

# **SOP**      **Hydrofluoric Acid (HF)**

Purdue University  
Applicable rooms:

Physics Department  
All PRIME Lab areas

PRIME Lab

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Revised by:		Revised:	

## **INTRODUCTION**

Hydrofluoric Acid is weak acid that is purchased by PRIME Lab in 48-49% concentration. In addition to being corrosive, HF reacts with glass and is a very dangerous contact poison. At PRIME Lab it is typically used to dissolve rock samples.

## **HAZARDS**

May be fatal if inhaled or ingested  
HF is a contact poison that is rapidly absorbed through the skin which can be fatal.  
Can cause severe burns to skin and eyes  
Skin exposure may result in destruction of deep tissue layers.  
Skin exposure may be painless for many hours which can delay critical treatment.  
Burns larger then 25 square inches may result in total body toxicity which may be fatal if untreated.  
Contact with the eyes can result in destruction of the cornea.  
Can cause severe respiratory and digestive tract burns  
Inhalation of fumes may cause difficulty in breathing and/or accumulation of fluid in the lungs.  
Ingestion of HF may result in severe burns to the mouth, esophagus and stomach.  
Symptoms of systemic poisoning are slow to develop  
Can cause deterioration of metal surfaces  
Contact with other materials may cause a fire

## **PROCEDURES**

- 1 Read and understand the MSDS or SDS before starting work.
- 2 All persons using HF must have completed PRIME Lab HF training and certification
- 3 Have running water in a sink outside of the hood to rinse gloves
- 4 The door to the laboratory should be unlocked
- 5 Another person should be in the lab with you unless you have authorization to work alone
- 6 Find the location of first aid supplies and check that they are not outdated
- 7 Put on appropriate PPE
- 8 Anyone working within 5 feet of you must also wear the same PPE
- 9 Perform necessary work involving HF
- 10 Make sure containers are appropriately capped.
- 11 Carefully remove PPE that is no longer needed
- 12 Clean or properly dispose of any contaminated PPE

## **SIGNS AND SYMPTOMS OF EXPOSURE**

- 1 Burns that may take many hours to develop
- 2 Causes itching, burning, redness and tearing in eyes
- 3 May cause nausea, vomiting, diarrhea, and abdominal discomfort.
- 4 May cause nose, throat, and lung irritation
- 5 May cause shortness of breath
- 6 inhalation causes narcotic effect/intoxication
- 7 May cause dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing and may include coughing, choking, chest tightness, chills, fever, and cyanosis

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## **MINIMUM PPE REQUIREMENTS**

**Specific requirements for each room are located on the certification of hazard assesment posted in that laboratory.**

### **ANY USE OF HF REQUIRES**

- 1 There must be a working safety shower and eye wash station in the work
- 2 Path to eyewash/safety shower must be unblocked
- 3 HF First aid supplies must be available and not outdated.
  - 2.5% calcium gluconate gel
  - 1% calcium gluconate eyewash
  - Milk of Magnesia bottle
- 4 Work must be performed in a hood unless otherwise noted
- 5 No working alone unless you have specific authorization to do so
- 6 Safety glasses or goggles
- 7 Lab Coat
- 8 Neoprene apron (to cover your front)

### **Working with open vessels with an HF concentration $\leq$ 5%**

Any use requirements plus

- 1 Nitrile or Latex Examination Gloves
- 2 Work can be performed outside of a hood

### **Working with open vessels with dilute HF and volumes < 5 ml**

Any use requirements plus

- 1 Nitrile Examination Gloves
- 2 PVC arm shields

### **Working with sealed vessels with dilute HF and volumes > 5 ml**

Any use requirements plus

- 1 Nitrile Examination Gloves
- 2 Work can be performed outside of a hood

### **Working with open vessels with dilute HF and volumes > 5 ml**

Any use requirements plus

- 1 Safety glasses or goggles AND full face shield
- 2 Chemical resistant gloves: natural rubber, nitrile, or vinyl
- 3 Nitrile examination gloves can be doubled over the rubber gloves for grip, if necessary
- 4 PVC arm shields
- 5 Chemical resistant overboots

### **Dispensing HF >40% from its originating container via approved spout and Volumes < 5 ml**

Any use requirements plus

- 1 Chemical resistant gloves: natural rubber, nitrile, or vinyl
- 2 PVC arm shields

### **Dispensing HF >40% from its originating container via spout or pouring and Volumes > 5 ml**

Any use requirements plus

- 1 Safety glasses or goggles AND full face shield
- 2 Chemical resistant gloves: natural rubber, nitrile, or vinyl
- 3 Nitrile examination gloves can be doubled over the rubber gloves for grip, if necessary
- 4 PVC arm shields
- 5 Chemical resistant overboots
- 6 Vinyl coat apron (to cover your shoulders)



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## **STORAGE**

- 1 Acids and bases should be stored separately from each other.
- 2 Acids must also be segregated from chemicals where a toxic gas would be generated upon contact
- 3 HF may not be stored in a glass container
- 4 Segregation may be achieved by distance or secondary containment
- 5 Keep container tightly closed at all times

## **DISPOSAL**

- 1 All chemical waste must be handled as specified in chapter 7 of the CHP
- 2 All hazardous chemical waste must be placed in appropriate closed containers
- 3 Containers must be properly labeled immediately
- 4 HF may not be disposed of in the sink
- 5 PRIME Lab has the capability of disposing of large volumes of HF by neutralization.
- 6 REM will provide for disposal of any HF not disposed of by PRIME Lab

## **EMERGENCY PROCEDURES**

### **FIRST AID**

HF First aid kit must contain:  
Calcium Gluconate 2.5% Gel  
Milk of Magnesia  
Eyewash 1% Calcium Gluconate Solution

### **INHALED**

Move to fresh air  
Call 911 (9-911 from PRIME Lab building)  
If not breathing - give artificial respiration

### **SKIN CONTACT**

Call 911 (9-911 from PRIME Lab building)  
Use emergency shower to flush affected area  
Immediately remove any contaminated clothing  
Flush for 5 minutes  
Use gloves to apply Calcium Gluconate Gel to affected area  
Re-apply Calcium Gluconate every 15 minutes

### **EYE CONTACT**

Call 911 (9-911 from PRIME Lab building)  
Use eyewash station to flush affected eye(s) for 5 minutes  
Use 1% Calcium Gluconate eyewash until help arrives

### **INGESTED**

Call 911 (9-911 from PRIME Lab building)  
Do not induce vomiting  
Drink large quantities of water followed by 12 ounces of milk of magnesia

# SOP

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### SPILLS

- 1 Small spills can be cleaned up by lab personnel  
appropriate PPE must be worn while cleaning up spills  
if HF vapors can be smelled outside of the hood treat it as a large spill  
spill can be cleaned up with absorbent material (spill kit, kimwipes) etc.  
cleanup materials should be placed in a tightly sealed plastic bottle for disposal by REM
- 2 Large spills  
Call 911 (9-911 from PRIME Lab building)  
evacuate area  
make sure others know not to enter the lab.  
Inform emergency personnel that HF is involved.

### INJURIES

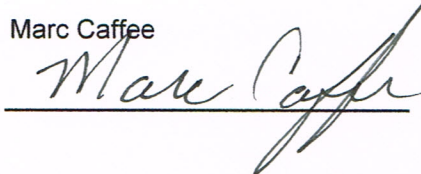
All injuries must be treated as specified in section 6.7 of the CHP

### APPROVAL

PI

Marc Caffee

Signature:



Date:

7/25/18