

AMMONIUM HYDROGEN DIFLUORIDE

GHS Safety Data Sheet

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

AMMONIUM BIFLUORIDE

OTHER NAMES

F2-H5-N, (NH4)-H-F2, N-H5-F2, N-H5-F2, "acid ammonium fluoride", "ammonium difluoride", "ammonium hydrofluoride", "ammonium hydrogen bifluoride", "ammonium acid fluoride", "ammonium bifluoride, solid"

PROPER SHIPPING NAME

AMMONIUM HYDROGEN DIFLUORIDE, SOLID

PRODUCT USE

In manufacture of magnesium and magnesium alloys; in brightening of aluminium; for purifying and cleansing various parts of beer-dispensing apparatus, tubes, etc., sterilizing dairy and other food equipment. In glass and porcelain industries; as mordant for aluminium; as a 'sour' in laundering cloth. In the laboratory production of hydrogen fluoride.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

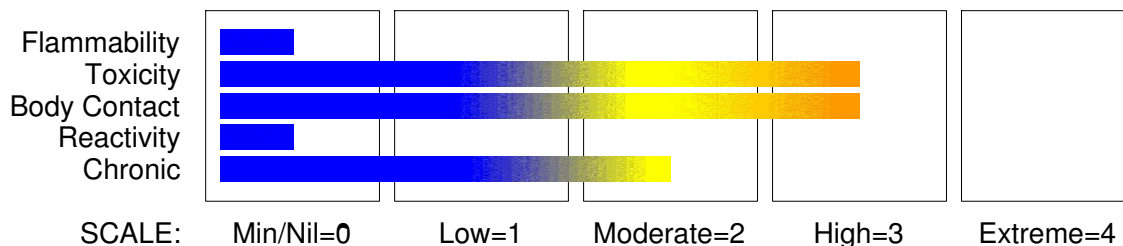
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HAZARD RATINGS



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Inhalation) Category 4

Acute Toxicity (Oral) Category 3

Metal Corrosion Category 1

Skin Corrosion/Irritation Category 1B



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H301 H332 H290 H314

Toxic if swallowed

Harmful if inhaled

May be corrosive to metals

Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Do not breathe dust or mist.

Wash thoroughly after handling.

Use only outdoors or in a well ventilated area.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wear protective gloves/clothing and eye/face protection.

Response

Call a POISON CENTER or doctor/physician if you feel unwell.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Immediately call a POISON CENTER or doctor/physician.

If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.

Absorb spillage to prevent material damage.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Specific treatment: refer to Label or MSDS.

Wash contaminated clothing before reuse.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

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Section 2 - HAZARDS IDENTIFICATION

Storage

Store in a corrosive resistant container with a resistant inliner.
Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
ammonium bifluoride	1341-49-7	> 98
impurities may include:		
ammonium fluoride	12125-01-8	< 2
hydrogen fluoride	7664-39-3	< 0.01
ammonium fluorosilicate	16919-19-0	< 0.05

Section 4 - FIRST AID MEASURES

SWALLOWED

Rinse mouth out with plenty of water. DO NOT delay.
For advice, contact a Poisons Information Centre or a doctor.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product or its vapours come in contact with the eyes,

- DO NOT DELAY: Immediately irrigate continuously by holding the eyelids apart and washing with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital, eye clinic or eye specialist, ophthalmologist without delay.

SKIN

If there is evidence of severe skin irritation or skin burns:

- Avoid further contact. Immediately remove contaminated clothing, including footwear.
- Flush skin under running water for 15 minutes.
- Avoiding contamination of the hands, massage calcium gluconate gel into affected areas, pay particular attention to creases in skin.
- Contact the Poisons Information Centre.
- Continue gel application for at least 15 minutes after burning sensation ceases.
- If pain recurs, repeat application of calcium gluconate gel or apply every 20 minutes.
- If no gel is available, continue washing for at least 15 minutes, using soap if

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Section 4 - FIRST AID MEASURES

available. If patient is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth.

- Transport to hospital, or doctor, urgently.

INHALED

- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear breathing passages.
- Ask patient to rinse mouth with water but to not drink water.
- Seek immediate medical attention.

NOTES TO PHYSICIAN

For acute or short term repeated exposures to fluorides:

- Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
- Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.
- Peak serum levels are reached 30 mins. post-exposure; 50% appears in the urine within 24 hours.
- For acute poisoning (endotracheal intubation if inadequate tidal volume), monitor breathing and evaluate/monitor blood pressure and pulse frequently since shock may supervene with little warning. Monitor ECG immediately; watch for arrhythmias and evidence of Q-T prolongation or T-wave changes. Maintain monitor. Treat shock vigorously with isotonic saline (in 5% glucose) to restore blood volume and enhance renal excretion.
- Where evidence of hypocalcaemic or normocalcaemic tetany exists, calcium gluconate (10 ml of a 10% solution) is injected to avoid tachycardia.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Fluorides in urine	3 mg/gm creatinine	Prior to shift	B, NS
	10mg/gm creatinine	End of shift	B, NS

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other exposures.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.

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Section 5 - FIRE FIGHTING MEASURES

- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered to be a significant fire risk, however containers may burn.
 - In a fire may decompose on heating and produce toxic / corrosive fumes.
- Decomposes on heating and produces toxic fumes of fluorides, ammonia (NH₃) and nitrogen oxides (NO_x).

FIRE INCOMPATIBILITY

Contact with alkaline material liberates heat and ammonia.

Personal Protective Equipment

Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

Environmental hazard - contain spillage.
Clean up all spills immediately.
Control personal contact by using protective equipment.
Use dry clean up procedures and avoid generating dust.
Place spilled material in clean, dry, sealable, labelled container.

MAJOR SPILLS

Environmental hazard - contain spillage.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

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Section 6 - ACCIDENTAL RELEASE MEASURES

life-threatening health effects is:

ammonium bifluoride 3.5 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

ammonium bifluoride 3.5 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

ammonium bifluoride 3.5 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:

ammonium bifluoride 3.5 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid generating and breathing dust
 - Avoid contact with skin and eyes.
 - Wear nominated personal protective equipment when handling.
 - Use in a well-ventilated area.
 - Use good occupational work practices.
 - Observe manufacturer's storing and handling recommendations.
- Local exhaust ventilation may be required for safe working, i.e. to keep exposures below required standards, otherwise PPE is required.
- Avoid contact with incompatible materials.
- Avoid sources of heat.
- Handle and open container with care.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.

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Section 7 - HANDLING AND STORAGE

Always wash hands with soap and water after handling. Work clothes should be laundered separately.

SUITABLE CONTAINER

- Check that containers are clearly labelled.
- Packaging as recommended by manufacturer.
- DO NOT use unlined steel containers.
- Do Not store in glass.

STORAGE INCOMPATIBILITY

Contact with acids produces toxic fumes, i.e. highly toxic, highly corrosive hydrogen fluoride.
DO NOT store near alkalies.
Avoid contamination of water, foodstuffs, feed or seed.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- ammonium bifluoride: CAS:1341- 49- 7 CAS:120144- 37- 8 CAS:7790- 15- 0 CAS:16941- 26- 7 CAS:19121- 60- 9 CAS:52697- 21- 9 CAS:96740- 33- 9 CAS:14055- 61- 9 CAS:127026- 25- 9 CAS:135446- 53- 6 CAS:159431- 44- 4
- ammonium fluoride: CAS:12125- 01- 8 CAS:16099- 75- 5 CAS:70786- 97- 9 CAS:102089- 31- 6 CAS:153985- 02- 5 CAS:124633- 37- 0 CAS:357290- 87- 0 CAS:178115- 94- 1 CAS:133332- 88- 4 CAS:161288- 32- 0 CAS:502760- 32- 9 CAS:204322- 87- 2 CAS:15818- 75- 4 CAS:215303- 13- 2
- hydrogen fluoride: CAS:7664- 39- 3
- ammonium fluorosilicate: CAS:16919- 19- 0 CAS:1309- 32- 6 CAS:36596- 71- 1 CAS:53238- 22- 5

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
hydrogen fluoride		30 [Unch]

ODOUR SAFETY FACTOR (OSF)

OSF=71 (HYDROGEN FLUORIDE)

Exposed individuals are reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class A or B.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

The Odour Safety Factor (OSF) is defined as:

$OSF = \text{Exposure Standard (TWA) ppm} / \text{Odour Threshold Value (OTV) ppm}$

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

MATERIAL DATA

Based on a study in which the threshold for minimum increase in bone density due to fluoride exposure was 3.38 mg/m³ (as fluoride), the present TLV-TWA has been adopted to prevent irritant effects and disabling bone changes. There is also support for the proposition that occupational exposure below the TLV will have no adverse effect on pregnant women or off-spring. IARC has classified fluorides in drinking water as Group 3 carcinogens; i.e. Not classifiable as to its carcinogenicity to humans. Equivocal evidence of carcinogenic activity (osteosarcoma) has been found in male rats administered sodium fluoride in drinking water. (0-175 ppm) Evidence was not found in female rats or in male or female mice.

INGREDIENT DATA

AMMONIUM FLUORIDE:

Based on a study in which the threshold for minimum increase in bone density due to fluoride exposure was 3.38 mg/m³ (as fluoride), the present TLV-TWA has been adopted to prevent irritant effects and disabling bone changes. There is also support for the proposition that occupational exposure below the TLV will have no adverse effect on pregnant women or off-spring. IARC has classified fluorides in drinking water as Group 3 carcinogens; i.e. Not classifiable as to its carcinogenicity to humans. Equivocal evidence of carcinogenic activity (osteosarcoma) has been found in male rats administered sodium fluoride in drinking water. (0-175 ppm) Evidence was not found in female rats or in male or female mice.

HYDROGEN FLUORIDE:

Odour Threshold: 0.042 ppm

NOTE: Detector tubes for hydrogen fluoride, measuring in excess of 1.5 ppm, are available commercially. Long-term measurements (8 hrs) may be conducted to detect concentrations exceeding 0.25 ppm.

Hydrogen fluoride is a primary irritant which as a gas causes severe respiratory irritation and as a liquid which causes severe and painful

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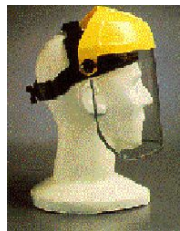
Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

burns to the skin and eyes. The recommendation for TLV-TWA is based on the results of controlled inhalation studies in human volunteers. The limit is thought to minimise the potential for occurrence of dental and/or osteofluorosis (systemic fluorosis) and to prevent the risk of primary irritation to the eyes, nose, throat and lower respiration system. At concentrations exceeding 3 ppm there have been reports of skin reddening and burning of the nose and eyes.

AMMONIUM FLUOROSILICATE:

Based on a study in which the threshold for minimum increase in bone density due to fluoride exposure was 3.38 mg/m³ (as fluoride), the present TLV-TWA has been adopted to prevent irritant effects and disabling bone changes. There is also support for the proposition that occupational exposure below the TLV will have no adverse effect on pregnant women or off-spring. IARC has classified fluorides in drinking water as Group 3 carcinogens; i.e. Not classifiable as to its carcinogenicity to humans. Equivocal evidence of carcinogenic activity (osteosarcoma) has been found in male rats administered sodium fluoride in drinking water. (0-175 ppm) Evidence was not found in female rats or in male or female mice.

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

Butyl rubber gloves or Neoprene rubber gloves.

OTHER

Overalls and Rubber apron or PVC apron.

- Impervious protective clothing.
 - Ensure that there is ready access to eye wash unit.
- Ensure there is ready access to an emergency shower.

Always ensure that a supply, is on hand, of calcium gluconate gel for treatment of burns and calcium carbonate tablets for accidental ingestion.

* Workers exposed to fluorides should have a comprehensive preplacement

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AMMONIUM HYDROGEN DIFLUORIDE

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

medical examination(including complete urinalysis) and biannual examinations thereafter, emphasising musculoskeletal, pulmonary, gastrointestinal tract and kidney functions. Monitor fluoride exposure by periodic urinalysis.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	B- AUS P	-
1000	50	-	B- AUS P
5000	50	Airline *	-
5000	100	-	B- 2 P
10000	100	-	B- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your
Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Use in a well-ventilated area.

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:
 - (a): particle dust respirators, if necessary, combined with an absorption cartridge;
 - (b): filter respirators with absorption cartridge or canister of the right type;
 - (c): fresh-air hoods or masks
- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:

direct spray, spray painting in shallow booths,
drum filling, conveyer loading, crusher dusts,
gas discharge (active generation into zone of
rapid air motion)

grinding, abrasive blasting, tumbling, high
speed wheel generated dusts (released at high
initial velocity into zone of very high rapid

Air Speed:

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

air motion).

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

White, deliquescent crystals, with no odour. Freely soluble in water.

Dissolves in water to form a weak solution of hydrofluoric acid.

In the presence of moisture, highly corrosive to glass, other siliceous materials and most metals.

PHYSICAL PROPERTIES

Solid.

Mixes with water.

Corrosive.

Molecular Weight: 57.06

Melting Range (°C): 125

Solubility in water (g/L): Miscible

pH (1% solution): 3.5 (5% aqueous)

Volatile Component (%vol): Not available.

Relative Vapour Density (air=1): Not available.

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°C): Not applicable

State: Divided solid

Boiling Range (°C): 239

Specific Gravity (water=1): 1.5

pH (as supplied): Not applicable

Vapour Pressure (kPa): Not available

Evaporation Rate: Not available

Flash Point (°C): Not applicable

Upper Explosive Limit (%): Not applicable

Decomposition Temp (°C): Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.

continued...

AMMONIUM HYDROGEN DIFLUORIDE

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

- Product is considered stable.
 - Hazardous polymerisation will not occur.
-

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

EYE

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

Toxic effects may result from skin absorption.

Reactions may not occur on exposure but response may be delayed with symptoms only appearing many hours later.

The skin is readily penetrated by the fluoride ion causing liquefaction necrosis of the soft tissues and decalcification and corrosion of bone. Healing is delayed and necrotic changes may continue to occur and spread beneath a layer of tough coagulated skin. Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation.

Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort.

A single acute over-exposure may even cause nose bleed. Pre-existing respiratory conditions such as emphysema, bronchitis may be aggravated by exposure. Occupational asthma may result from exposure.

The material may produce respiratory tract irritation. Symptoms of pulmonary irritation

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Section 11 - TOXICOLOGICAL INFORMATION

may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.

Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).

The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs. Therefore prolonged exposure to respiratory irritants may cause sustained breathing difficulties.

CHRONIC HEALTH EFFECTS

Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts.

Long term exposure to vapour or dust with inorganic fluorides may result in fluorosis, with rheumatic symptoms, stiff joints, mottling of tooth enamel. Other signs may include nausea, vomiting, anorexia, diarrhoea or constipation, weight loss, anaemia, weakness and general ill-health. Polyuria and polydipsia may also occur. Exfoliative dermatitis, atopic dermatitis, stomatitis, gastrointestinal and respiratory allergy, and on occasions , central nervous system involvement have all been described.

TOXICITY AND IRRITATION

as fluoride anion

Oral (human) LDLo: 50 mg/kg

Oral (human) TDLo: 3 mg/kg

Inhalation (rat) LC50: 1276 ppm/1hr*

Inhalation (mouse) LC50: 342 ppm/1hr*

Eye (-): corrosive*

Skin (-): corrosive*

*[Bayer]

AMMONIUM FLUORIDE:

TOXICITY

Intraperitoneal (rat) LD50: 31 mg/kg

IRRITATION

Nil Reported

HYDROGEN FLUORIDE:

TOXICITY

Inhalation (human) LCLo: 50 ppm/30 m

Inhalation (man) TCLo: 100 mg/m³/1 m

Inhalation (rat) LC50: 1276 ppm/1 h

IRRITATION

Eye (human): 50 mg - SEVERE

AMMONIUM FLUOROSILICATE:

TOXICITY

Oral (rat) LDLo: 100 mg/kg

IRRITATION

Nil Reported

Section 12 - ECOLOGICAL INFORMATION

Fish toxicity:

Acute (Brachydanio rerio) LC0: 237 mg/l/96h (F Flakes)*

Bacterial toxicity:

Acute (activated sludge micro-organism) EC50: 2394 mg/l (B Flakes)*

Acute (activated sludge micro-organism) EC50: 4184 mg/l (F Flakes)*

Water pollution class (WGK): 1 - slightly hazardous to water*

*[Bayer]

WGK: Classification in accordance with German Water Resources Act.

Refer to data for ingredients, which follows:

AMMONIUM FLUORIDE:

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Section 12 - ECOLOGICAL INFORMATION

Fish LC50 (96hr.) (mg/l): 364

Toxicity Fish: LC50(96)364mg/L

Toxicity invertebrate: LC50(96)75mg/L

HYDROGEN FLUORIDE:

Hazardous Air Pollutant: Yes

Pollutant.

CORROSIVE.

Section 13 - DISPOSAL CONSIDERATIONS

Recycle wherever possible. Consult manufacturer for recycling options.

Consult State Land Waste Management Authority for disposal.

Treat and neutralise at an effluent treatment plant.

Bury residue in an authorised landfill.

Decontaminate empty containers with a lime slurry.

Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE

HAZCHEM: 2X

UNDG:

Dangerous Goods Class: 8

UN Number: 1727

Subrisk:

None

Packing Group:

II

Shipping Name:AMMONIUM HYDROGEN DIFLUORIDE, SOLID

Air Transport IATA:

ICAO/IATA Class: 8

UN/ID Number: 1727

ERG Code: 8L

ICAO/IATA Subrisk:

None

Packing Group:

II

Shipping name:AMMONIUM HYDROGEN DIFLUORIDE, SOLID

Maritime Transport IMDG:

IMDG Class: 8

UN Number: 1727

EMS Number: F- A, S- B

IMDG Subrisk:

None

Packing Group:

II

Shipping name:AMMONIUM HYDROGEN DIFLUORIDE, SOLID

continued...

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Section 15 - REGULATORY INFORMATION

REGULATIONS

ammonium bifluoride (CAS: 1341-49-7) is found on the following regulatory lists;
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals
The Australia Group Export Control List: Chemical Weapons Precursors

No data available for ammonium bifluoride as CAS: 120144-37-8, CAS: 7790-15-0, CAS: 16941-26-7, CAS: 19121-60-9, CAS: 52697-21-9, CAS: 96740-33-9, CAS: 14055-61-9, CAS: 127026-25-9, CAS: 135446-53-6, CAS: 159431-44-4.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
ammonium bifluoride	1341- 49- 7, 120144- 37 - 8, 7790- 15- 0, 16941- 26- 7, 19121- 60- 9, 52697- 21- 9, 96740- 33- 9, 14055- 61- 9, 127026 - 25- 9, 135446- 53- 6, 159431- 44- 4
ammonium fluoride	12125- 01- 8, 16099- 75 - 5, 70786- 97- 9, 102089- 31- 6, 153985- 02- 5, 124633- 37- 0, 357290- 87- 0, 178115- 94- 1, 133332- 88- 4, 161288- 32- 0, 502760- 32- 9, 204322- 87- 2, 15818- 75- 4, 215303- 13- 2
ammonium fluorosilicate	16919- 19- 0, 1309- 32 - 6, 36596- 71- 1, 53238- 22- 5

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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