



## Corrosives - Strong Acids

H290 H314 H315 H316 H318 H319 H320



**Prior to SOP approval, lab-specific information must be entered in the fields marked by blue boxes.**  
**This SOP is not a substitute for hands-on training.**

Print a copy and insert into your laboratory SOP binder.

Department:	
Date SOP was written:	
Date SOP was approved by PI/lab supervisor:	
Principal investigator/lab supervisor:	Name: Signature: _____
Internal lab safety coordinator or lab manager:	Name: Lab Phone: Office Phone:
Emergency contact:	Name: Phone Number:
Location(s) covered by this SOP:	

### 1. Purpose

This SOP covers the precautions and safe handling procedures for the use of corrosives - strong acids. For a list of corrosives - strong acids covered by this SOP and their use(s), see the "List of Chemicals". Procedures described in Section 12 apply to all materials covered in this SOP.

***If you have questions concerning the applicability of any recommendation or requirement listed in this procedure, contact the principal investigator/laboratory supervisor or the campus chemical hygiene officer at [ucbcho@berkeley.edu](mailto:ucbcho@berkeley.edu).***

### 2. Physical & Chemical Properties/Definition of Chemical Group

A strong acid is one that completely ionizes (dissociates) in a solution.

### 3. Potential Hazards/Toxicity



All acids in this class are highly corrosive chemicals. Inhalation may cause irritation to the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath, and pulmonary edema. Contact with skin causes burns and irritation. Eye contact causes burns, irritation, and may cause blindness. Ingestion may cause permanent damage to the digestive tract.

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) designates corrosives by one or more of the following H codes:

**H290** May be corrosive to metals

**H314** Causes severe skin burns and eye damage

**H315** Causes skin irritation

**H316** Causes mild skin irritation

**H318** Causes serious eye damage

**H319** Causes serious eye irritation

**H320** Causes eye irritation

Strong acids may also have other hazardous properties in addition to corrosivity. Safe use requires assessing all potential hazards.

It is the principal investigator's responsibility to ensure activity-specific laboratory procedures and/or processes are taken into account when using this Chemical Class SOP.

Please review the SDS of any chemical before use (see Section 11 – SDS Location).

Additional notes on chemical-specific hazards:

- Hydrofluoric acid: Causes severe burns that may not be immediately painful or visible. Symptoms of skin exposure may be delayed 8 hours or longer. Requires treatment with calcium gluconate – **chemical-specific SOP required.**
- Nitric acid – Strong oxidizer; may ignite or explode on contact with organic compounds.
- Perchloric acid – Strong oxidizer; may form explosive compounds – **chemical-specific SOP required.**
- Sulfuric acid can act as an oxidizer resulting in charring and decomposition of organic materials; it may act as a chemical de-hydrating agent, abstracting the elements of water from a molecule, sometimes forming flammable gases; sulfuric acid has a high heat of dilution.

#### 4. Engineering Controls

Use the engineering controls listed below unless other lab-specific information is included in the Protocol/Procedure section.

- Work with corrosives – strong acids must be conducted in a fume hood unless other controls are designated in the lab-specific Protocol/Procedure section. Sash height must be kept as low as possible to avoid escaping fumes and provide a physical barrier.
- Laboratories and rooms where strong acids are used must have general room ventilation that is negative pressure with respect to the corridors and external environment. The laboratory/room door must be kept closed at all times.

#### 5 - Personal Protective Equipment

At a minimum, the following PPE must be worn at all times.



### Eye and Face Protection

- A. ANSI Z87.1-compliant safety glasses with side shields, or chemical splash goggles.
  - Ordinary prescription glasses will NOT provide adequate protection unless they also meet ANSI standard and have compliant side shields.
- B. If the potential for explosion/splashing exists, and adequate coverage is not provided by the hood sash, a face shield must be worn.

### Skin and Body Protection

- A. Gloves are required when handling hazardous chemicals.
  1. Refer to specific chemical SDS for information on glove selection.
  2. For additional information on glove selection, go to:  
<http://ehs.berkeley.edu/hs/63-laboratory-safety/94-glove-selection-and-usage.html>
- B. Lab coats are required when handling hazardous chemicals in the lab. Select the type of lab coat according to the substances at the specific workplace.
- C. Long pants, closed-toe/closed-heel shoes, and covered legs and ankles.

### Respiratory Protection

Respiratory protection is normally not required for UC Berkeley laboratory activities. Any lab personnel considering the use of a respirator (e.g., N-95 respirator, dust mask) must contact EH&S for a workplace assessment.

## 6. First Aid Procedures and Medical Emergencies

*In the event of an injury, notify your supervisor immediately and EH&S within 8 hours.*



*Go to the Occupational Health Facility (Tang Health Center, on campus); if after hours, go to the nearest emergency room (Alta Bates, 2450 Ashby Ave in Berkeley); or*



*Call 911 (from a cell phone: 510-642-3333) if:*

- *it is a life threatening emergency; or*
- *you are not confident in your ability to fully assess the conditions of the environment and/or the condition of the contaminated/injured person, or you cannot be assured of your own safety; or*
- *the contaminated/injured person is not breathing or is unconscious.*

*Please remember to provide a copy of the appropriate manufacturer SDS (if available) to the emergency responders or physician. At a minimum, be ready to provide the identity/name of any hazardous materials involved.*

**Note:** Hydrofluoric acid (HF) burns require immediate and specialized first aid and medical treatment. Symptoms may be delayed up to 24 hours depending on the concentration of HF. First aid requires treatment with calcium gluconate. See chemical specific HF SOP for more details.

#### In case of skin contact

Immediately drench in the safety shower with copious amounts of water for no less than 15 minutes to remove any remaining contaminants; remove any jewelry or clothing as necessary to facilitate clearing of any residual materials. Wash off with soap and plenty of water for 15 minutes.

#### In case of eye contact



Rinse thoroughly with plenty of water using an eyewash station for at least 15 minutes, occasionally lifting the upper and lower eyelids. Remove contact lenses if possible.

**If swallowed**

Do NOT induce vomiting unless directed otherwise by the SDS. Never give anything by mouth to an unconscious person. Rinse mouth with water.

**Needle stick/puncture exposure**

Wash the affected area with antiseptic soap and warm water for 15 minutes.

**If inhaled**

Move into fresh air.

## 7. Special Handling, Storage, and Disposal Requirements

Lab-specific information on handling and storage may be included in the Protocol/Procedure section.

### Precautions for Safe Handling

- Do not allow water to get into the containers because of potentially violent reactions. Do not get in eyes, on skin, or on clothing.
- When mixing with water, always add acids slowly to the water and stir continuously. Never add water to acid.
- Strong acids that are also oxidizers may react violently with organic compounds.
- Eliminate or substitute for a less hazardous material when possible.
- Design your experiment to use the least amount of material possible to achieve the desired result.
- Do not exceed the scale of procedures specified in Protocol/Procedure section without approval of the PI.
- Verify your experimental set-up and procedure prior to use.
- Know the location of the nearest eyewash, safety shower, and fire extinguisher before beginning work.
- Upon leaving the work area, remove any personal protective equipment worn and wash hands.
- At the end of each project, thoroughly decontaminate the work area according to the material being handled.

### Conditions for Safe Storage

- Store in a cool, dry, well-ventilated area away from incompatible substances.
- Strong acids must be stored in isolation from all other chemicals in an approved acid or corrosives safety cabinet. If no corrosive cabinet is available, use secondary container to store acids.

### Disposal

- Waste materials generated must be treated as hazardous waste.
- The empty container must be rinsed three times with a COMPATIBLE solvent; leave it open in the back of the fume hood overnight. Solvent rinses and water rinse must be disposed of as hazardous waste.
- As an alternative, unrinsed empty containers can be disposed of through EH&S as hazardous waste. The unrinsed empty containers must be capped.
- Do not mix with incompatible waste streams.
- Decontamination of the empty container in order to use it for other purposes is not permitted.



## 8. Chemical Spill

**Spill** – Assess the extent of danger; if necessary, request help by calling **911** (from a cell phone: **510-642-3333**) for emergency assistance or 510-642-3073 for non-life-threatening situations. If you cannot assess the conditions of the environment well enough to be sure of your own safety, do not enter the area. If possible, help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors from spill. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

- **Minor Spill** – In the event of a minor spill, if there is no potential for hazardous chemical exposure, report the spill to 510-642-3073 and proceed to clean it if you are trained. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label, and request pick-up.
- **Major Spill** – Any hazardous chemical spill that involves chemical exposure, any chemical spill that due to size and/or hazard requires capabilities beyond your training, or any chemical spill that gives the perception (e.g., because of odor) that there has been a hazardous release. Call **911** or 510-642-3073 for assistance.

## 9. Cleaning and Decontamination

Lab-specific information on decontamination may be included in Section 12 - Protocol/Procedure.

- Wearing proper PPE, laboratory work surfaces must be cleaned at the conclusion of each procedure and at the end of each work day.
- Decontaminate all equipment before removing from a designated area.

## 10. Hazardous Waste Disposal

Label Waste

- Label all waste containers. See the EH&S Fact Sheet, “Hazardous Waste Management” for general instructions on procedures for disposing of hazardous waste.

Dispose of Waste

- Dispose of regularly generated chemical waste within 6 months.
- Contact EH&S at 510-642-3073 if you need assistance.

## 11. Safety Data Sheet (SDS) Location

SDS can be accessed online at <http://ucsd.com>



## -Take Ownership of Your Safety-



**Before starting any work, ask yourself:**

- 1- **What will I be doing?**
- 2- **Do I know what the hazards are?**
- 3- **Do I have everything I need to do the job safely?**
- 4- **Am I doing the job safely?**
- 5- **What can we do better?**



12. Protocol/Procedure – Corrosives – Strong Acids

Section 12 must be customized to your specific needs. Delete any procedure that does not apply to your laboratory.

Procedure/Use	Scale	Engineering Controls/Equipment	PPE (eye, face, gloves, clothing)	Procedure Steps and Precautions
	Remember to obtain PI approval if higher scale is necessary.			
Notes	Any deviation from this SOP requires approval from PI.			



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