Mallinckrodt
Material Safety Data

Mallinckrodt, Inc., Science Products Division, P.O. Box M, Paris, KY 43061.

Emergency Phone Number: 314-982-5000

HYDROFLUORIC ACID (10-48%)

PRODUCT IDENTIFICATION:

Synonyms: Fluorohydric acid; fluoric acid

Formula CAS No.: 7664-39-3

Molecular Weight: 20.01

Chemical Formula: HF in Aqueous Solution.

Hazardous Ingredients: Not applicable.

PRECAUTIONARY MEASURES

DANGER! HAZARDOUS LIQUID AND VAPOR. CAUSES SEVERE BURNS WHICH MAY NOT BE IMMEDIATELY PAINFUL OR VISIBLE.

Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Cool before opening.

EMERGENCY/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, give artificial 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.
SEE SECTION 5.

DOT Hazard Class: Corrosive Material

SECTION 1 Physical Data

Appearance: Clear, colorless liquid.

Odor: Acrid odor. Do not breathe fumes.

Solubility: Infinitely soluble.

Boiling Point: ca. 104-108°C (219-226°F).

Melting Point: ca. -11 to -36°C (12 to-33°F).

Specific Gravity: 1.17-1.18

Vapor Density (Air=1): No information found.

Vapor Pressure (mm Hg): No information found.

Evaporation Rate: No information found.

SECTION 2 Fire and Explosion Information

Fire:
Not considered to be a fire hazard.

Explosion:
Reacts with metals forming flammable gas (Hydrogen).

Fire Extinguishing Media:
Keep upwind of fire. Use water or carbon dioxide on fires in which Hydrofluoric Acid is involved. 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 3 Reactivity Data

Stability:
Stable at room temperature (68°F) 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 reduce silicon tetrafluoride, a hazardous colorless gas.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Arsenic trioxide, phosphorus pentoxide, ammonia, calcium oxide, sodium hydroxide, sulfuric acid, vinyl acetate, ethylenediamine, acetic anhydride. Will also react with steam or water to produce toxic fumes.

SECTION 4 Leak/Spill Disposal Information

Notify safety personnel, provide adequate ventilation, and remove ignition sources since hydrogen may be generated by reactions with metals. Use protective clothing and equipment. 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 (acid spill tamer) and add soda ash or magnesium oxide and slaked lime. Containerize in plastic materials and save for disposal. Wash spill site with soda ash solution. Disposal: The neutralized slurry can be scraped up for disposal in a RCRA approved waste facility. NOTE: Porous materials (concrete, wood, plastic, etc.) will absorb HF and become a hazard for an indefinite time. Such spills should be cleaned and neutralized immediately. Reportable Quantity (RQ)(CWA/CERCLA): 100 lbs. ca. 200 lbs. product.

Ensure compliance with local, state and federal regulations.

SECTION 5 Health Hazard Information

A. EXPOSURE / HEALTH EFFECTS

Inhalation:
Severely corrosive to the respiratory tract. May cause sore throat, coughing, labored breathing and lung congestion/inflammation.

Ingestion:
Corrosive. May cause sore throat, abdominal pain, diarrhea, vomiting, and severe burns of the digestive tract.

Skin Contact:
Corrosive to the skin. Skin contact causes serious skin burns which may not be immediately apparent or painful. Symptoms may be delayed 8 hours or longer. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone.

Eye Contact:
Corrosive to the eyes. Symptoms of redness, pain, blurred vision, and permanent eye damage may occur.

Chronic Exposure:
Intake of more than 6 mg of fluorine per day may result in fluorosis. Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream.

Aggrevation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, or impaired kidney or respiratory function may be more susceptible to the effects of this substance.

B. FIRST AID

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:
DO NOT INDUCE VOMITING because of probable severe burns. If patient is conscious, give large quantities of milk or, if not available, water. Send to hospital immediately.

Skin Exposure:
Get medical help immediately. Remove contaminated clothing and immediately wash skin with plenty of water to remove acid. Without delay, cover the burn with a generous amount of 50:50 water/magnesium sulfate paste or a 2-1/2% calcium gluconate paste. (Mix calcium gluconate U.S.P. powder with Unibase, a Parke-Davis water soluble ointment.) Keep this poultice in place until medical help arrives or patient has been transferred to hospital emergency room.

Eye Exposure:
Get medical help immediately. Wash open eyes thoroughly with large but gentle stream of water for 15 minutes. Do not use oily drops or ointment. Place ice pack on eyes until reaching emergency room.

C. TOXICITY DATA (RTECS, 1982)

Inhalation rat LC50: 1276 ppm/1H. Mutation references cited. Reproductive References cited.

SECTION 6 Occupational Control Measures

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
3 ppm (TWA).
-ACGIH Threshold Limit Value (TLV):
3 ppm (TWA); 6 ppm (STEL)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. 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 PEL is exceeded, wear a supplied air, full face-piece respirator, airlined hood, or self-contained breathing apparatus.

Skin Protection:
Wear protective clothing, including boots or safety shoes with polyvinyl chloride (PVC), neoprene or composition soles; chemical goggles and/or a full face shield; 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. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick drench facilities in work area.

SECTION 7 Storage and Special Information

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.

TRANS

MATERIAL SAFETY DATA SHEET

Ashland Chemical Co.

Date Prepared: 12/10/97
Date Printed: 01/23/99
MSDS No: 308.0025481-006.004

HYDROFLUORIC ACID CR

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: HYDROFLUORIC ACID CR
Product Code: 3471230
General or Generic ID: INORGANIC ACID

Company
Ashland Chemical Co.
P.O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
WATER	7732-18-5	49.0- 53.0
HYDROFLUORIC ACID	7664-39-3	49.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.

Skin
Both the liquid and vapor can cause severe burns which may not be immediately painful or visible.

Swallowing
Swallowing this material may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

Inhalation
Breathing of vapor or mist is possible. Breathing this material may be harmful or fatal. Symptoms may include severe irritation and burns to the nose, throat, and respiratory tract.

Symptoms of Exposure
No data

Target Organ Effects
Repeated, prolonged overexposure to inorganic fluoride compounds may result in increased bone density, fluorosis, digestive disturbances, loss of weight, anemia, and diseases of the teeth.

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Developmental Information
No data

Cancer Information
No data

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact.

4. FIRST AID MEASURES

Eyes
If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.

Skin
Immediately flush contaminated skin with large quantities of cool water for at least 15 minutes. Remove contaminated clothing. As soon as possible apply 2.5% calcium gluconate gel to all affected skin areas. The gel should be massaged into the affected skin by personnel wearing protective gloves to prevent skin contamination during first aid. Alternatively, affected areas may be soaked in either iced 0.2% water solution of Hyamine 1622 or iced 0.13% water solution of Zephiran chloride. If Hyamine 1622 or Zephiran chloride solutions are not available, use an iced saturated water solution of magnesium sulfate (Epsom salts), or if that is not available, iced 70% alcohol or ice water. Get medical attention as soon as possible. :::NOTE:::Calcium gluconate gel can be prepared by mixing a 10 milliliter ampule of calcium gluconate with a 2-ounce tube of K-Y jelly (Johnson & Johnson). After a jar of this mixture has been opened and used it should be discarded to prevent bacterial or chemical contamination. If Hyamine or Zephiran solutions are used, they should be prepared in advance and kept in a refrigerator in the first aid area.

Swallowing
Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended. Several glasses of milk may also be given. The calcium in milk and the magnesium in milk of magnesia will act as an antidote in cases of hydrofluoric acid ingestion.

Inhalation
If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Note to Physicians
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), Exposure to this material may aggravate any preexisting condition sensitive to a decrease in available oxygen, such as chronic lung disease, coronary artery disease or anemias.

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5. FIRE FIGHTING MEASURES

Flash Point
Not applicable

Explosive Limit
Not applicable

Autoignition Temperature
No data

Hazardous Products of Combustion
May form: acid vapors, hydrogen fluoride.

Fire and Explosion Hazards
No data

Extinguishing Media
water fog.

Fire Fighting Instructions
Water may be used to keep fire-exposed containers cool until fire is out. Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 4, Flammability - 0, Reactivity - 2

6. ACCIDENTAL RELEASE MEASURES

Small Spill
Cover the contaminated surface with sodium bicarbonate or a soda ash/flaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry and wash site with soda ash solution. Proper mixing procedures are essential. Trained personnel should conduct this procedure. Untrained personnel should be removed from the spill area.

Large Spill
Persons not wearing protective equipment should be excluded from area of spill until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump to salvage tank.

7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Addition to water releases heat which can result in violent boiling and spattering. Always add slowly and in small amounts. Never use hot water. Never add water to acids. Always add acids to water.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles and face shield (8" min.) in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your industrial hygienist.)

Skin Protection
Wear resistant gloves such as: neoprene, polyvinyl chloride, To prevent skin contact, wear impervious clothing and boots..

Respiratory Protections
If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Exposure Guidelines
Component

WATER (7732-18-5)
No exposure limits established

HYDROFLUORIC ACID (7664-39-3)
OSHA VPEL 3.000 ppm - TWA as F
OSHA VPEL 6.000 ppm - STEL as F
ACGIH TLV 3.000 ppm - Ceiling as F

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
(for product) 227.0 F (108.3 C) @ 760 mmHg

Vapor Pressure
(for product) 10.000 mmHg @ 68.00 F

Specific Vapor Density
.070 @ AIR=1

Specific Gravity
1.176 @ 68.00 F

Liquid Density
9.800 lbs/gal @ 68.00 F
1.176 kg/l @ 20.00 C

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Percent Volatiles
100.0 %

Evaporation Rate
> 1.00 (ETHER)

Appearance
No data

State
LIQUID

Physical Form
HOMOGENEOUS SOLUTION

Color
CLEAR & COLORLESS

Odor
No data

pH
No data

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: acid vapors, hydrogen fluoride.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: organic materials, strong alkalies, Acid reacts with most metals to release hydrogen gas which can form explosive mixtures with air..

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information
Collect and add slowly to large volume of agitated solution of soda ash and slaked lime. Add neutralized solution to excess running water in accordance with applicable regulations.

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14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:
HYDROFLUORIC ACID, SOLUTION,8,UN1790,II

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101

Product Quantity (lbs)	Component
204	HYDROGEN FLUORIDE

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4(a)

Component	RQ (lbs)
HYDROGEN FLUORIDE	100

CERCLA RQ - 40 CFR 302.4(b)
Materials without a "listed" RQ may be reportable as an "unlisted hazardous substance". See 40 CFR 302.5 (b).

SARA 302 Components - 40 CFR 355 Appendix A

Section 302 Component(s)	TPQ (lbs)	RQ (lbs)
HYDROGEN FLUORIDE	100	100

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed( ) Fire( ) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65

Section 313 Component(s)	CAS Number	%
HYDROGEN FLUORIDE	7664-39-3	49.00

International Regulations

Inventory Status
Not determined

State and Local Regulations

California Proposition 65
None

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New Jersey RTK Label Information
HYDROGEN FLUORIDE 7664-39-3

Pennsylvania RTK Label Information
HYDROFLUORIC ACID 7664-39-3

16. OTHER INFORMATION