

HYDROFLUORIC ACID (HF)

HEALTH HAZARDS OF HF EXPOSURE

Skin exposure

HF is corrosive and destroys tissue even as dilute solutions. It readily penetrates human skin, allowing it to destroy tissues, decalcify bone and interfere with nerve function. Skin exposure to highly concentrated HF (48% or greater) immediately results in serious and painful destruction of tissue.

Exposure to concentrated HF can be fatal if the exposure covers over 2% of the body

(approximately eight square inches of skin). This acid reacts with the calcium in blood, which affects heart function. Skin contact with HF at lower concentrations may not produce pain until hours after the exposure. Because of this, all skin, eye, or tissue contact with HF should receive immediate first aid and medical evaluation even if no pain is felt.

Eye exposure

HF exposure to the eyes may result in blindness or permanent eye damage.

Inhalation exposure

HF vapors can seriously damage the lungs. Pulmonary edema (flooding of the lungs with fluids) may not be apparent for hours after the initial exposure. Avoid all exposures above 3 parts per million (ppm). Airborne exposures above 50 ppm can be fatal.

Long term exposure

Long term or chronic exposure to HF may result in fluorosis, a syndrome characterized by weight loss, brittle bones, anemia, and general ill health.



SAFE USE OF HF

Due to the extreme hazards of HF, take these precautions if possible:

- **Avoid working with HF** by eliminating the acid or substituting a less toxic alternative for HF.
- If that is not technically feasible, **do not work alone** when using HF.
- Ensure everyone in your work area is **trained on HF and first aid** measures.
- Follow **standard operating procedures**.
- Do not eat, smoke, or drink where HF is handled.
- Ensure that **skin is fully covered** on legs and feet when handling HF.
- Protect your eyes and face, by **wearing goggles and a face shield**.
- Wear a **laboratory coat with a chemical splash apron** of rubber, neoprene or Viton, and Tyvek sleeve covers, or a Tyvek suit.
- **Wear 6 mil nitrile inner gloves and 22 mil (nominal) gauge neoprene or butyl rubber gloves** or SilverShield outer gloves. Nitrile gloves (6 mil) may also be used as a layer on top of SilverShield gloves for dexterity. **Do not use latex gloves**. Dispose of gloves after each use.
- If gloves become contaminated with HF, remove them immediately, thoroughly wash your hands, **apply calcium gluconate gel** as instructed below, and dispose of the gloves as a hazardous waste.

STORAGE

Store HF in labeled, chemically compatible containers (polyethylene or Teflon).

- Glass, metal and ceramic containers are not compatible with HF.
- Do not store HF near incompatible chemicals such as organic acids, ammonia or other alkaline chemicals.
- If possible, store HF containers in a polyethylene tub on the lower shelf in an acid storage cabinet and transport containers using a bottle carrier.



EMERGENCY PROCEDURES

Skin contact

In the event of skin contact with HF use the safety shower for 5 minutes. Remove clothing while in the shower being careful not to spread contamination to other skin areas. Double glove using SilverShield and nitrile gloves. Then, apply 2.5% calcium gluconate gel (Calgonate Corp.) to the affected area. Massage it into the skin. White specks in the contaminated area indicate that the reaction of calcium and fluoride is taking place. If the gel clouds or separates, then reapply the gel.

Call 911* as soon as possible. Reapply calcium gluconate gel every 10 to 15 minutes and continue to massage into the skin until medical assistance arrives. If calcium gluconate gel isn't available, wash area with water for at least 15 minutes and call 911*.

Eye contact

In the event of eye contact, call 911*. Rinse the eyes in the safety eyewash for 5 minutes, then apply a sterile 1% calcium gluconate Emergency Eyewash Solution (Calgonate Corp.). If you don't have the Calgonate Emergency Eyewash Solution, rinse the eyes in the safety eyewash for 15 minutes. Do not apply calcium gluconate gel in the eyes. Call 911*.

Inhalation

If HF is inhaled, call 911*. Move the exposed person to fresh air and wait for medical assistance.

**Call 911 on UW Seattle campus phone; follow local emergency procedures for other locations.*

In all cases, give written information about HF to emergency personnel, such as an SDS, SOP or this focus sheet. HF is not a common chemical and can be easily confused with other acids that are not as hazardous. Follow up with the Employee Health Center at 206-685-1026 and submit an incident report to EH&S via the Online Accident Reporting System.



INCIDENT REPORTING

Follow up with the Employee Health Center at 206-685-1026.

- Outside of business hours, call UWPD at 911 from a campus phone.
- At medical centers and other locations follow internal emergency procedures.

Any spill incident requires the involved person or supervisor to complete and submit the **Online Accident Reporting System (OARS)** form to EH&S within 24 hours (or eight hours if serious injury or hospitalization).

CLEANING UP SPILLS

Small spills

Clean up only small spills (less than 100 ml) of dilute HF (less than 1%) that spill in a fume hood using universal spill pads found in the UW Multipurpose Spill Kit.

- Wear goggles, and a face shield.
- Double glove using a nitrile inner glove and a SilverShield, butyl rubber or neoprene outer glove.
- Wear a Tyvek suit, or a chemical splash apron of natural rubber, neoprene or Viton.
- Use Tyvek sleeve covers if the apron doesn't cover the arms.
- After absorbing the spill, decontaminate surfaces and equipment with a 10% calcium carbonate solution, followed by soap and water.

Larger spills

HF spills inside or outside of a fume hood that are greater than 1% in concentration, or greater than 100 ml are very dangerous.

- Evacuate the area, close all doors to the area and post signs to prevent others from entering.
- Call EH&S during business hours at 206.543.0467 to arrange for a contractor to clean up the spill.
- Call 911* after business hours.

DISPOSAL OF HF

Manage HF and all HF-contaminated spill debris as a hazardous waste.

For information, refer to the "Hydrofluoric Acid SOP Template" on the EH&S website.

Contact EH&S Environmental Programs at 206.616.5835 or visit www.ehs.washington.edu.