

FACT SHEET

Hydrofluoric Acid

Hydrofluoric acid (HF) is a clear, colorless, fuming, corrosive liquid or gas commonly used to dissolve silica and metals in the laboratory. Improper use may cause serious injury, illness, or death. Faculty, staff and students are required to receive training prior to using hydrofluoric acid. Instruction should include identification of HF hazards, proper protective measures, and procedures for treatment in the event of exposure.

SYNONYMS

Anhydrous hydrofluoric acid

Hydrofluoride

Hydrogen fluoride

HEALTH EFFECTS

A poison by inhalation, ingestion, absorption, or contact. Target organs are the eyes, respiratory and digestive systems, and skin. Anhydrous HF or HF mists or vapors can cause severe respiratory-tract irritation, which may be fatal. A corrosive irritant to skin, eyes (at 0.05 mg/L), and mucous membranes; acid splashed into the eyes may cause blindness. Ingestion causes acute irritation of the digestive tract and of the esophagus. A teratogen.

Symptoms of exposure include irritation of the eyes, nose, and throat; pulmonary edema, burns of the skin and eyes; nasal congestion; bronchitis.

HANDLING/PROTECTIVE EQUIPMENT

HF attacks glass, concrete, and some metals; especially cast iron and alloys that contain silica. It also attacks such organic materials as leather, natural rubber, and wood.

Adequate ventilation is crucial. All work must be performed in a hood so that safe levels are not exceeded; i.e., less than the OSHA 8-hour Permissible Exposure Limit of 3 parts per million (ppm) and the 15 minute Short-Term Exposure Limit of 6 ppm.

All contact of the vapor or liquid with eyes, skin, respiratory, or digestive system must be avoided by using protective equipment. Wear anti-acid clothing (e.g., an acid-resistant apron), neoprene gloves, goggles and/or a face shield, and synthetic rubber shoes or boots to avoid burns and poisoning. Wearing clothing that has absorbed small amounts of HF can result in serious delayed effects such as painful, slow-healing skin ulcers. The protective equipment should be washed after each use to remove any HF. An emergency shower and eyewash must be readily accessible in areas where HF is used.

Contact lenses should not be worn when working with this chemical.

An HF spill kit which includes calcium gluconate gel must be in the immediate area of use.

STORAGE

Anhydrous HF must be stored in pressure containers because of its low boiling point (19.54 C) and high vapor pressure (40 mm Hg at 2.5 C).

Although HF is nonflammable, it should not be stored or used in metallic containers or piping since aqueous solutions can cause formation of hydrogen which presents a fire and explosion hazard. Potential sources of ignition (sparks and flames) should be excluded from areas having equipment containing HF.

HF should not be stored in glass bottles.

SPILL RESPONSE

Spills of HF must be treated immediately to minimize the dangers of vapor inhalation, body contact, corrosion of equipment, and possible generation of hazardous gases. Only properly trained personnel should cleanup spills using the procedure outlined below. If you have not received such training, do not use HF. For assistance with HF spills contact EHS at 801-581-6590.

If properly trained, contain the spill and evacuate non-essential personnel from the laboratory or area where the spill occurred. Next, using appropriate protective equipment (i.e., approved respirator, gloves, apron, and eye protection) slowly cover the contaminated surface with lime, sodium carbonate (soda ash), or sodium bicarbonate. Mix and add water to form a slurry. Check pH to determine neutrality, absorb the neutralized material and collect for disposal, submit a disposal request via the laboratory management system on the EHS website.

FIRST AID

Anyone who knows or suspects that they have come into direct contact with HF should immediately flush the exposed area with large quantities of cool water continuously for at least 15 minutes. Contaminated clothing should be removed as quickly as possible while flushing. Cover the exposed area with calcium gluconate gel and get medical attention immediately, even if the injury appears slight. Contact the Poison Control Center for additional assistance.

In case of contact with the eyes, immediately flush the eyes with large amounts of water, alternately lifting the lower and upper lids. Continue for at least 15 minutes. Call 911.

Anyone who has inhaled HF vapor should be removed immediately to fresh air. If breathing has stopped, artificial respiration should be performed. Keep the affected person warm and at rest. Call 911.

Anyone who has ingested HF should drink a large quantity of water as quickly as possible. Do not induce vomiting. Medical help should be obtained promptly. After the acid has been diluted with water, if medical attention is delayed, the person should be given milk or 2 fluid ounces of milk of magnesia to drink in order to soothe the burning effect.

Information contained in this fact sheet includes excerpts from "Academic Laboratory Chemical Hazards Guidebook" by William J. Mahn and "Hazardous Chemicals Desk Reference" edited by Richard J. Lewis.

