

Safety Data Sheet



1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **HYDROGEN FLUORIDE ANHYDROUS**

Other name(s): Anhydrous Hydrogen Fluoride; AHF; Anhydrous HF; HF Acid; HF.

Recommended Use of the Chemical and Restrictions on Use Manufacture of chlorofluorocarbons, fluoride chemicals, fluorine gas; Alkylation catalyst.

Supplier: Ixom Operations Pty Ltd
ABN: 51 600 546 512
Street Address: Level 8, 1 Nicholson Street
East Melbourne Victoria 3002
Australia

Telephone Number: +61 3 9906 3000
Emergency Telephone: **1 800 033 111 (ALL HOURS)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Acute Oral Toxicity - Category 2
Acute Dermal Toxicity - Category 1
Acute Inhalation Toxicity - Category 2
Skin Corrosion - Sub-category 1A
Eye Damage - Category 1

SIGNAL WORD: DANGER



Hazard Statement(s):

H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary Statement(s):

Prevention:

P260 Do not breathe mist, vapours, spray.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash hands 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.

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Response:

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P302+P350 IF ON SKIN: Gently wash with plenty of soap and water.
P321 Specific treatment (see First Aid Measures on Safety Data Sheet).
P322 Specific measures (see First Aid Measures on Safety Data Sheet).
P363 Wash contaminated clothing before re-use.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P320 Specific treatment is urgent (see First Aid Measures on this Safety Data Sheet).
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 or doctor/physician.

Storage:

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 Dispose of contents and container in accordance with local, regional, national, international regulations.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Hydrogen fluoride	7664-39-3	100%	H300 H310 H330 H314

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:

Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If victim is conscious, give four 600mg or five 500mg effervescent calcium gluconate tablets. Where calcium gluconate tablets are only available in other active strength levels, the total active concentration should be approximately 2400 - 2500mg. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:

Immediately remove contaminated clothing using PVC gloves and drench the area with water for 1-2 minutes (usually) to remove all acid. Obtain a supply of calcium gluconate gel. Apply calcium gluconate gel (2.5-3%) to and around the contaminated area with gloved fingers. Continued massage with repeated application for 15 minutes after the pain has subsided or until medical treatment is available. For large or severe burns (affecting an area more than 65 cm², approximately half the size of an adult hand) four 600 mg or five 500 mg effervescent calcium gluconate tablets should be given by mouth, and repeated every two hours until hospital admission. Where calcium gluconate tablets are only available in other active strength levels, the total active concentration should be approximately 2400 - 2500 mg. Destroy all contaminated clothing. Seek immediate medical assistance.

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Eye Contact:

Immediately wash in and around the eye area with large amounts of water for at least 15 minutes. Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport promptly to hospital or medical centre.

Ingestion:

Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. If victim is conscious, give four 600 mg or five 500 mg effervescent calcium gluconate tablets. Where calcium gluconate tablets are only available in other active strength levels, the total active concentration should be approximately 2400 - 2500 mg. Never give anything by the mouth to an unconscious patient. Seek immediate medical assistance.

Indication of immediate medical attention and special treatment needed:

Treat symptomatically. Can cause corneal burns. Delayed pulmonary oedema may result. There is a significant risk of low serum calcium and magnesium levels (from systemic fluoride poisoning), resulting in cardiac irregularity, when large areas of skin or inhalation or ingestion are involved. Nasogastric suction with calcium gluconate solution may reduce systemic fluoride toxicity when ingested, although gastrointestinal burns must still be considered. Calcium gluconate gel should continue to be applied to the skin for 15 minutes after the pain has completely subsided. If necrotic tissue forms a barrier it should be excised and the gel massaged into the burns. If burns fail to respond to the calcium gluconate gel, subcutaneous injection of sterile 5% calcium gluconate solution should be considered. Quantity should be based on symptomatic response. Relief of pain is an indication that immediate treatment is successful. Because of this, local anaesthetics are contra-indicated and general anaesthesia should be considered for situations where the skin is tightly adhered to underlying tissue. Exposure of subungual tissue may require the removal of the nail in order to treat adequately.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Not combustible, however, if material is involved in a fire use: Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem or Emergency Action Code: 2XE

Specific hazards arising from the chemical:

Although hydrogen fluoride is non-combustible, its action on metal containers and metal piping can result in the formation of hydrogen, creating a fire and explosion hazard. All potential sources of ignition should be eliminated from areas around such equipment.

Special protective equipment and precautions for fire-fighters:

Decomposes on heating emitting toxic fumes. If safe to do so, remove containers from path of fire. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition. Keep containers cool with water spray.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:

Shut off all possible sources of ignition. Clear area of all unprotected personnel. If contamination of sewers or waterways has occurred advise local emergency services. For large spills notify the Emergency Services.

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Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Work up wind or increase ventilation. **SMALL SPILLS:** Use water only if available in large amounts to rapidly dilute the liquid and suppress most of the vapour released - dilution by a factor of at least fifty fold (particularly for high concentration hydrofluoric acid solutions) is desirable. Neutralise with soda ash, lime or lime slurry and wash down with water.

LARGE SPILLS: Contain - prevent run off into drains and waterways. Spillage should be run off at a controlled rate for dilution as above. A large amount of fume will be given off from the pool of hydrogen fluoride which should be suppressed as far as possible using fog nozzles downwind of the spill. In contained areas such as bunds, cover with polyacrylamide (PAM), to absorb spillage and suppress fumes. 1 part PAM to 2 parts hydrogen fluoride, and leave for at least 30 minutes. If PAM is unavailable, cover with polythene sheeting or cold mineral oil to reduce fumes. In all cases carefully neutralise with soda ash or slaked lime. All water should be added by hose from a safe distance as reaction is exothermic. Wash neutralised solution to drain with excess water.

7. HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:

Avoid skin and eye contact and breathing in vapour, mists and aerosols. Keep out of reach of children. When using do not eat, drink or smoke. Wash hands thoroughly after handling.

Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well ventilated place. Store in mild steel pressure vessels manufactured according to ASME 8 or equivalent code. Regular inspections must take place in accordance with the relevant regulations. Check containers regularly for evidence of blistering. Store away from foodstuffs. Store away from sources of heat or ignition. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for leaks.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Hydrogen fluoride (as F): Peak Limitation = 2.6 mg/m³ (3 ppm)

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

Peak Limitation - a maximum or peak airborne concentration of a particular substance determined over the shortest analytically practicable period of time which does not exceed 15 minutes.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Biological Exposure Indices: Biological Exposure Index (Fluorides): Fluoride in urine = 160umol/L (3 mg/L) (Prior to shift)

Biological Exposure Index (Fluorides): Fluoride in urine = 530umol/L (10 mg/L) (End of shift)

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Appropriate engineering controls:

Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards. Keep containers closed when not in use.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, RUBBER BOOTS, AIR MASK , GLOVES (Long), APRON.

* Not required if wearing air supplied mask.



Wear overalls, chemical goggles, full face shield, elbow-length impervious gloves, splash apron or equivalent chemical impervious outer garment, and rubber boots. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Clear, fuming liquid.
Colour:	Colourless
Odour:	Extremely Pungent
Molecular Formula:	HF
Solubility:	Miscible with water. Releases heat on dilution.
Specific Gravity:	ca. 1.00 @20°C
Relative Vapour Density (air=1):	2.21 @20°C
Vapour Pressure (20 °C):	102.8 kPa
Flash Point (°C):	Not applicable
Flammability Limits (%):	Not applicable
Autoignition Temperature (°C):	Not applicable
Boiling Point/Range (°C):	19.5
pH:	Not available
Freezing Point/Range (°C):	-83

10. STABILITY AND REACTIVITY

Reactivity:	Reacts violently with water. Reacts with metals liberating flammable hydrogen gas.
Chemical stability:	Stable.

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Possibility of hazardous reactions:	Reacts exothermically on dilution with water. Corrosive to metals in the presence of moisture. Corrosive to glass in the presence of moisture.
Conditions to avoid:	Avoid exposure to moisture.
Incompatible materials:	Incompatible with glass , leather , natural rubber , metals , fluorine , arsenic trioxide , carbonates , sulfides , cyanides , alkalis .
Hazardous decomposition products:	Fluorides.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:	Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract. Death may occur if large amounts are ingested.
Eye contact:	A severe eye irritant. Corrosive to eyes; contact can cause corneal burns. Contamination of eyes can result in permanent injury.
Skin contact:	Contact with skin will result in severe irritation. Corrosive to skin - may cause skin burns. Serious skin splashes may cause death.
Inhalation:	Breathing in vapour can result in headaches, dizziness, possible nausea and irritation to the respiratory tract, experienced as nasal discomfort and discharge with chest pain and coughing. Lung edema may occur and these effects may be delayed.

Acute toxicity:

Inhalation LC50 (rat): 1276 ppm/1hr

Inhalation LC50 (mice): 342 ppm/1hr

Chronic effects: Chronic low dose exposure to hydrogen fluoride by inhalation can lead to ulceration and perforation of the nasal septum. Chronic exposure to excessive quantities of gaseous or particulate fluoride results in nausea, vomiting, loss of appetite and diarrhoea or constipation. Fluorosis or other chronic effects may result from significant acute exposures. Hydrogen fluoride is a calcium scavenger binding with calcium in the bloodstream and bones.

12. ECOLOGICAL INFORMATION

Ecotoxicity	Avoid contaminating waterways.
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13. DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of contents and container in accordance with local, regional, national, international regulations.

14. TRANSPORT INFORMATION

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Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.



UN No: 1052
Transport Hazard Class: 8 Corrosive
Subrisk 1: 6.1 Toxic
Packing Group: I
Proper Shipping Name or Technical Name: HYDROGEN FLUORIDE, ANHYDROUS
Hazchem or Emergency Action Code: 2XE

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 1052
Transport Hazard Class: 8 Corrosive
Subrisk 1: 6.1 Toxic
Packing Group: I
Proper Shipping Name or Technical Name: HYDROGEN FLUORIDE, ANHYDROUS
IMDG EMS Fire: F-C
IMDG EMS Spill: S-U

Air Transport

TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

UN No: 1052
Transport Hazard Class: 8 Corrosive
Subrisk 1: 6.1 Toxic
Proper Shipping Name or Technical Name: HYDROGEN FLUORIDE, ANHYDROUS

15. REGULATORY INFORMATION

Classification:

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Acute Oral Toxicity - Category 2
Acute Dermal Toxicity - Category 1
Acute Inhalation Toxicity - Category 2
Skin Corrosion - Sub-category 1A
Eye Damage - Category 1

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**Hazard Statement(s):**

H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2012.

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Reason(s) for Issue:

5 Yearly Revised Primary SDS

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.