

**STANDARD OPERATING PROCEDURE**

**Hydrofluoric Acid (HF)**

According to the Safety Data Sheet (SDS) for **Hydrofluoric Acid** special precautions must be taken when working with this chemical. Below are some of the characteristics of **Hydrofluoric Acid** followed by some recommendations in handling the chemical and finally any paperwork needed in order to use the chemical in the laboratory. This Standard Operating Procedure will be followed along with the requirements of the Chemical Hygiene Plan.

GHS Classifications: **Signal Word: Danger**

 **Pictograms: Acute Toxicity and Corrosive Toxicity**

Additional Classification: **Department of Homeland Security (DHS) Chemical of Interest if 50% concentration or higher**

Brief description of proposed chemical work: **Hydrofluoric Acid has a number of chemical, physical and toxicological properties that make handling this material particularly hazardous. HF is used for, among other thing, a glass etchant, a cleaning agent and as a dissolving agent for rock.**

**Section 1:Brief Safety Overview:**

● The Principal Investigator is responsible for training employees using the material on site. The training should include a discussion of the known and potential hazards; an explanation of the relevant policies, techniques and procedures including the proper use of personal protective equipment, emergency/spill procedures and containment equipment (engineering controls).

● Limit access to authorized users.

● Minimize the possibility of inadvertent ingestion, inhalation and direct skin or eye contact with the substance.

● Chemical has been entered in the Chemical Inventory (EHS Assistant)

● Require annual training.

**Section 2: Research Laboratory Procedures**

* **Handling Instructions**

Example: (Preparation of the stock solutions): **Preparation can depend upon the laboratory practices. Proper laboratory procedure must be followed and employees must be trained to handle the material. An SOP is required for the use of HF in the laboratory and should be based on the quantities used and concentrations. Employees must take the HF training which is available on the Environmental Health and Safety Website.**

* **Storage:**

 **Corrosives attack and corrode metals including non-rated cabinets when being stored. EHS recommends that you store corrosives in a corrosives cabinet. When acid attacks metal, hydrogen gas is often emitted which is flammable when an ignition source is present. Corrosives should never be stored above eye level. Segregate acids and bases when in storage. Segregate HF away from glass, ceramics, concrete, alkali materials, metals, leather, common metals, carbonates, sulfides, and cyanides, oxides of silicon, ignition sources and fluorine. Reacts violently with some additional chemicals which are listed on the Material Safety Data Sheets. Chemical containers must be closed and labeled. HF should be stored in a secondary container.**

* **Extra Precautions:**

**A sign should be posted when HF is being used in the laboratory. An HF first aid kit is recommended for immediate use in the laboratory. Contents of the HF first aid kit can be found in the HF training on the EHS website.**

***Location – Engineering controls***

[x]  Ventilation (example: Fume Hood, Canopy Hoods, etc.): **Fume Hood.**

[x]  Designated area (specify): **Fume Hood**

***PPE required:***

[x]  Skin/Body Protection (example: Lab Coat) **Laboratory Coat and rubber apron**

[x]  Eye protection

[ ]  Face shield

[ ]  Respirator (example: N95):

[x]  Hand protection (example: Nitrile gloves): **Butyl or Neoprene rubber gloves**

* **Cleanup/Decontamination procedures for work area after use:**

**Laboratory personnel should use 70% Ethanol to decontaminate work surfaces after use.**

* **Disposal Procedures**

**All full strength and diluted HF waste must be collected and disposed of through Environmental Health and Safety. Waste must be collected in an appropriate specifically labeled, leak-proof container.**

**Section 3: Occupational Exposures**

* **Routes of Exposure**

Skin – **Very hazardous in case of eye and skin contact**.

Inhalation – **Very hazardous in case of inhalation.**

Ingestion- **Very hazardous in case of ingestion.**

Injection- **N/A**

* **Toxicological Effects**

Acute Effects/ Precautionary Safety Measures: **Breathing in HF at high levels or in combination with skin contact can cause death from irregular heartbeat or from fluid buildup in the lungs. Swallowing only a small amount of highly concentrated HF will affect major internal organs and may be fatal. Irritating to the eyes, nose and respiratory tract.**

Chronic Effects/ Precautionary Safety Measures: **HF is toxic to lungs, mucous membranes, skin, eyes, bones and teeth. Target organs can be damaged from repeated or prolonged exposure to HF.**

* **Occupational Exposure Response and First Aid Measures**

Skin: **Wash skin for 15 minutes with large amounts of water. Remove contaminated clothing. After water wash, apply and massage calcium gluconate 2.5% gel into affected areas of the skin. Seek immediate medical treatment.**

Eyes: **Flush eyes for at least 15 minutes while holding eyelids open. Remove contacts if they do not flush out. If available, rinse eyes with 1% calcium gluconate in saline solution. Seek immediate medical treatment.**

Inhalation: **Remove victim from the exposure area and take to fresh air immediately. Seek immediate medical treatment. Do not perform mouth-to-mouth resuscitation.**

Ingestion: **If victim is conscious have them chew several calcium or magnesium containing antacid tablets or take a magnesium-containing liquid antacid along with 1 to 2 glasses of water. Do not induce vomiting. Seek immediate medical treatment.**

* **Emergency Procedure for Chemical Spills and Accidental Releases**

**Small and Large Spills:**

**Proper PPE must be worn when cleaning the spill. Use soda ash, lime, or a special HF spill pillow in conjunction with inert absorbent material to contain, neutralize and absorb any freestanding liquid. Evacuate all personnel from the space, shut the door and if possible turn off the power to the room. Post the door with the chemical spill sign from the spill kit, and call the Environmental Health and Safety Emergency Response Team, and report the spill. If the spill occurs inside the fume hood, shut the sash, evacuate all personnel from the space and shut the door. Report the spill by contacting the Environmental Health and Safety Emergency Response Team.**

This Standard Operating Procedure must be placed in the Chemical Hygiene Plan and the SDS must be accessible. Also, all laboratory personnel must be familiar with safe handling practices (i.e., training with documentation of training) when working with these chemicals. This must be incorporated into the comprehensive chemical hygiene plan of the laboratory. If you have any questions regarding a comprehensive mandatory laboratory chemical hygiene plan please contact your Representative at Environmental Health and Safety (292-1284).

For any other questions or concerns, please contact:

PI contact information

Name:

Primary Contact Number:

Emergency Contact Number:

P.I. Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_