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MADRAS FLUORINE PRIVATE LTD

Safety Data Sheet

HYDROFLUORIC ACID

SECTION 1 : CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	**Hydrofluoric Acid**
Synonyms	Fluorohydric acid; fluoric acid; Hydrogen fluoride solution
CAS No	7664-39-3
Molecular Weight	20.01
Chemical Formula	HF in Aqueous Solution
General Use	Chemical Manufacturing

Contact Information	**OFFICE :** **Madras Fluorine Private Ltd** No.71, 4th Main Road Gandhi Nagar, Adyar Chennai 600 020, India E-mail : exim@mfplfluorine.com	**FACTORY** **Madras Fluorine Private Ltd** Express Highway Manali Chennai – 600 068, India
Emergency Telephone No:	**+91 44 2442 6830 / 2442 0654** **MON – FRI : 9.30 AM – 6.00 PM**	**MON – SAT : 9.00 AM – 5.30 PM**

SECTION 2 : HAZARD IDENTIFICATION

Emergency Overview
Form : liquid
Color : colourless
Odor : stinging

Classification of the substance or mixture
Classification of the substance or mixture

Corrosive to metals, Category 1
Acute toxicity, Category 2, Oral
Acute toxicity, Category 2, Inhalation
Acute toxicity, Category 1, Dermal
Skin corrosion, Category 1A
Serious eye damage, Category 1

GHS Label elements, including precautionary statements
Symbol(s) :

Signal word : Danger

Hazard statements : May be corrosive to metals. Fatal if swallowed, in contact with skin or if inhaled
Causes severe skin burns and eye damage.

Precautionary statements :
Prevention:
Keep only in original container.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Do not get in eyes, on skin, or on clothing.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing.
Wear eye protection/ face protection.
Wear respiratory protection.

Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER/doctor.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
Absorb spillage to prevent material damage.

Storage:
Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep only in original container.

Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified
Causes severe burns which may not be immediately painful or visible.
May cause hypocalcemia (depletion of calcium in the body) which may be fatal.
Specialized medical treatment is required for all exposures.

Carcinogenicity
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3 :COMPOSITION/INFORMATION ON INGREDIENT

Ingredient	Hydrogen Fluoride	Water
CAS No	7664-39-3	7732-18-5
Hazardous	Yes	No
Percent	35 – 36% 40 – 41% 50 – 51% 60 – 61% 70 – 71%	65 – 64% 60 – 59% 50 – 49% 40 – 39% 30 – 29%

SECTION 4 : FIRST AID MEASURES

For any route of contact: Detailed First Aid procedure should be planned before beginning work with HF.

Inhalation:
Get medical help immediately. If patient is unconscious, give artificial respiration or use inhalator. Keep patient warm and resting, and send to hospital after first aid is complete.

Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:
1) Remove the victim from the contaminated area and immediately place him under a safety shower or wash him with a water hose, whichever is available
2) Remove all contaminated clothing. Handle all HF-contaminated material with gloves made of appropriate material, such as PVC or neoprene
3) Keep washing with large amounts of water for a minimum of 15 minutes
4) Have someone make arrangements for medical attention while you continue flushing the affected area with water
5) If the following materials are available, limit the washing to five minutes and immerse the burned area in a solution of 0.2% iced aqueous Hyamine 1622 or 0.13% iced aqueous Zephiran Chloride. If immersion is not practical, towels should be soaked with one of the above solutions and used as compresses for the burn area. Ideally compresses should be changed every 2 minutes. Alternately, 2.5% calcium gluconate gel should be massaged into the affected area.
6) Seek medical attention as soon as possible for all burns regardless of how minor they may appear initially. .

Eye Contact:
1) Irrigate eyes for at least 30 minutes with copious quantities of water, keeping the eyelids apart and away from eyeballs during irrigation
2) Get competent medical attention immediately, preferably an eye specialist
3) If a physician is not immediately available, apply one or two drops of ophthalmic anesthetic, (e.g., 0.5% Pontocaine Hydrochloride solution)
4) Do not use oily drops, ointment or HF skin burn treatments. Place ice pack on eyes until reaching emergency room.

Note to Physician:
General: For burns of moderate areas, (greater than 8 square inches), ingestion and significant inhalation exposure, severe systemic effects may occur, and admission to a critical care unit should be considered. Monitor and correct for hypocalcemia, cardiac arrhythmias, hypomagnesemia and hyperkalemia. In some cases renal dialysis may be indicated.

Inhalation: Treat as chemical pneumonia. Monitor for hypocalcemia, 2.5% calcium gluconate in normal saline by nebulizer or by IPPB with 100% oxygen may decrease pulmonary damage. Bronchodilators may also be administered.

Skin: For deep skin burns or contact with concentrated HF (over 50%) solution, consider infiltration about the affected area with 5% calcium gluconate [equal parts of 10% calcium gluconate and sterile saline for injection]. Burns beneath the nail may require splitting the nail and application of calcium gluconate to the exposed nail bed. For certain burns, especially of the digits, use of intra-arterial calcium gluconate may be indicated.

Eyes: Irrigation may be facilitated by use of Morgan lens or similar ocular irrigator, using 1% aqueous calcium gluconate solution [50ml of calcium gluconate 10% in 500 ml normal saline].

An Alternative First Aid Procedure: The effect of HF, i.e. onset of pain, particularly in dilute solutions, may not be felt for up to 24 hours. It is important, therefore, that persons using HF have immediate access to an effective antidote even when they are away from their work place in order that first aid treatment can be commenced immediately.

We recommend that any person in contact with HF should carry, or have access to a tube of HF Antidote Gel at all times; ideally with one tube at the work place, one on the person and one at home. It is imperative that any person who has been contaminated by HF should seek medical advice when the treatment by HF Antidote Gel has been applied.

SECTION 5 : FIRE-FIGHTING MEASURES

Fire:
Not considered to be a fire hazard. Fire may produce poisonous or irritating gases.

Explosion:
Violent exothermic reaction occurs with water. Sufficient heat may be produced to ignite combustible materials. Reacts with metals forming flammable Hydrogen gas.

Fire Extinguishing Media:

Keep upwind of fire. Use water or carbon dioxide on fires in which Hydrofluoric Acid is involved. Halon or foam may also be used. In case of fire, the sealed containers can be kept cool by spraying with water.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Avoid getting water in tanks or drums; water can cause generation of heat and spattering. In contact with air, the acid gives off corrosive fumes which are heavier than air.

SECTION 6 : ACCIDENTAL RELEASE MEASURES

Notify safety personnel, provide adequate ventilation, and remove ignition sources since hydrogen may be generated by reactions with metals. Wear appropriate personal protective equipment as specified in Section 8. Do not flush to sewers or waterways. Spills: Evacuate the danger area. Apply magnesium sulfate (dry) to the spill area. Follow up with inert absorbent and add soda ash or magnesium oxide and slaked lime. Collect in appropriate plastic containers and save for disposal. Wash spill site with soda ash solution.

NOTE: Porous materials (concrete, wood, plastic) will absorb HF and become a hazard for an indefinite time. Such spills should be cleaned and neutralized immediately. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

SECTION 7 : HANDLING AND STORAGE

Keep in tightly closed polyethylene containers. Store in a cool, dry place with adequate ventilation separated from other chemicals. Protect from physical damage. Storage facilities should be constructed for containment and neutralization of spills. Handling and storage of HF requires special materials and technology for containers, pipes, valves, etc., which is available from suppliers. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

SECTION 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits:
Hydrogen fluoride:
OSHA Permissible Exposure Limit (PEL) : 3 ppm (TWA) as F.
ACGIH Threshold Limit Value (TLV) : 0.5 ppm (TWA) as F; 2 ppm (STEL) Ceiling as F

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres. Since the IDLH is low (30 ppm), the above cartridge system is not specifically approved for HF. (3M Respirator Selection Guide)

Skin Protection:
Wear protective clothing, including boots or safety shoes with polyvinyl chloride (PVC) or neoprene. Use chemical goggles and/or a full face shield. Wear coveralls with long sleeves, gauntlets and gloves of PVC or neoprene. A high degree of protection is obtained with an air-inflated suit with mask and safety belt. Use protection suitable for conditions.

Eye Protection:
Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities in work area.

SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

Appearance	**:** Colorless, fuming liquid.
Odor	**:** Acrid odor. Do not breathe fumes.
Solubility	**:** Infinitely soluble.
Specific Gravity	**:** 1.15 -1.18
pH	**:** 1.0 (0.1M solution)
% Volatiles by volume @ 21C (70F)	**:** 100 (as water and acid)
Boiling Point	**:** 108C (226F)
Melting Point	**:** < -36C (< -33F)
Vapor Density (Air=1)	**:** 1.97
Vapor Pressure (mm Hg)	**:** 25 @ 20C (68F)
Evaporation Rate (BuAc=1)	**:** No information found.

SECTION 10 : STABILITY AND REACTIVITY

Stability:
Stable at room temperature (68F) when stored and used under proper conditions.

Hazardous Decomposition Products:
On contact with metals, liberates hydrogen gas. On heating to decomposition, could yield toxic fumes of fluorides. Attacks glass and other silicon containing compounds. Reacts with silica to produce silicon tetrafluoride, a hazardous colorless gas.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Hydrofluoric acid is incompatible with arsenic trioxide, phosphorus pentoxide, ammonia, calcium oxide, sodium hydroxide, sulfuric acid, vinyl acetate, ethylenediamine, acetic anhydride, alkalis, organic materials, most common metals, rubber, leather, water, strong bases, carbonates, sulfides, cyanides, oxides of silicon, especially glass, concrete, silica, fluorine. Will also react with steam or water to produce toxic fumes.

Conditions to Avoid:
Moisture and incompatibles.

SECTION 11 : TOXICOLOGICAL INFORMATION

Acute oral toxicity	: Acute toxicity estimate: 7.14 mg/kg Method: Calculation method
Acute inhalation toxicity	: Acute toxicity estimate: 0.76 mg/l , vapour Exposure time: 4 h Method: Calculation method
Acute dermal toxicity	: Acute toxicity estimate: 7.14 mg/kg Method: Calculation method
Skin irritation Hydrofluoric acid	: Species: Rabbit Classification: Corrosive Method: OECD

Further information :
Note: Causes severe burns which may not be immediately painful or visible.The potential delay in clinical signs or symptoms for dilute solutions is given below.

HF Concentration (Delay in Symptoms)
>50% (Immediately Apparent)
20%-50% (1-8 hours)
0%-20% (Up to 24 hours)Symptoms might include pain, redness of the skin and possible tissue destruction.Hydrofluoric Acid will penetrate skin and attack underlying tissues.May cause hypocalcemia (depletion of calcium in the body) which may be fatal.Chronic exposure to fluoride has been reported to result in tooth mottling in children, bone fluorosis, and sometimes osteosclerosis in adults and children.

SECTION 12 : ECOLOGICAL INFORMATION

Environmental Fate:
If the pH is > 6.5, soil can bind fluorides tightly. High calcium content will immobilize fluorides, which can be damaging to plants when present in acid soils.

Environmental Toxicity:
This material is expected to be slightly toxic to aquatic life. 60 ppm/*/Fish/Lethal/Fresh Water *=time period not specified. > 300ppm/48hr./Shrimp/LC50/Aerated Saltwater

SECTION 13 : DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 14 : TRANSPORT INFORMATION

Domestic (Land, D.O.T.)

Proper Shipping Name : RQ, HYDROFLUORIC ACID (WITH NOT MORE THAN 60% STRENGTH)
Hazard Class : 8, 6.1
UN/NA : UN1790
Packing Group : II

International (Water, I.M.O.)

Proper Shipping Name : HYDROFLUORIC ACID (WITH NOT MORE THAN 60% STRENGTH)
Hazard Class : 8, 6.1
UN/NA : UN1790
Packing Group : II

SECTION 15 : REGULATORY INFORMATION

Chemical Inventory Status - Part -1

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Fluoride (7664-39-3)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

Chemical Inventory Status - Part 2

	--Canada--			
Ingredient	Korea	DSL	NDSL	Phil
Hydrogen Fluoride (7664-39-3)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

Federal, State & International Regulations - Part 1

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Hydrogen Fluoride (7664-39-3)	100	100	Yes	No
Water (7732-18-5)	No	No	No	No

Federal, State & International Regulations - Part 2

	-RCRA-	-TSCA-	
Ingredient	CERCLA	261.33	8(d)
Hydrogen Fluoride (7664-39-3)	100	U134	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: Yes TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: S7
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

SECTION 16 : OTHER INFORMATION

NFPA Ratings: Health: **4** Flammability: **0** Reactivity: **1**

Label Hazard Warning:
Poison Danger Corrosive, extremely hazardous liquid and vapor, causes severe burns which may not be immediately painful of visible. May be fatal if swallowed or inhaled. Liquid and vapor can burn skin, Eyes and respiratory tract. Causes bone damage. Reaction with certain metals generates flammable and potentially explosive hydrogen gas.

Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Cool before opening.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.

Label First Aid:

IN ALL CASES, CALL PHYSICIAN IMMEDIATELY. First Aid procedures should be pre-planned for HF emergencies. A supply of 50:50 water/magnesium sulfate paste or 2 1/2% Calcium Gluconate paste should be available where first aid medications are administered. If ingested, DO NOT INDUCE VOMITING. If patient is conscious, give large quantities of milk or water and send to hospital. If inhaled and patient is unconscious, giveartificial respiration or use inhalator and send to hospital. In case of eye contact, wash open eyes with large but gentle stream of water for 15 minutes. Place ice pack on eyes until reaching emergency room. In case of skin contact, remove contaminated clothing and wash burn area with plenty of water to remove acid. Cover burn area with a poultice of 50:50 water/magnesium sulfate paste or 2 1/2% calcium gluconate paste. Leave in place until medical help arrives or patient is transferred to hospital.

Product Use:
Laboratory Reagent.

Disclaimer:

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