

**Standard Operating Procedure for Using Hydrofluoric Acid (HF)**

Print a copy and keep with your Safety Data Sheets and training documents.

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| Department |  |
| Principal Investigator (PI) |  |
| PI Phone Number |  |
| Lab Manager |  |
| Lab Manager Phone Number |  |
| Emergency Contact |  |
| Emergency Contact Phone Number |  |

1. **Purpose**

The purpose of this document is to provide the information necessary to safely use hydrofluoric acid in the \_\_\_\_\_\_\_\_\_\_ laboratory and to comply with OSHA hydrofluoric acid guidelines ([CAS# 7664-39-3](https://www.cdc.gov/niosh/npg/npgd0334.html)).

1. **Hazard Identification:**

*Corrosive* –

* Hydrofluoric acid (HF) is a highly corrosive liquid and is a contact poison. It should be handled with extreme care (i.e., beyond what is generally required to handle other mineral acids). Owing to its low dissociation constant, HF as a neutral lipid-soluble molecule penetrates tissue more rapidly than typical mineral acids. Because of the ability of hydrofluoric acid to penetrate tissue, poisoning can occur readily through exposure of skin or eyes, or when inhaled or swallowed. Symptoms of exposure to hydrofluoric acid may not be immediately evident. HF interferes with nerve function, meaning that burns may not initially be painful. Accidental exposures can go unnoticed, delaying treatment and increasing the extent and seriousness of the injury.
* HF is a calcium seeker. A person can’t sense when it comes in contact with the skin, but it dissolves the calcium in the bone. HF burns are not evident until a day later. If not stored, handled and disposed of properly, HF can pose a serious threat to the health and safety of laboratory personnel, emergency responders and waste handlers. Hence, it is important to thoroughly understand the properties of HF and follow all safety protocols to properly store and handle HF.

1. **Engineering & Administrative Controls**

Hydrofluoric acid must only be handled/used within the chemical fume hood, which is designed to pull air and fumes up and away from the user (Engineering Control).

All lab personnel who use HF must be trained on the hazards of HF, including being familiar with this SOP (Administrative Control).

The door to the \_\_\_\_\_\_\_\_\_\_\_ lab is posted with signage indicating the presence and hazards associated with HF (Administrative Control).

1. **Personal Protective Equipment (PPE)**

* *Hand Protection*: Thin disposable gloves (such as 4, 6, or 8 mil blue nitrile gloves) used in laboratory operations provide a contact barrier only and should be disposed immediately when contamination is suspected. Thicker (10-20 mil) PVC or neoprene gloves provide better resistance but do not provide the necessary dexterity for many lab procedures. Thinner PVC or poly gloves can provide some resistance to HF, but require immediate changing at the first sign of contamination. Do not wear disposable gloves without double gloving because of the potential for exposure through pinholes.
* *Eye protection:* Goggles must be worn when handling HF*.*
* *Skin and Body Protection*: A lab coat must be worn when handling HF.
* *Respiratory Protection*: Work with HF should always be done in a fume hood, glove box, or in totally-sealed containers to keep inhalation exposures as low as possible

1. **Standard Operating Procedures for Handling Hydrofluoric Acid:**

*Handling*

* 1. Ensure that you have all the PPE required for handling HF.
  2. HF must always be stored in plastic (Nalgene / polypropylene) containers. DO NOT store HF in glass bottles/containers.
  3. Store in corrosive/acid storage cabinet within a secondary containment (Nalgene/ polypropylene tray or tub).
  4. Do not store in the topmost shelf of the storage cabinet.
     1. Note: In general, do not store chemicals at or above eye level.
  5. Ensure the container is tightly closed at all times.
  6. Do not store with oxides, organic chemicals, bases or metals.
  7. Carefully carry the stock bottle in a rubber maid bottle carrier/Nalgene secondary container to the wet bench/chemical fume hood and pour out desired amount into a smaller container.
  8. Place stock bottle back in corrosive chemical storage cabinet with cap tightly closed.
  9. Lab buddy system is highly recommended when handling HF. Lab emergency contact information must be readily available. The lab personnel must have easy access to a telephone (landline or cell phone).
  10. As they deem necessary, the PI/supervisor should insert here any information about whether a special use-area is designated for this material/process.
  11. Add appropriate lab-specific information here describing how this material(s) is generally used. E.g., name of protocol, typical frequency done, quantities used, temperature and any additional safety measures, etc.

1. **Chemical Disposal**

Hydrofluoric acid should never be disposed of by drain. Elementary neutralization of HF does not permit drain disposal, even if the resulting solution pH is 7. Neutralization of hydrofluoric acid with a basic material produces metal fluoride salts, which are toxic. It must always be collected as hazardous waste in closeable plastic containers.

All chemical waste must be disposed of according to federal and state regulations and UNM's Chemical Hygiene Plan. HF and HF-containing wastes should be placed in a suitable container and properly labeled as soon as waste is added to the container. HF waste should be labeled as such:

**HAZARDOUS WASTE**

**Hydrofluoric Acid**

**Highly Corrosive**Call EHS at 277-2753 to schedule a pickup of waste HF and/or other waste chemicals.

1. **Spill Procedures:**

For small/minor spills (<1L), use the materials in the spill kit to clean up the spill. Minimum PPE for cleaning up a hydrofluoric acid spill is safety glasses/goggles, gloves and lab coat. The spill clean-up materials must be double-bagged, tightly closed, labeled and picked up by EH&S for disposal.

Spills in excess of 1L of HF should not be cleaned up by lab personnel. In the event of a large/major spill of HF, evacuate the area and call:

* Campus Police -- 911 on a landline or 505-277-2241 on a mobile phone, and
* Environmental Health & Safety (EH&S) – 505-277-2753 during business hours, or
* EH&S Duty Officer Pager -- 505-951-0194 (enter your phone number after the message)

1. **First Aid Procedures**

In the event of a hydrofluoric acid exposure, seek immediate medical attention.

* Skin Contact and Eye Contact should be washed immediately in safety shower or eyewash respectively for 15 minutes.
* If the exposure is severe, seek medical attention at the emergency room. If heading to UNMH, a non-injured person should contact the UNMH charge nurse in advance at 505-604-9349 with information on the chemical and nature of exposure.
* UNM employees should contact Employee Occupational Health Services (EOHS) at 505-272-8034.
* UNM students should contact Student Health Services at 505-277-7810.
* If the exposure occurs after hours, employees and students should seek medical treatment at a hospital emergency room.
* The supervisor of the injured person and EH&S must be notified as soon as possible after the exposure.

The notice of Accident, Incident, or Spill form should be filled out on the EH&S website.

1. **Other Emergencies**

**Fire or Medical Emergency -- Dial 911**

**Life-Threatening Emergency, After Hours, Weekends and Holidays** – **Dial 911**

**Non-Life Threatening Emergency** – Call EH&S at 505-277-2753 to seek assistance and report the incident.

1. **Training Requirements**

All lab personnel who use Hydrofluoric Acid must take the following trainings:

* Hydrofluoric Acid SOP

**Principal Investigator SOP Approval**

By signing and dating here, the Principal Investigator certifies that this Standard Operating Procedure (SOP) for Using hydrofluoric acid is accurate and provides information sufficient to safely use hydrazine in the \_\_\_\_\_\_\_\_\_\_\_\_ laboratory.

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Signature Printed Name/Title Date

I have read and understand the content of this SOP:

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| **Name** | **Signature** | **Date** |
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