hPa (negligible, decomposes first)
Relative Vapor Density (air=1)	>1 (solid powder)
Viscosity	Not applicable (solid); 5~10 mPa·s (10% aq. solution, 25°C)
Hygroscopy	Strongly hygroscopic, deliquescent in humid air (RH>60%)
Corrosivity	Corrosive to glass, metal, concrete and skin/eyes
Explosive Properties	Non-explosive
Oxidizing Properties	None

SECTION 10: Stability and Reactivity

10.1 Chemical Stability

Stable under **recommended dry and sealed storage conditions (0~30°C, RH≤60%)**; no decomposition or chemical reaction. Strongly hygroscopic, deliquesces in humid air to form an acidic aqueous solution.

10.2-10.5 Reactivity Summary

- No hazardous reactions under normal dry and sealed handling/storage conditions.
- **Conditions to Avoid:** Humid air, water contact, high temperature (>100°C), strong acids, strong bases, metals, glass/metal containers.
- **Incompatible Materials:** Concentrated HCl/H₂SO₄, NaOH/KOH, iron/aluminum/zinc metal, hydrogen peroxide, potassium permanganate, glass, concrete, marble.
- **Hazardous Decomposition Products:** Ammonia (NH₃, toxic/pungent) and hydrofluoric acid (HF, corrosive/toxic) gas (decomposes at >100°C or in humid air for a long time).
- **Hazardous Reactions:** Reacts with strong acids to release HF gas; reacts with strong bases to release NH₃ gas; reacts with active metals to release hydrogen gas (H₂); corrosive reaction with glass/metal to generate fluoride salts.

SECTION 11: Toxicological Information

11.1 Key Toxicological Data

- **Acute Toxicity:**
 - Oral (Rat, LD₅₀): 250 mg/kg bw (toxic, causes fluoride poisoning)
 - Dermal (Rabbit, LD₅₀): 500 mg/kg bw (corrosive, causes severe skin burns)
 - Inhalation (Rat, LC₅₀): 1800 mg/m³ (4h exposure, causes respiratory tract corrosion)
- **Skin Corrosion/Irritation:** Category 1B (Rabbit test), severe chemical burns, blistering and scarring.
- **Serious Eye Damage/Irritation:** Category 1 (Rabbit test), severe corneal damage and permanent vision loss.
- **Respiratory Irritation:** Severe irritation and corrosion of nasal cavity, trachea and lungs; causes cough, chest tightness and pulmonary edema in high concentration.
- **Sensitization:** No skin/respiratory sensitization (Guinea pig test).
- **Carcinogenicity/Mutagenicity:** IARC Class 3 (not classifiable as carcinogenic to humans); Ames test negative (no mutagenicity).
- **Reproductive/Developmental Toxicity:** High-dose fluoride ions cause fetal skeletal malformation in animal studies; long-term exposure causes fluorosis in adults (teeth mottling, bone sclerosis).
- **Target Organ Toxicity:** Skin, eyes, respiratory tract, gastrointestinal tract, bones and teeth (fluoride ion accumulation).
- **Aspiration Hazard:** Low (solid powder), but dust inhalation causes severe respiratory tract damage.

11.2 Additional Information

Toxicity is mainly caused by **corrosive effect** of the compound and **fluoride ion poisoning** (binds calcium ions in the body, causes hypocalcemia and fluorosis). No chronic toxic effects at low exposure levels meeting OEL; timely first aid and medical treatment can reduce damage from acute exposure.

SECTION 12: Ecological Information

12.1 Ecotoxicity

- **Aquatic Organisms:**
 - Zebrafish (LC₅₀, 96h): 0.8 mg/L (very toxic)
 - Daphnia (EC₅₀, 48h): 0.5 mg/L (very toxic)
 - Green algae (EC₅₀, 72h): 1.2 mg/L (very toxic)
- **Terrestrial Organisms:** Inhibits seed germination and plant growth (10 mg/kg soil); toxic to soil microorganisms (bacteria/fungi) at high concentration; causes fluorosis in grazing animals (bone damage).
- **Other Organisms:** Toxic to aquatic invertebrates and amphibians, causes population decline at low concentration.

12.2-12.7 Ecological Properties

- **Persistence/Degradability:** Non-biodegradable in aquatic/soil environment; fluoride ions exist stably in the environment for a long time.
- **Bioaccumulative Potential:** Moderate bioaccumulation (log Kow=-0.8); fluoride ions accumulate in aquatic organisms (fish bones/ shells) and terrestrial plants, and biomagnify in the food chain.
- **Mobility in Soil:** High mobility; easily leaches into groundwater with rainwater, causing groundwater fluoride pollution (exceeds drinking water standard 1.0 mg/L).
- **PBT/vPvB Assessment:** Classified as **PBT** (persistent, bioaccumulative, toxic) in the environment.
- **Endocrine Disrupting Properties:** No endocrine disrupting effect (in vitro/in vivo animal tests negative).

- **Other Adverse Effects:** Long-term fluoride pollution causes soil salinization and reduced fertility; high fluoride groundwater causes human fluorosis (drinking water); aquatic ecosystem damage and biodiversity reduction.

SECTION 13: Disposal Considerations

13.1 Waste Treatment Methods

- **Product Waste:** Spoiled/expired ammonium fluoride is classified as **hazardous waste (corrosive, aquatic toxic)**; send to licensed hazardous waste treatment facilities for **stabilization/solidification treatment** (mix with lime to form non-toxic calcium fluoride), then incineration/landfill (in accordance with hazardous waste disposal standards). Do not dump directly into the environment.
- **Spill Waste:** Contaminated powder, soil, sand and cleaning cloth are collected into sealed HDPE containers and disposed of as hazardous waste (same as product waste).
- **Washing Water/Waste Liquid:** Collect all contaminated water (spill cleaning, equipment washing) into a sealed tank; add lime water to neutralize (pH 7~8, form calcium fluoride precipitate); filter the precipitate (disposed as hazardous waste), and discharge the supernatant only after reaching national wastewater discharge standards (fluoride ion ≤ 1.0 mg/L).
- **Packaging Waste:** Rinse HDPE packaging with a small amount of lime water (neutralize residual fluoride ions), then rinse with water; the clean packaging can be recycled (HDPE) or disposed of as non-hazardous waste. Do not reuse contaminated packaging.

13.2 Disposal Regulations

Comply with China's **Hazardous Waste Pollution Control Law, Water Pollution Prevention and Control Law** and **Solid Waste Pollution Control Law**; comply with EU REACH (EC 1907/2006) and US RCRA hazardous waste disposal regulations; follow local corrosive and aquatic toxic hazardous waste disposal standards. Strictly implement the "zero discharge" of fluoride-containing waste to the aquatic environment.

SECTION 14: Transport Information

14.1-14.6 Transport Details

- **UN Number:** 2505
- **UN Proper Shipping Name:** Ammonium fluoride, solid
- **Transport Hazard Class:** 8 (Corrosive substances)
- **Packaging Group:** II (Medium hazard)
- **Marine Pollutant:** **Yes** (IMDG/IATA)
- **Transport Label:** Corrosive (Class 8), Marine Pollutant, Danger
- **Special Transport Requirements:**
 1. Transport by **closed anti-corrosion chemical cargo vehicles (HDPE lining)**; no open transport, no mixed transport with food, feed, aquatic products, metals and strong acids/bases.
 2. Use shockproof, sealed and moisture-proof HDPE packaging; avoid package collision, leakage, rain and humid air during transport; transport temperature 0~35°C, relative humidity $\leq 60\%$.
 3. The transport vehicle is equipped with spill emergency treatment equipment (dry plastic shovel, sealed HDPE containers, lime water) and fire extinguishers; no open fire or smoking during loading and unloading.
 4. Avoid transport through water source protection areas, aquaculture areas, nature reserves and residential areas; take detour measures if necessary.
 5. **IATA/IMDG Classification:** Class 8, Packaging Group II, Marine Pollutant; comply with IATA DGR and IMDG Code for corrosive and marine pollutant transport.
 6. Loading and unloading with anti-corrosion mechanical equipment (no manual direct contact); the operation site is dry and well-ventilated, with no water and humid air.



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SECTION 15: Regulatory Information

15.1 National/International Regulations

- **China (MEE/SAMR):** Hazardous Chemical Safety Management Regulation (Class 8 corrosive chemical); National Drinking Water Standard (fluoride ion ≤ 1.0 mg/L); Hazardous Waste Identification Standard; Occupational Exposure Limit for Chemical Hazards in the Workplace.
- **International (UN / 欧盟 / US):** UN GHS Rev.9 (hazard classification); EU REACH (listed in SVHC Candidate List for aquatic toxicity); US OSHA (occupational exposure limit); US RCRA (hazardous waste classification); IMDG/IATA (transport regulations for marine pollutants).
- **Other Standards:** ISO 9001 (quality management); ISO 14001 (environmental management); OHSAS 18001 (occupational health and safety).

15.2 Other Requirements

- Production and handling must comply with the national **Hazardous Chemical Safety Production Regulations**; the operation personnel must hold a special operation certificate for hazardous chemicals.
- The product must be labeled in accordance with GHS and transport regulations (hazard class, marine pollutant, emergency contact); the safety data sheet must be provided to the receiver.
- All batch production records, test reports and COA must be retained for ≥ 5 years in accordance with hazardous chemical regulatory requirements.
- Environmental protection measures must be taken in production and use to ensure that fluoride ion discharge meets national standards; no environmental pollution is allowed.

SECTION 16: Other Information

- **MSDS Validity:** This MSDS is valid for 3 years from the revision date (20 FEB 2026) unless the product quality or hazard information changes.
- **Disclaimer:** This MSDS is based on current scientific and chemical industry knowledge, complying with GB/T 16483, GHS Rev.9 and international hazardous chemical safety standards. The supplier is not liable for any damage caused by improper handling, non-compliance with storage/transport/disposal requirements, unauthorized use or failure to follow safety precautions, especially environmental damage caused by fluoride pollution.
- **Additional Technical Support:** For industrial application, process optimization, corrosion prevention and environmental protection treatment of ammonium fluoride, contact the technical department at +86-021-50350029 ext. 843 (for licensed industrial manufacturers only).
- **Key Reminder:** This product is a Class 8 corrosive chemical and marine pollutant, very toxic to aquatic life with long-lasting effects. Strictly follow the PPE, storage, transport and waste disposal requirements during all operations; prepare emergency equipment and first aid supplies; strictly prevent fluoride-containing waste from entering the environment to avoid ecological damage and legal liabilities.