## Wayne State University

Safety Talk - Hydrofluoric Acid (HF)

Date:	Trainer:

HF is a highly corrosive solution of hydrogen fluoride. It can penetrate skin, destroy soft tissues, and decalcify bones. When working with HF, it is important to establish and frequently review safety procedures. Seek immediate medical assistance (WSU PD 7-2222) for anyone exposed to HF.

**Skin or eye exposure** to liquid or vapor can cause severe burns. HF penetrates the skin and attacks underlying tissues. Large or multiple burns greater than 25 sq. in. of body surface area may be fatal. Prolonged contact to very dilute HF solutions can cause burns; symptoms may be delayed:

- HF concentrations greater than 50%: Immediate burns, rapid destruction of tissue beginning as a whitish discoloration, usually progressing to blisters, accompanied by severe pain.
- HF concentrations between 20% and 50%: Symptoms can be delayed up to eight hours.
- HF concentrations less than 20%: Symptoms may be delayed up to 24 hours.
- HF concentrations as low as 2%: If exposure is prolonged enough, symptoms can appear.

**Inhalation**: Severe exposure can cause nose and throat burns, lung inflammation, pulmonary edema, and other toxic effects including hypocalcemia which, if not treated properly, can be fatal. Mild exposure can irritate the nose, throat and respiratory system; symptoms may be delayed for several hours.

**Ingestion** can cause severe burns to the mouth, throat and stomach and may result in death if swallowed. Even ingesting small amounts of dilute HF will likely cause profound and possibly fatal hypocalcemia and systemic toxicity unless medical treatment is immediately initiated.

**Spills:** Help prevent spills by maintaining a supply as small as possible and promptly disposing of unwanted hydrofluoric acid. Keep a hydrofluoric acid spill kit nearby, containing personal protection gear (gloves, goggles, shoe covers, etc.) spill containment, cleanup, and disposal items. Calcium carbonate or calcium hydroxide should also be kept near where the work will be conducted. If more than 100 ml is spilled, or if the HF is concentrated, contain the spill as much as possible, evacuate the area, and call WSU Police (7-2222) and OEHS (7-1200). Avoid exposure to vapors. If a small quantity (100 ml or less) of dilute HF solution is spilled, clean it up by using powdered calcium carbonate or calcium hydroxide.

## **Protective Measures**

- Inform all users about the hazards and procedures for use and disposal.
- Inform everyone working in the area of the hazards of HF and emergency and first aid procedures.
- Only those familiar with the hazards should handle concentrated HF. Avoid working alone with HF.

Personal protective equipment (PPE) required when working with HF solutions (especially >1%):

- Goggles and a face shield.
- Long-sleeved, buttoned lab coat; pants or long skirt; and closed-toe shoes.
- Neoprene or nitrile (22mil) or other hydrofluoric acid resistant gloves (HF burns around the fingernails are extremely painful, difficult to treat, and may require surgical removal of the nail).
- A chemical resistant apron is also recommended.

## First Aid - Call WSU PD (7-2222) immediately: request an ambulance for anyone exposed to HF.

**Skin Exposure** - In order to prevent cross contamination, the victim should perform the following actions on him/herself (others may help but they must be careful not to contaminate themselves by wearing HF-protective gloves and other safety equipment): Immediately wash acid off all affected areas with water. While flushing with water, remove all clothing or jewelry that could trap HF (remove goggles last: close eyes, face the water flow and pull goggles over head). If 2.5% calcium gluconate gel is not available, continue flushing with water until medical assistance arrives. Rinsing may be limited to 5 minutes if 2.5% calcium gluconate gel is available: apply gel freely and massage it into the affected site as soon as the washing is done; the affected areas don't need to be dried prior to application. Reexamine the victim for any

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exposure / burn sites that have been overlooked. Apply gel every 10-15 minutes and massage it into the skin until medical assistance arrives. Provide the following information to the EMS team and/or physician:

- The concentration of the HF and its MSDS.
- Time of exposure, duration of exposure, and how it occurred.
- Time when calcium gluconate gel was first applied, and how many times it was applied in total.
- Body parts affected or exposed.
- Summary of first aid measures given.

**Eye Exposure**: Immediately flush eyes for at least 5 minutes with cool flowing water. Hold the eyelids open and away from the eye during irrigation to allow thorough flushing of the eyes. If sterile 1% calcium gluconate solution is available, washing may be limited to 5 minutes, after which the 1% calcium gluconate solution should be used repeatedly to irrigate the eye. Immediately call WSU PD (7-2222) to take the victim to a doctor, preferably an eye specialist. Clean water, eyewash, 1% calcium gluconate solution, or ice water compresses should be used to continue to irrigate the eye(s) while transporting.

Inhalation: Immediately move the victim to fresh air and call WSU PD (7-2222). If breathing has stopped, begin CPR. Make sure mouth and throat are free of foreign material. Administer 100% oxygen (10 to 12 L/min flow rate) as soon as possible by a trained individual until medical assistance arrives. A nebulized solution of 2.5% calcium gluconate may be administered with oxygen by inhalation. The victim should be examined by a doctor and held for observation for at least 24 hours (inhalation of HF may cause swelling in the respiratory tract up to 24 hours after exposure). A person who has inhaled HF vapors may require prophylactic oxygen treatment. Vapor exposures can burn skin and mucous membrane and damage pulmonary tissue; treat vapor burns to the skin the same way as liquid HF burns.

**Ingestion**: Drink large amounts of water as quickly as possible to dilute the acid. Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink several glasses of milk or several ounces of Milk of Magnesia, Mylanta, Maalox or similar product, or eat up to 30 Tums, Caltrate or other antacid tablet. The calcium or magnesium in these compounds may act as an antidote.

I have received this information:

Print Name	WSU ID	Initials