SAFETY DATA SHEET

AMMONIUM BIFLUORIDE (TECH)

CAS No.: 1341-49-7

This Safety Data Sheet is issued by Suraj Chemicals as the distributor/supplier of record, based on manufacturer and published GHS / regulatory reference data for this substance. Users should also consult the specific manufacturer's SDS where available.

1. IDENTIFICATION

GHS Product identifier

AMMONIUM BIFLUORIDE (TECH)
Ammonium Hydrogen Difluoride; Ammonium Hydrogen Fluoride; NH_4HF_2
CAS: 1341-49-7

Other means of identification

Not relevant

Recommended use of the chemical and restrictions on use

Relevant uses: Glass etching/frosting, metal surface treatment and pickling, descaling and chemical cleaning agent, electroplating, laboratory reagent, chemical intermediate in fluorine chemistry. For industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3.

Supplier's details

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2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), based on the mandatory (harmonised) GHS classification for ammonium hydrogendifluoride (CAS 1341-49-7). This substance shares much of the systemic fluoride toxicity and corrosivity profile of hydrofluoric acid.

Acute Tox. 2 (Oral)	Acute oral toxicity, Category 2, H300
Acute Tox. 1 (Dermal)	Acute dermal toxicity, Category 1, H310
Acute Tox. 2 (Inhalation)	Acute inhalation toxicity, Category 2, H330
Skin Corr. 1A	Skin corrosion, Category 1A, H314
STOT SE 3	Respiratory tract irritation, Category 3, H335

GHS label elements, including precautionary statements

GHS: Danger

Hazard statements

H300: Fatal if swallowed.
H310: Fatal in contact with skin.
H314: Causes severe skin burns and eye damage.
H330: Fatal if inhaled.
H335: May cause respiratory irritation.

Precautionary statements

P260: Do not breathe dust/mist.
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash exposed skin thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340: IF INHALED: Remove person to fresh air and keep 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.
P320: Specific treatment is urgent (see calcium gluconate first-aid advice on this label).
P322: Specific measures (see first-aid advice on this label).
P330: Rinse mouth.
P405: Store locked up.
P501: Dispose of contents/container in accordance with local/regional/national regulations.

Other hazards which do not result in classification

Liberates hydrofluoric acid/hydrogen fluoride vapour on contact with moisture or acids. Systemic fluoride poisoning (hypocalcaemia, cardiac arrhythmia) can occur following skin/eye exposure, inhalation or ingestion, even from apparently minor contact, and may be delayed in onset. Corrosive to glass and many silicate materials. Not a PBT/vPvB substance.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Chemical description: Ammonium Hydrogen Difluoride (NH_4HF_2), technical grade

In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 1341-49-7	Ammonium Bifluoride – Acute Tox. 2/1/2, Skin Corr. 1A, STOT SE 3: H300, H310, H314, H330, H335 – Danger	≥95% (technical grade)

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

Mixtures

Non-applicable (technical-grade single substance)

4. FIRST AID MEASURES

Description of necessary first-aid measures

Medical emergency – treat as a hydrofluoric-acid-type exposure. Request medical assistance immediately, showing the SDS of this product; specific calcium gluconate treatment may be required.

By inhalation

Remove person to fresh air immediately, keeping the responder upwind. Keep at rest. If breathing is difficult, give oxygen. Obtain immediate medical attention even if symptoms are delayed or absent, as pulmonary oedema can develop hours after exposure.

By skin contact

Remove contaminated clothing immediately. Flush skin immediately with copious water for at least 15–20 minutes. If available, apply 2.5% calcium gluconate gel to the affected area while awaiting emergency medical transport. Obtain immediate medical attention regardless of apparent severity.

By eye contact

Rinse immediately with copious water for at least 20 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Obtain immediate medical attention.

By ingestion/aspiration

Do NOT induce vomiting. Rinse mouth. If conscious, give large quantities of water or milk (calcium source) to drink. Obtain immediate medical attention – this is a medical emergency.

Most important symptoms/effects, acute and delayed

Severe corrosive burns to skin, eyes and respiratory/digestive tract. Fluoride ion penetrates tissue and can cause deep, progressive burns and systemic hypocalcaemia, which may cause life-threatening cardiac arrhythmia; onset of systemic symptoms may be delayed several hours after skin contact.

Indication of immediate medical attention and special treatment needed, if necessary

Specific treatment with calcium gluconate (topical gel, subcutaneous infiltration, intra-arterial or intravenous as directed by a physician) is required for significant exposures. Cardiac monitoring is recommended for any substantial exposure due to risk of hypocalcaemia-induced arrhythmia.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Suitable: Use extinguishing media appropriate to the surrounding fire (water spray, dry chemical, CO_2).
Unsuitable: None known; avoid contact of large water streams with glass/silica-containing equipment due to corrosivity of resulting solution.

Specific hazards arising from the chemical

Not combustible. Thermal decomposition or contact with moisture/acid releases toxic and corrosive hydrogen fluoride (HF) gas and ammonia.

Special protective actions for fire-fighters

Wear self-contained breathing apparatus with full facepiece in pressure-demand mode and full acid-resistant protective clothing, as fire/heat may liberate hydrogen fluoride gas.

Additional provisions

Approach from upwind. Evacuate the area and warn people of the danger of toxic HF fumes.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Evacuate the area immediately. Do not attempt clean-up without full PPE described in section 8. Avoid all contact and dust inhalation.

For emergency responders

Wear full chemical-protective clothing and SCBA. Keep unprotected persons away. See section 8.

Environmental precautions

Prevent entry into drains, watercourses or soil. Notify the relevant authority immediately in case of significant environmental release.

Methods and materials for containment and cleaning up

Carefully sweep up dry material (avoid generating dust) using non-glass, HF-resistant equipment (plastic, PTFE, or similar) and place in a suitable, labelled, dry container. Neutralise residual traces cautiously with limewater or soda ash solution under controlled conditions by trained personnel only.

Reference to other sections

See sections 8 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling

A. General precautions for safe use

Handle only with full PPE described in section 8. Avoid all contact with skin, eyes and clothing. Do not breathe dust. Use only with adequate local exhaust ventilation. Keep calcium gluconate gel readily available at the point of use.

B. Technical recommendations for the prevention of fires and explosions

Not combustible; keep away from strong acids and moisture to prevent generation of hydrogen fluoride gas.

C. Technical recommendations on general occupational hygiene

Do not eat, drink or smoke while handling. Wash hands and exposed skin thoroughly after handling, even where no contact is suspected.

D. Technical recommendations to prevent environmental risks

Prevent uncontrolled discharge to drains or watercourses; provide secondary containment for storage.

Conditions for safe storage, including any incompatibilities

A. Specific storage requirements

Storage condition	Store in tightly closed, non-glass (plastic-lined or polyethylene) containers, in a cool, dry, well-ventilated, locked area, separate from incompatible materials
Incompatible materials	Glass and silicate materials, concentrated acids, strong bases, metals, moisture

B. General conditions for storage

Do not store in glass containers (corrosive to glass). Keep dry and segregated from acids and reactive metals. Restrict access to trained, authorised personnel only.

Specific end use(s)

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Identification	Occupational Exposure Limit Type	Value
Ammonium Bifluoride (as F) CAS: 1341-49-7	Time Weighted average concentration (8 hrs)	2.5 mg/m³ (as F)
	Short-term exposure limit	Available on request (grade/region specific)

Appropriate engineering controls

Provide dedicated local exhaust ventilation and, where practicable, closed/automated handling systems to minimise operator contact. Emergency shower and calcium gluconate first-aid supplies must be immediately accessible at the point of use.

B. Respiratory protection

Use a NIOSH/BIS-approved full-facepiece respirator with acid-gas cartridge for routine handling; use positive-pressure SCBA for spill response, confined space entry or any uncontrolled release.

C. Specific protection for the hands

Chemical-resistant gloves specifically rated for hydrofluoric acid/fluoride exposure (e.g. heavy-duty nitrile or neoprene of adequate thickness); replace immediately if damaged or contaminated.

D. Eye and face protection

Full-face chemical splash goggles or face shield in combination with safety goggles; do not rely on safety glasses alone.

E. Bodily protection

Full acid-resistant protective suit and boots. Change contaminated clothing immediately and launder separately.

F. Additional emergency measures

Emergency shower and eyewash stations, plus a readily accessible supply of 2.5% calcium gluconate gel, must be available at the point of use.

Environmental exposure controls

Prevent environmental release of both product and container; see subsection 7.1.D.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	
Physical state at 20°C	Solid (crystalline powder/granules)
Appearance	White crystalline solid
Odor	Slight pungent (HF-like) odor
Odour threshold	Not established
Volatility	
Boiling point	Not applicable (decomposes before boiling)
Melting point	~126°C (decomposes/sublimes)
Vapour pressure	Low at room temperature; increases with temperature (sublimes)
Evaporation rate	Not applicable (solid)
Product Description	
Molecular weight	57.04 g/mol
Density	~1.5 g/cm³
pH (5% aqueous solution)	~4.0–5.0 (acidic)
Solubility in water at 20°C	~63 g/100 mL (freely soluble)
Flammability	
Flash Point	Non-applicable (non-combustible solid)
Flammability (solid, gas)	Not flammable
Autoignition temperature	Not applicable
Lower / Upper flammability limit	Not applicable

Other information

Explosive properties	Not applicable
Oxidising properties	Not classified as an oxidiser
Corrosive to metals	Corrosive to glass, ceramics and many metals in aqueous solution; liberates HF gas with acids/moisture

10. STABILITY AND REACTIVITY

Reactivity

Reacts with glass, silicates and many metals, particularly in aqueous solution, releasing corrosive fluoride species. Reacts with strong acids/moisture liberating toxic hydrogen fluoride gas; reacts with strong bases liberating ammonia gas.

Chemical stability

Chemically stable under the indicated conditions of storage, handling and use when kept dry and in appropriate (non-glass) containers.

Possibility of hazardous reactions

Hazardous evolution of toxic hydrogen fluoride and/or ammonia gas can occur on contact with acids, bases or moisture.

Conditions to avoid

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Not applicable	Avoid excessive heat (decomposition, HF release)	Not applicable	Avoid moisture

Incompatible materials

Glass, silicate materials, concentrated acids, strong bases, reactive metals, moisture.

Hazardous decomposition products

Hydrogen fluoride (HF) gas and ammonia gas.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:

A. Ingestion (acute effect)

Fatal if swallowed. Causes severe corrosive burns to the mouth, throat and digestive tract; systemic fluoride absorption can cause life-threatening hypocalcaemia and cardiac arrhythmia.

B. Inhalation (acute effect)

Fatal if inhaled. Corrosive to the respiratory tract; may cause pulmonary oedema, which can be delayed in onset.

C. Contact with skin and eyes (acute effect)

Skin: fatal in contact with skin; causes severe, deep, progressive corrosive burns with risk of systemic fluoride toxicity even from limited-area contact. Eyes: causes serious, potentially irreversible eye damage.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity)

Not listed as a carcinogen by IARC, NTP or OSHA. Classification criteria for mutagenicity/reproductive toxicity are not met based on available data.

E. Sensitizing effects

Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure

May cause respiratory irritation; systemic fluoride toxicity can affect the cardiovascular system (hypocalcaemia-induced arrhythmia) following significant exposure.

G. Specific target organ toxicity (STOT) – repeated exposure

Chronic excessive fluoride exposure has been associated with skeletal fluorosis; not classified for occupational exposure at controlled levels based on available data.

H. Aspiration hazard

Not applicable (solid).

Product-specific toxicological information

Identification	Acute Toxicity	Genus
Ammonium Bifluoride CAS: 1341-49-7	LD50 oral: ~50 mg/kg (as F equivalent toxicity, comparable to hydrofluoric acid)	Rat
	Corrosive on skin/eye contact (severity precludes standard LD50 dermal testing)	Rabbit

12. ECOLOGICAL INFORMATION

Toxic to aquatic life; fluoride is toxic to fish and aquatic invertebrates at relatively low concentrations.

Toxicity

Acute Toxicity	Species	Genus
LC50: ~2.7–7.5 mg/L (96h, as F)	Non-applicable	Fish
EC50: <10 mg/L (48h, as F)	Non-applicable	Daphnia

Persistence and degradability

Inorganic; biodegradation is not applicable. Fluoride ion is persistent in the environment.

Bioaccumulative potential

Not expected to bioaccumulate significantly in soft tissue; fluoride can accumulate in bone/skeletal tissue of exposed organisms over long-term exposure.

Mobility in soil

Koc	Henry	Dry Soil	Moist Soil
Not applicable	Not applicable	Highly soluble/mobile as fluoride/ammonium ions	

Results of PBT and vPvB assessment

Not applicable (inorganic substance).

Other adverse effects

Uncontrolled release is toxic to aquatic life and may harm vegetation (fluoride phytotoxicity) at elevated soil/water concentrations.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Classified as hazardous waste. Neutralise cautiously with limewater/soda ash under controlled conditions by trained personnel, precipitating fluoride as calcium fluoride where feasible, and dispose of via a licensed hazardous-waste contractor. Empty containers may retain hazardous residue.

Refer to national and local regulations on hazardous waste management.

14. TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR/RID)

14.1 UN number	UN1727
14.2 UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3 Transport hazard class(es)	8 (Subsidiary risk: 6.1)
14.4 Packing group	II
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG)

14.1 UN number	UN1727
14.2 UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3 Transport hazard class(es)	8 (Subsidiary risk: 6.1)
14.4 Packing group	II
14.5 Marine pollutant	Yes
14.6 Special precautions for user	EmS Codes: F-A, S-B
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO)

14.1 UN number	UN1727
14.2 UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3 Transport hazard class(es)	8 (Subsidiary risk: 6.1)
14.4 Packing group	II
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

15. REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product in question

Listed as a hazardous/toxic chemical under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (India). It is recommended to use the information in this SDS as data for a local risk evaluation for handling, use, storage and disposal; on-site emergency planning is recommended given the severity of potential exposure.

Other legislation

Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
Public Liability Insurance Act, 1991

16. OTHER INFORMATION

Legislation related to safety data sheets

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3

H300: Fatal if swallowed.
H310: Fatal in contact with skin.
H314: Causes severe skin burns and eye damage.
H330: Fatal if inhaled.
H335: May cause respiratory irritation.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training

Mandatory training is strongly recommended before handling this product, covering fluoride/HF-specific first aid (including calcium gluconate treatment), correct PPE use, safe storage/segregation and emergency response, given the severity and potentially delayed onset of systemic fluoride toxicity.

Principal bibliographical sources

Publicly available (mandatory/harmonised) GHS classification and physicochemical reference data for ammonium hydrogendifluoride (CAS 1341-49-7).

Abbreviations and acronyms

LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | HF: Hydrogen Fluoride/Hydrofluoric Acid | SCBA: Self-Contained Breathing Apparatus | IARC: International Agency for Research on Cancer

Disclaimer: The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

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