




Hydrofluoric Acid

DANGER

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Laboratories should create their own specific SOP's for the use of Hydrofluoric Acid

Hazard	Potential Hazards	<p>Fatal if swallowed, in contact with skin, or if inhaled.</p> <ul style="list-style-type: none"> Causes severe skin burns and eye damage. For further safety information, refer to Lab Chemical Safety Summary for hydrofluoric acid. (Pubchem), New Jersey Right to Know Fact Sheet on Hydrogen Fluoride and manufacturer Safety Data Sheet (SDS). <i>Hydrofluoric acid penetrates the skin and dissociates into hydrogen and fluoride ions, which can subsequently cause tissue destruction, decalcification of bone, cardiac arrhythmia, and liver and kidney damage. Greater than 50% hydrofluoric acid usually causes immediate burns that are extremely painful and slow to heal. Exposure to lower concentrations may not be apparent for several hours but can still cause burns and further damage if not washed off.</i> 	
	Selection & Purchase	<ul style="list-style-type: none"> Consider the use of an alternative acid. Purchase the smallest container at the lowest concentration practical. Calcium gluconate gel is required to be in the room when Hydrofluoric Acid is in use. If you need calcium gluconate contact Dartmouth EHS: ehs@dartmouth.edu or 603-646-1762. If there is a risk of possibility of ingestion have available calcium carbonate antacid tablets (Tums). 	
Hazard Controls-1	Storage & Transport	<ul style="list-style-type: none"> Store in compatible (e.g. polyethylene) primary and secondary containers. DO NOT use glass containers – <u>hydrofluoric acid dissolves glass</u>. Keep primary container tightly closed. Store in a dry and well-ventilated place. Store below eye level but not on the floor. Store away from bases, metals, and other incompatibles. DO NOT store under the sink. Transport in a bottle carrier. 	
	Engineering Controls & Safety Equipment	<ul style="list-style-type: none"> Eyewash and drench hose are required in immediate work area. A safety shower will also be necessary for most uses of hydrofluoric acid. All work must be done in a chemical fume hood 	
	Work Practice Controls	<ul style="list-style-type: none"> <i>A lab-specific SOP approved in advance by the PI is required.</i> <i>EHS also require the completion of a High Hazard Lab Chemical operations Form</i> Before using this acid, make sure calcium gluconate gel and antacid tablets have not expired. Have an area in the laboratory that is exclusively designated for hydrofluoric acid use. Notify all laboratory members that you are actively using hydrofluoric acid and where. Work within sight and/or hearing of at least one other person who is familiar with the hazards and lab-specific written procedures. Line all work surfaces with plastic-backed absorbent paper and/or a containment tray that is compatible with hydrofluoric acid. Always add hydrofluoric acid to water and not the reverse. DO NOT use glass, ceramic or other incompatible containers. 	

	<p>Work Practice Controls</p>	<ul style="list-style-type: none"> • DO NOT heat. • DO NOT breathe hydrofluoric acid vapors, mists, or gas. • DO NOT get in eyes, on the skin, or on clothing. • Wash hands immediately after handling. • Once work is complete, decontaminate the area by wiping with a 10% sodium carbonate (Na₂CO₃, also known as soda ash) solution.
<p>Hazards Controls-2</p>	<p>Personal Protective Equipment (PPE)</p>	<ul style="list-style-type: none"> • Dartmouth College has a Policy on PPE for Chemistry • Eyes & Face: Tight fitting safety goggles and it is <i>recommended</i> to wear a face shield (8" in length, minimum) • Hands: Use 5 mil Neoprene for <50 ml of 48% • or less. Change gloves every 30 min. • For >50 ml, >48%, or for spills: use 17 mil (or thicker) Neoprene, 14 mil (or thicker) butyl, or 5 mil neoprene over laminate (e.g., Silver Shield). • Inspect gloves for defects prior to use. • Remove gloves after handling and take care to not touch the outer surface of the glove. • Dartmouth College Stockrooms provide Purple Nitrile Gloves which have a thickness of 0.09-0.15 mm from Cuff to Middle Finger. • Body: Fully buttoned lab coat, sleeves to wrist; clothing covering legs; closed toed shoes; rubber apron; chemical-resistant sleeves. 
<p>Other</p>	<p>Medical Emergencies</p>	<ul style="list-style-type: none"> • <i>Immediate first aid and medical treatment is essential for people exposed to hydrofluoric acid.</i> • People working in and around hydrofluoric acid should be familiar with the Hydrofluoric Acid First Aid Guidelines. These guidelines should be printed and kept with first aid supplies. • For an actual chemical exposure/injury: • Seek immediate medical attention at the emergency department for any exposure. • Persons helping an exposed colleague must wear PPE as indicated above. • Call 911 (if in Borwell, Rubin and Williamson dial 5555) from any phone to request assistance and/or emergency transport. • For exposure-related advice contact Dartmouth EHS at 603-646-1762. (EHS or EMS may recommend that person ingest calcium carbonate tablets (such as Tums) for skin exposure.) Report the injury/illness after seeking treatment. • Skin exposure: • Flush with water for 5 minutes then rub calcium gluconate gel onto the burn site. Continue to massage the calcium gluconate gel into the burn site during transportation to a medical facility and while waiting to see a physician. • Calcium gluconate gel will bind to the fluoride ions and prevent further tissue destruction, but it must be applied quickly (even if burns have not been felt) to be effective. • If not using calcium gluconate gel, continually rinse with water until treatment is provided. • Eye exposure: • Flush eyes for at least 15 minutes with large amounts of gently flowing water. • Take the victim to a doctor, preferably an eye specialist, as soon as possible. Use ice water compresses on the eyes during transportation. • Ingestion: • Administer a calcium-containing medication (such as Tums) if available. Magnesium-containing stomach medication or several glasses of milk may also be given.

Other	Emergencies & Spills	<ul style="list-style-type: none"> Any HF spill (no matter the size) is considered an emergency by EHS and will be cleaned up by EHS. Contact Dartmouth EHS by calling 603-646-1762. Contain the spill with paper towels or compatible spill pads (some spill pads have fiber glass these are not suitable for HF clean ups) until EHS arrives. For fire or potential for a fire – Pull nearest fire alarm pull station, evacuate the building and go to a safe location to dial 911. (In Borwell, Rubin and Williamson, dial 5555)
	Waste	<ul style="list-style-type: none"> Label any waste containers with the appropriate waste labels. Store in appropriate secondary containers (no glass or metal secondary containers). For waste pick up and disposal contact Dartmouth EHS by e-mailing ehs@dartmouth.edu
	Training	Dartmouth College requires certain training for employees. For this chemical Laboratory Safety/ Hazardous Waste Management is required. This training is mandatory for all personnel working in a teaching or research wet laboratory. It is an introductory program on laboratory safety and waste management in a biomedical, engineering, chemistry, earth science or physics lab at Dartmouth College. The course takes approximately 45 minutes to complete. Completion is required every three years.
	Medical Surveillance	
	Monitoring Requirements	<ul style="list-style-type: none"> Exposure limits: ACGIH TLV – 2 ppm ceiling, 0.5 ppm average over 8 hrs. OSHA PEL: 3 ppm.
	Questions	Contact Dartmouth Environmental Health and Safety by e-mailing us a ehs@dartmouth.edu calling 603-646-1762 or visting our website .

“I have read and understand this Guidelines. I agree to fully adhere to its requirements.”

Last	First	Dartmouth ID	Signature

Acknowledgement: Special thanks for Duke’s Occupational & Environmental Safety Office for their permission to use this great design for our chemical guidelines. All Dartmouth High Hazard Guidelines are based on [Duke OESO Chemical SOP’s and Guidelines](#)