



Requirements for Use of Hydrogen Fluoride Gas and Hydrofluoric Acid

Hydrogen Fluoride (HF) is a colorless fuming gas or liquid. In its liquid state it's called Hydrofluoric Acid. Acute and chronic exposure to both gaseous and liquid HF can have very serious and life threatening health effects. HF will penetrate the skin and attack the underlying tissues and bone, possibly with fatal results. The full extent of damage may not exhibit itself until hours after the exposure. Therefore, all laboratory personnel who work with Hydrogen Fluoride gas or Hydrofluoric Acid must implement the procedures and laboratory design requirements shown below.

IF YOU ARE EXPOSED TO HF GAS, SEEK IMMEDIATE CARE AT THE NEAREST HOSPITAL EMERGENCY ROOM. FOR CONTACT WITH HF ACID, FLUSH WITH LARGE AMOUNTS OF COLD WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING. APPLY CALCIUM GLUCONATE GEL AND SEEK IMMEDIATE EMERGENCY MEDICAL ATTENTION.

I. HYDROGEN FLUORIDE GAS

Contact EH&S prior to obtaining HF gas. EH&S must review and pre-approve experimental and research protocols (see "Questionnaire for Use of Hydrogen Fluoride Gas and Hydrofluoric Acid").

Laboratory Information Required

1. A completed Experimental Protocol outlining proposed use of HF gas. Protocol must include details such as:
 - a. HF gas quantities, concentration, pressure, temperature, flow rate, etc.
 - b. Personal Protective Equipment (see attached HF PPE Chart) - gloves, eye/face protection, etc.
 - c. Engineering Controls - fume hood, gas cabinet, special exhaust device, alarm monitoring system, etc.
 - d. Safe Handling Requirements - routine leak detection, emergency evacuation procedure in case of accidental release/exposure, location of emergency shower and eye/face wash unit(s), location of calcium gluconate gel, posted emergency room contact phone numbers, etc.
2. A complete laboratory Chemical and Gas Inventory is required to determine if incompatibilities exist for ventilation and storage needs.

Storage and Engineering Requirements

1. Maximum quantity of HF gas allowed will be determined on a case by case basis for each Experimental Protocol.
2. HF gas cylinders must be stored in an approved vented gas cylinder cabinet with a HF alarm sensor that will detect an immediate HF release.
 - a. Alarm monitoring system should be easy to calibrate by Laboratory User(s).



- b. Alarm monitoring system should have battery back-up in case of power outage.
3. EH&S and Facilities Management will conduct a code review to determine additional Engineering Control requirements. Controls may include, but not be limited to, fume hood or other ventilation containment, room pressurization, duct work and exhaust fan(s), exhaust scrubbers, system alarms, placarding, etc.

Personal Protective Equipment (PPE) & Safe Handling Requirements

1. Emergency shower and eye/face wash unit(s) may be required. Flush and assure their proper operation at least weekly.
2. Experimental Protocols and Material Safety Data Sheets must be posted in visible, prominent locations in the lab. All laboratory personnel must be trained on Experimental Protocols.
3. 2.5% calcium gluconate gel must be immediately available in Lab. EH&S can provide this gel at a reasonable cost.

II. HYDROFLUORIC ACID

Contact EH&S prior to purchase of HF acid. EH&S must review and pre-approve experimental and research protocols (see "Questionnaire for Use of Hydrogen Fluoride Gas and Hydrofluoric Acid").

Laboratory Information Required

1. A completed Experimental Protocol outlining proposed use of HF acid. Protocol must include details such as:
 - a. HF quantities, concentration, temperature, etc.
 - b. Personal Protective Equipment (see attached HF PPE Chart) - gloves, eye/face protection, etc.
 - c. Engineering Controls - fume hood, special exhaust device, alarm monitoring system, etc.
 - d. Safe Handling Requirements - routine check of HF container(s) for leaks, emergency evacuation procedure in case of accidental release/exposure, location of emergency shower and eye/face wash unit(s), location of calcium gluconate gel, posted emergency room contact phone numbers, etc.
2. A complete laboratory Chemical and Gas inventory is required to determine if incompatibilities exist for ventilation and storage needs.

Storage and Engineering Requirements

1. Maximum quantity of HF acid allowed will be determined on a case by case basis for each experimental protocol.
2. HF acid container(s) are required to be stored in an approved vented corrosive cabinet.
3. EH&S and Facilities Management will conduct a code review to determine additional Engineering Control requirements. Engineering Controls may include, but not limited to, fume hood or other ventilation



containment, room pressurization, duct work and exhaust fan(s), exhaust scrubbers, system alarms, placarding, etc.

Personal Protective Equipment (PPE) & Safe Handling Requirements

- 1. Emergency shower and eye/face wash unit(s) may be required. Flush and assure their proper operation at least weekly.
2. Experimental Protocols and Material Safety Data Sheets must be posted in visible, prominent locations in the lab. All laboratory personnel must be trained on Experimental Protocols.
3. 2.5% calcium gluconate gel must be immediately available in Lab. EH&S can provide this gel at a reasonable cost.

* All PPE Listed Below Has Been Rated For 48% HF, Unless Otherwise Noted

GLOVES:

Table with 4 columns: Manufacturer, Product Name/Material(s), Degradation Rating, Vendor(s). Lists various glove types like Nitrile, Neoprene, PVC, and Butyl from manufacturers like Stansolv, Stanzoil, Pylox, Silver Shield, 4H Gloves, Ansell, etc.

APRONS:

Table with 4 columns: Manufacturer, Product Name/Material(s), Resistance Rating, Vendor(s). Lists apron materials like Nitrile/PVC Blend, Neoprene, Rubber, and Vinyl (PVC) from manufacturers like Hycar, Ansell, FisherBrand, etc.