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## **Standard Operating Procedures For Use of Concentrated HF**

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### **Purpose**

The purpose of this document is to develop safe working, handling and emergency procedures for the laboratory personnel when working with concentrated hydrofluoric acid (HF).

### *Overview*

Hydrofluoric acid is a clear, colorless liquid. It is an extremely dangerous material and all forms, including vapors and solutions, can cause severe, slow-healing burns to tissue. At concentrations of less than 50%, the burns may not be felt immediately and at 20% the effects may not be noticed for several hours. At higher concentrations, the burning sensations will become noticeable much more quickly, in a matter of minutes or less. HF burns pose unique dangers distinct from other acids, it readily penetrates skin, damaging underlying tissue. The fluoride ion can then cause destruction of soft tissues and decalcification of the bones. HF can cause severe burns to the eyes, which may lead to permanent damage and blindness.

### **Standard Operating Procedures (SOP)**

#### *Storage*

1. Concentrated HF should be stored in an acid cabinet in a secondary containment container. Secondary containment container should be constructed of polyethylene (i.e. plastic).
2. Do not store HF with incompatible materials such as glass, ceramics, and metals. Reactions with metals may generate potentially explosive hydrogen gas.
3. All cabinets containing concentrated HF should be clearly marked and have a copy of this SOP and the MSDS posted prominently.
4. Due to the hazardous nature of the material only minimal quantities of material should be purchased and stored. Quantities will be determined on a case by case basis by the University Department of Safety and Health.

#### *Handling*

1. All operations involving concentrated HF will be performed in a fully functioning chemical fume hood.

2. The laboratory worker must use all personal protective equipment (particularly gloves and eyewear) specified by the MSDS sheet. Contact the Department of Environmental Health and Safety for more glove information.
3. No work with concentrated HF will be performed alone. A second person cognizant of the dangers and emergency procedures for handling HF contact must be present at all times within the laboratory while the operations with concentrated HF are being carried out.

### *Training*

No work with HF will be carried out prior to emergency procedure training with the departmental chemical hygiene officer (CHO) or the Department of Environmental Health and Safety. All training will be documented and kept on file.

### *First Aid requirements*

1. All labs having concentrated HF must have the following:
  - For skin contact a tube of 2.5% calcium gluconate gel present within the laboratory.
  - For eye contact a sterile solution of 1% calcium gluconate or dropper bottle of 0.5 % pontocaine hydrochloride.
2. All laboratory personnel working in the area must be informed of the special hazards involving the use of concentrated HF and know where the calcium gluconate gel is located.

### *Emergency Procedures*

1. In case of skin contact with concentrated HF:
  - Wash the affected area immediately under running water either under the safety shower or some other source and flush affected area thoroughly with cool running water for at least 5 minutes. Remove all contaminated clothing while flushing.
  - Apply a generous amount of Calcium Gluconate Gel to the affected area. Massage the 2.5% calcium gluconate gel into the burn site. Apply every 15 minutes and massage continuously until pain and/or redness disappear or until more definitive medical care is given. It is advisable for the applicator to wear protective gloves.
  - Seek immediate medical attention at a hospital
2. In case of eye contact:
  - Promptly wash with copious amounts of water for at least 15 minutes while holding the eyelids apart. If the sterile solution of 1 % calcium gluconate is available, washing may be limited to 5 minutes, after which the 1 % calcium gluconate solution should be used repeatedly to irrigate the eye using a syringe.
  - If the 0.5 % pontocaine hydrochloride is available, wash the eye at least 15 minutes, after which apply one or two drops of the 0.5 % pontocaine hydrochloride.
  - Seek immediate medical attention.
3. If HF is ingested, obtain medical attention immediately.
4. If HF vapor is inhaled, move the person to fresh air and seek medical attention at once.

5. After making sure that the affected laboratory worker is capable of washing the affected area, the backup safety person should dial **9-911** immediately. After arranging immediate transport of the affected individual to a hospital with the emergency operator, alert security by calling the campus emergency number: **Drexel Public Safety – x 2222**
6. The MSDS sheet for HF should be brought to the hospital to aid the hospital workers in treating the injury.
7. The Department of Environmental Health and Safety will be notified by Drexel Public Safety and will respond to ensure any spill is immediately cleaned up.