HYDROFLUORIC ACID

Background

The unique properties of hydrofluoric acid (HF) make it a particularly dangerous inorganic acid, which should be handled with due consideration for safety. Hydrofluoric acid is similar to other acids in that the initial extent of a burn depends on the concentration, temperature, and duration of contact with the skin. Hydrofluoric acid differs, however, from other acids because the fluoride ions readily penetrate the skin, causing destruction of deep tissue layers, including bone. Unlike other acids that are rapidly neutralized, this process may continue for days.

Toxicity

Exposure to HF and its vapors results in chemical burns and can occur via skin and eye contact, inhalation, and ingestion. Contact with concentrated forms of the acid result in immediate tissue destruction, while contact with dilute solutions can result in delayed reactions that do not generate symptoms for several hours. The destructive effect of exposure to HF can continue for extended periods of time. Consult a Safety Data Sheet for in-depth information on the toxicity of HF.

First Aid

- Skin Contact
    - Immediately flush exposed skin for a minimum of 10 minutes with copious amounts of clean water. If assisting someone who has been exposed, don protective gloves and eyewear to prevent contact with the acid.
    - Remove all contaminated clothing while flushing exposed skin with water.
    - Apply calcium gluconate to the site of contact (iced benzalkonium chloride, 0.13% Soaks or calcium gluconate, 2.5% gel). Use gloves while applying to prevent contact with uncontaminated skin.
    - Seek medical attention. All exposures to HF require medical follow-up.

- Eye Contact
  - Immediately flush the eyes for at least 15 minutes with large amounts of gently flowing water. Hold the eyelids open and away from the eye during irrigation to allow thorough flushing of the eyes. Do not apply calcium gluconate or other medicine.
  - Seek medical attention immediately after flushing the eyes. Apply ice water compresses and if possible, continue irrigating the eyes until attended to by a physician.
- Inhalation
  - Immediately move to fresh air and seek medical attention.

Handling

- Observe all standard, safe chemical handling practices. See EHS SOP, ***General Guidance for Chemical Ordering, Receipt, Distribution, Use & Storage***.
- Always handle HF in a properly functioning fume hood. Consult the fume hood manufacturer regarding recommended sash material composition.
- Ensure unimpeded and immediate access to an ANSI-approved safety shower and continuous-flow eyewash.
- Ensure immediate availability of an adequate supply of calcium gluconate. This material will expire and should be regularly replaced.
- Use appropriate Personal Protective Equipment while handling HF, including goggles, face shield, neoprene gloves, acid resistant apron, and closed-toed shoes.
- As with all chemicals, familiarize yourself with the information in the Safety Data Sheet before handling.

Storage

- Store in a cool, dry place away from incompatible materials.
- Avoid contact with glass, concrete, metals, water, acids, oxidizers, reducers, alkalis, combustibles, organics, and ceramics.
- Secondary containment trays, constructed of polyethylene, are recommended. Never store HF in glass containers.

Spills

- Equip storage and use areas with appropriate spill response supplies.
- Small spills (less than 100 mls of solutions that are 10% or less) can be neutralized by covering with soda ash or absorbed onto spill control pads, absorbent, socks, or similar products that are specifically designed to combat spills of HF. Absorbents that can be used which are not reactive to HF include 3M Chemical Sorbent (made of polypropylene).
- If the spill is large, involves concentrated acid, or is in a confined space or an area where there is not adequate ventilation, evacuate the room and immediately report the spill to "911."

Additional information can be found at:
https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750030.html