



Corrosive Chemicals

Description

This standard operating procedure outlines the handling and use of corrosive chemicals. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when handling corrosive chemicals.

Potential Hazards

Corrosive chemicals can cause destruction of living tissue by chemical action at the site of contact and can be solids, liquids, or gases. Corrosive effects not only can occur on the skin and eyes, but also in the respiratory tract and, in the case of ingestion, in the gastrointestinal tract as well. While acids and bases are familiar corrosives, many other materials are corrosive to the body as well (including [bleach](#) and [phenol](#)).

Review the Safety Data Sheet (SDS) of the material to determine if it is corrosive and to identify other hazards. If the material also has other physical hazards or health hazards, follow those appropriate SOPs as well.

Refer to SOP templates for [hydrofluoric acid](#), [perchloric acid](#), [phenol](#), and [bleach](#).

*Acutely toxic and reactive acids meeting the MIOSHA definition of a **Particularly Hazardous Substance** (see below) require [customized SOPs](#) with principal investigator approval that incorporate their toxic and/or reactive hazards.*

NOTES:

The University of Michigan-Flint [Chemical Hygiene Plan](#) requires specific measures to take in order to ensure laboratory employee protection, including provisions for additional employee protection for work with Particularly Hazardous Substances. These include "select carcinogens," reproductive toxins and substances which have a [high degree of acute toxicity](#), e.g., hydrogen cyanide, hydrogen sulfide, and nitrogen dioxide.

Specific consideration shall be given to the following provisions which shall be included where appropriate for each **Particularly Hazardous Substance**:

- A. Establishment of a designated area;
- B. Use of containment devices such as fume hoods or glove boxes;
- C. Procedures for safe removal of contaminated waste; and
- D. Decontamination procedures.

EHS can assist researchers by providing additional information on working with Particularly Hazardous Substances. General guidelines and recommendations for the safe handling, use and control of hazardous chemicals and particularly hazardous substances can be found in a chemical's [SDS](#) and in other [chemical hazard references](#).

Engineering Controls

Where the eyes or body of any person may be exposed to corrosive chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. *Bottle type eyewash stations are not acceptable.*

A safety or drench shower should be available in a nearby location where the corrosive material is used.

Depending on the material's pH or based on its ability to cause severe tissue damage, e.g., formaldehyde, methylene chloride, methyl ethyl ketone peroxide (MEKP), phenol, etc., the location of the emergency shower and/or emergency eyewash shall be within [25 to 100 feet from the hazardous operation](#).

Manipulation of some corrosive materials outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to corrosive materials in the laboratory and are the preferred ventilation control device.

Work Practice Controls

Segregate the various types of corrosives. Separate acids and bases. Liquids and solids should also be separated. Specially designed corrosion resistant cabinets should be used for the storage of large quantities of corrosive materials. Store corrosives on plastic trays. Do not store corrosive materials on high cabinets or shelves.

Nitric acid should be stored in secondary containment in a well-ventilated area that is separated from organics and other combustible materials and incompatibles. Also refer to the SOPs for hydrofluoric acid, nitric acid, picric acid and sulfuric acid.

Containers: All corrosive chemicals must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

NOTES:

Employers may choose to label secondary, portable or in-house workplace containers with [label alternatives](#) that meet the requirements for the new Hazard Communication Standard (HCS). Alternative labeling systems such as the National Fire Protection Association (NFPA) the Hazardous Material Information System (HMIS) are permitted for workplace containers. However, the information supplied on these labels must be consistent with the revised HCS, e.g., ***no hazard warnings or pictograms that conflict with GHS.***

Personal Protective Equipment (PPE)

In order to select the appropriate PPE for the workplace, a Hazard Assessment is conducted. The Hazard Assessment determines the hazards and potential hazards associated with a task, machinery, or process. The appropriate PPE for the situation may be subsequently determined. Contact EHS at (810) 766-6763 to obtain a copy of the Hazard Assessment Form. The form may be completed by Environment, Health and Safety, workplace supervisor, laboratory supervisor or principal investigator.

Eye protection in the form of safety glasses must be worn at all times when handling corrosive materials. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the ***American National Standard for Occupational and Educational Personal Eye and Face Protection Devices (ANSI/ISEA Z87.1)*** and must be equipped with side shields (that also meet the requirements of ANSI/ISEA Z87.1). Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn. It is recommended that face shields be worn when a splash potential exists with corrosive materials.

Gloves must be worn when handling corrosive chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Below are some glove material recommendations for some common acids.

Acid	Recommended Glove Materials ¹
Acetic Acid	<ul style="list-style-type: none"> • Butyl (Unsupported) • Latex (Unsupported Natural Rubber) • Neoprene • Nitrile (Unsupported) • Polyvinyl Chloride (PVC)
Hydrochloric Acid	<ul style="list-style-type: none"> • Butyl • Neoprene • Nitrile • Polyvinyl Chloride (PVC)
Nitric Acid	<ul style="list-style-type: none"> • Butyl • Natural Rubber • Neoprene
Phosphoric Acid	<ul style="list-style-type: none"> • Natural Rubber • Neoprene • Nitrile • Polyvinyl Chloride (PVC)
Sulfuric Acid	<ul style="list-style-type: none"> • Butyl • Neoprene • Polyethylene • Polyvinyl Chloride (PVC)

1. The recommendations above are based on typical laboratory concentrations and uses. Refer to the acid's SDS as well as [Glove Compatibility Charts](#) for each particular concentration of acid for additional recommendations, especially for unusual concentrations or use of a particular acid.

Lab workers should contact EHS for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated. [EHS's Glove Compatibility](#) webpage can also be used to determine the recommended gloves.

Lab coats, long pants, closed toed shoes and long sleeved clothing should be worn when handling corrosive materials. Additional protective clothing should be worn if the possibility of skin contact is likely.

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of corrosive materials which pose this risk should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants, are acceptable.

Transportation and Storage

- Transport corrosives in secondary containment, preferably a polyethylene or other non-reactive acid/solvent bottle carrier.
- Store in well-ventilated areas with secondary containment, such as a non-reactive plastic bin.
- Store below eye level.
- Store away from metal (unless the metal has a corrosion-proof coating), and do not store under the sink.
- Store away from incompatibles – many corrosive materials are incompatible with each other – oxidizing acids are incompatible with organic acids, and acids are incompatible with bases. Review the chemical's Safety Data Sheet (SDS) for additional incompatibility information. Also refer to EHS's Chemical Storage webpage for more information.
- Avoid storing on the floor. If storing on the floor is necessary, use secondary containment.

Waste Disposal

Most spent, unused and expired corrosive materials are considered hazardous wastes and **must be collected and disposed of within 90-days** by Environment, Health and Safety (EHS). Contact EHS at (810) 766-6763 for waste containers, labels, manifests, waste collection and for any questions regarding proper waste disposal. Also refer to UM-Flint Hazardous Waste Management Program and EHS webpage <http://www.umflint.edu/ehs/environment-health-and-safety> for more information.

Exposures/Unintended Contact



If the employee is in need of emergency medical attention, call 911 immediately.



Personnel: Immediately flush contaminated area with copious amounts of water after contact with corrosive materials. Remove any clothing and/or jewelry to facilitate removal of chemicals. If a delayed response is noted, report immediately for medical attention. Be prepared to detail what chemicals were involved.

If the incident involves **Hydrofluoric acid (HF)**, seek immediate medical attention. Also refer to UM-Flint's SOP for HF ([link to SOP](#)).

If there is any doubt about the severity of the injury, seek immediate medical attention.

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the [Illness and Injury Report Form](#) to WorkConnections within 24 hours. Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the [EHS Laboratory Incident and Near-Miss Report Form](#). This will be valuable in improving laboratory safety on UM-Flint campus.

TREATMENT FACILITIES:

MAJOR INJURIES	MINOR INJURIES –During Business Hours	MINOR INJURIES –After Business Hours
Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710 Hurley Medical Center One Hurley Plaza Flint, MI 48503 (810) 262-9000 McLaren Hospital Flint 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000	Genesys Occupational Health Network 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. & Sun. Noon to 8 pm McLaren Flint-Burton OCC Center 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat & Sun 10 am to 2 pm	Downtown Flint 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550 Genesys East 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351 Genesys North 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397 Genesys South 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

Spill Procedures

Area: Decontamination procedures vary depending on the material being handled. The corrosivity of some materials can be neutralized with other reagents. Special neutralizing agents should be on hand to decontaminate areas.

- When a spill occurs, ***personal safety should always come first.***
- Alert and clear everyone in the immediate area where the spill occurred.
- Use proper personal protective equipment (PPE) as noted above.

A **minor (small) chemical spill** is one of a known chemical that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., (*less than 1 liter*). A **major/large chemical spill** requires active assistance from emergency personnel.

Additional Spill Response Steps:

MINOR CHEMICAL SPILL

- Alert people in immediate area of spill.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- Open outside windows, if possible.
- Use proper personal protective equipment (PPE) as noted above.
- Avoid breathing vapors from spill.
- Confine spill to as small an area as possible.
- **Do not wash spill down the drain.**
- Use appropriate spill kits/sorbents to neutralize corrosives and/or absorb spill. Collect contaminated materials and residues and place in container. For powdered chemicals sweep carefully to avoid generation of dust or, if

appropriate, use moist sorbent pads or wet the powder with a suitable solvent and then wipe with a dry cloth. Contact EHS at (810) 766-6763 for proper disposal.

- Clean spill area with water.

MAJOR CHEMICAL SPILL

Report large chemical spills in corridors or common areas, e.g., hallways, elevators, eating areas, rest rooms, offices, etc., to UM-Flint Department of Public Safety (DPS) at (810) 762-3333 (*or 911*).

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- **Call UM-Flint DPS at 911 from any university phone or (810) 762-3333 from any cell phone or non-university phone immediately for assistance.**
- Close doors to affected area.
- Post warnings to keep people from entering the area.
- Have person available that has knowledge of incident and laboratory to assist emergency personnel.

Additional Spill Links:

- www.oseh.umich.edu/pdf/chemspil.pdf
- <http://www.oseh.umich.edu/emer-chemical.shtml>.

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan-Flint Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

Training of Personnel

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the ***Comprehensive Laboratory Safety*** session (**BLS009** or equivalent) via [MyLINC](#), or UM-Flint EHS on-line training or other equivalent approved by EHS. Furthermore, all personnel shall read and fully adhere to this SOP when handling corrosive chemicals.

Certification

I have read and understand the above SOP. I agree to contact my Supervisor or Lab Manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator? YES NO

Principal Investigator _____

Revision Date _____