

# Hydrofluoric Acid Overview



The information presented in this overview is intended to provide general guidance regarding the hazards associated with hydrofluoric acid. It is not intended to be a specific written safety procedure for your laboratory. Specific written procedures are the responsibility of the Principle Investigator. If you have questions concerning the applicability of any item listed in this overview, contact Risk Management & Safety (RMS) or the Principal Investigator of your laboratory.

Hydrofluoric acid (HF), a solution of hydrogen fluoride gas in water, is one of the most corrosive and dangerous chemicals encountered in the laboratory. Exposure to HF can cause severe tissue damage and even death. Deaths have been reported from concentrated acid burns (i.e., 50% or stronger solutions) to as little as 2.5% Body Surface Area. In lower concentrations, symptoms may be delayed. The following special safety precautions are necessary when using this chemical.

## **Background on HF**

HF is absorbed quickly; however, damage/symptoms can occur hours to days later. Any person exposed to HF must have immediate first aid, followed by immediate medical treatment from a physician. When seeking medical attention bring a copy of the HF Safety Data Sheet to the Emergency Room. As always, if you need emergency assistance, call 911.

## **Hazard Assessment**

Not all risks can be eliminated from work with hazardous chemicals, but through informed risk assessment and careful risk management, laboratory safety is greatly enhanced. Do not begin work with a HF unless you have been adequately trained in the proper handling and emergency procedures.

Safety Considerations when working with HF:

- HF should be manipulated in a properly working chemical fume hood.
- HF is corrosive to metals and tissue. It is highly toxic by ingestion and inhalation. Exposure to fumes or very short contact with HF may cause severe burns to tissue.
- HF easily dissolves glass and can attack enamels, pottery, concrete, rubber, leather, many metals and organic compounds. HF may react with certain metals generating flammable hydrogen gas.
- DO NOT use vermiculite to absorb spills. It can cause a reaction, which may result in the generation of toxic gases.

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## Health & Safety Training:

- Lab personnel must be trained on the hazards of HF, safety precautions, and emergency procedures. A lab specific emergency response plan must be developed and reviewed with each lab occupant before they can work with HF.

## Protective Apparel

- Lab coats, closed toed shoes, and long pants should be worn when working with HF. A Neoprene long-sleeve apron should be worn if splash/spray is possible. Plan operations to eliminate risk of HF splash/ spray.
- Butyl rubber or neoprene gloves should be worn when working with HF. Lab personnel should contact RMS for advice on chemical resistant glove selection when prolonged contact with hazardous chemicals is anticipated. Consult the [glove chart](#) for more information on glove selection. The glove manufacturer can also be consulted for suitability of a particular glove.
- Researchers should assess the risks associated with an experiment and use the appropriate level of eye protection. Chemical splash goggles and a face shield should be worn when working with HF.

## Emergency Procedure

Always remember that HF is unique and exposure can be result in serious injury or death.

- Know who to Contact - (911, RMS, and the Principal investigator of the laboratory including evening phone number)
- Know the location of all safety equipment (showers, eye wash, fire extinguishers, etc.)  
Click [here](#) for more information on Safety Showers and Eyewashes.

## Chemical Spills:

Large Spills: If > 500 mL is spilled outside of a chemical hood: Evacuate the area, close doors, and notify PI immediately. RMS can be reached at 334-703-7511. Post signs to prevent others from accessing the area.

Small spills: If < 500 mL and inside a chemical fume hood can be contained (if safe to do so) by carefully neutralization the spill with any of the following: dry magnesium sulfate, calcium carbonate, calcium hydroxide or a commercial HF spill kit. Never use Vermiculite for HF spills.

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## Personnel Exposures

**Note:** calcium gluconate must be readily available when working with HF.

First Aid Procedures and First Aid Kits:

- Post AU HF First Aid Procedures in labs that keep or use HF gas or solutions
- First aid kit must contain calcium gluconate gel for use in emergencies.
  - 2.5% calcium gluconate gel can be purchased through many lab safety supply vendors.
  - Ensure gel is intended for HF “dermal exposures” and has an effective shelf life of at least one year.
  - Create a system to refresh your supply of gel before the expiration date.

### Skin Exposure:

The following first aid procedures shall be initiated for skin contact:

1. Immediately proceed to the nearest emergency shower and flush affected area for at least 15 minutes;
2. Remove all contaminated clothing while in the shower;
3. Apply calcium gluconate gel to the burn site as soon as possible;
4. Seek medical assistance.

***Those who assist HF victims must be wear proper PPE to avoid contaminating themselves***

### Eye Exposure:

1. Immediately flush eyes with water for at least 15 minutes under emergency eyewash or other water source. If only one eye is affected, be careful not to flush contaminated water into the other eye.
2. Seek medical attention

**Inhalation:** Inhalation exposure does not always present symptoms. If you have been suspect you may have been exposed, you should seek medical assistance immediately.

### Ingestion:

1. Rinse mouth with cold water. Do not induce vomiting.
2. If the victim is conscious, have them drink lots of water to dilute the acid. Seek medical attention.

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## Handling Precautions

### Work Practices:

- Label work area with sign: "HF Use Area."
- Work in a fume hood with the sash opening minimized— sash must not be opened beyond the stickered arrow.
- Avoid using glass, metal, and ceramic containers. HF will etch and degrade glass. Use only containers that are chemically compatible, such as polyethylene or Teflon.
- Store HF on lower shelving and according to chemical compatibility.

### Safety Equipment:

- ANSI recommends that the emergency equipment can be reached in no more than 10 seconds and range in distance from 50-100 feet. If using a highly corrosive chemical, the emergency shower and eyewash station should be within 10- 20 feet of the hazard.
- Ensure chemical fume hood has been certified within the last 12 months (check sticker on fume hood).

## Labels

**Post these first aid instructions in the room where the hydrofluoric acid is used or handled.**

### Location of Calcium Gluconate Gel

Building and Room: \_\_\_\_\_

Exact Location in Room: \_\_\_\_\_