

Hydrofluoric Acid Safety Guidelines

Risks

Despite being an aqueous-phase weak solution hydrofluoric acid (HF) is a highly corrosive and potentially physiologically dangerous acid due to its fluoride ions, which can easily penetrate tissue and bind calcium and magnesium, thus depleting them from the body and causing destruction of deep tissue layers, including bone.

* Skin contact with liquid or gaseous acid can cause severe chemical burns, which could develop in a matter of hours to skin ulcers, electrolyte imbalance, pulmonary edema and arrhythmia (due to hypocalcemia or hypomagnesemia) though the pain associated with skin exposure to HF may occur only about 24hrs. later.

* HF vapors pose an inhalation hazard and ocular irritation injury.

Good Hygiene Practice (GHP)

1. Make sure you are well acquainted and adept with the experimental procedure involving HF.
2. Read SDS.
3. Never work alone with HF.
4. **Prior to commencing work –**

4.1 The lab contains validated (not expired) **calcium gluconate** ointment in case of skin exposure and **Diphoterine** to treat both eyes as well as skin exposures. Be acquainted with the calcium gluconate and Diphoterine location in the lab.



4.2 Both the emergency shower and the eye washer are intact, running fresh water.

4.3 Make sure the floor's spill kit is intact and be acquainted with its location.

4.4 Make sure magnesium sulfate ($MgSO_4$), sodium bicarbonate ($NaHCO_3$) / magnesium oxide (MgO) are within reach.

5. Work only in an operating and intact **chemical fume hood**.

6. Personal Protective Equipment (PPE) –

- 6.1 A long-buttoned lab coat and preferably an HF-resistant apron
- 6.2 Close-toed shoes, preferably leather
- 6.3 Goggles or a complete face shield
- 6.4 2 pairs of thick nitrile / neoprene gloves (HF attacks natural rubber). Change outer pair of gloves often.

7. Storage –

- 7.1 HF should be stored in either –
 - 7.1.1 Polyethylene
 - 7.1.2 Plastic containing fluorocarbons
 - 7.1.3 Lead
 - 7.1.4 Platinum
- 7.2 Place HF container inside a secondary polyethelene container.
- 7.3 Always store at a cool, ventilated, and dry location.
- 7.4 **It is forbidden to store HF in –**
 - 7.4.1 **Glass**
 - 7.4.2 **Platinum**
- 7.5 Segregate from all other hazmats.
 - 7.5.1 Specifically ensure HF cannot contact concrete, glass, metals, water, oxidizers, bases, flammables, organics and ceramics.

8. Emergency –

- 8.1 Call the Security & Emergency Unit: 04-829-2222.
- 8.2 Remove all exposed clothing.
- 8.3 Wash all exposed areas with copious amounts of water using the safety shower or eyewasher station.

8.4 Eye exposure - flush exposed eyes for at least 15 minutes

8.5 Skin exposure - flush exposed skin for only five (5) minutes, followed by treatment with 2.5%-33% calcium gluconate / calcium carbonate directly.

8.6 Small spills (up to 100ml) –

8.6.1 Neutralized by covering the spill liquid with dry magnesium sulfate.

8.6.2 Absorb with spill control pads.

8.6.3 Add sodium bicarbonate / magnesium oxide.

8.6.4 Place in a designated plastic bag for chemical disposal.

8.6.5 Wash spill site using sodium bicarbonate.

8.6.6 **Never use spill absorbents, such as silicon, vermiculite or sand**, as the odorless toxic gas, silicon tetrafluoride, could be formed.