

## Corrosives

### Section 1 – Lab-Specific Information

<b>Department:</b>	College of Engineering – Discovery Learning Labs
<b>Date SOP was written:</b>	10/29/2018
<b>Date SOP was approved by PI/lab supervisor:</b>	<a href="#">Click here to enter a date.</a>
<b>Principal Investigator:</b>	Thomas Silman
<b>Internal Lab Safety Coordinator/Lab Manager:</b>	Thomas Silman
<b>Lab Phone:</b>	414-288-4602
<b>Office Phone:</b>	414-288-5423
<b>Emergency Contact:</b>	Thomas Silman 414-350-5432
<b>Location(s) covered by this SOP:</b>	<i>Engineering Hall – Discovery Learning Labs Complex</i>

## Section 2 – Type of SOP:

Process       Hazardous Chemical       Hazardous Class

## Section 3 – Physical / Chemical Properties and Uses

### Physical / Chemical Properties:

CAS#: N/A

GHS Classification: Corrosive

Molecular Formula: N/A

Form (physical state): Liquid or Solid

Color: N/A

Boiling Point: N/A

Flash Point: N/A

Lower Explosive Limit: N/A

Upper Explosive Limit: N/A

Relative Vapor Density: N/A

### Uses:

Acid and bases are common laboratory chemicals that are also used in plastic production, cleaning and descaling agents, detergents, fertilizers, oil-refining, and paper manufacturing, among others. Sulfuric acid is the electrolyte in lead-acid batteries. Aqueous potassium hydroxide is employed as the electrolyte in alkaline batteries based on nickel-cadmium and manganese dioxide-zinc. Most corrosive materials are hygroscopic, meaning they readily absorb moisture in air.

### Important Definitions:

- **Acid**- Any chemical compound which, when dissolved in water, gives a solution with a pH of less than 7.0.
- **Mineral Acid**- A compound having atoms of hydrogen, identifying nonmetal (typically chlorine, sulfur, or phosphorus), and maybe oxygen. Sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) and Hydrochloric acid (HCl) are examples of mineral acids.
- **Organic Acid**- An organic compound with acidic properties. Generally, Organic acids are also flammable. Acetic acid (CH<sub>3</sub>COOH) and Formic acid (HCOOH) are examples of organic acids.
- **Base**- Any chemical compound which, when dissolved in water, gives a solution with a pH of greater than 7.0.

## Section 4 – Potential Hazards

Corrosive. May be harmful if inhaled, ingested, or absorbed through the skin. 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. It is destructive to the tissue of the mucous membranes and upper respiratory tract. Acids and bases may have other hazards associated with them, such as

flammability, oxidizer, or toxicity. Note: Refer to SOP of Hydrofluoric acid (HF) for specific hazards and safety information.



## Section 5 – Personal Protective Equipment (PPE)

### Respirator Protection:

If corrosives are being used outside of a chemical fume hood, respiratory protection may be required. If this activity is absolutely necessary, contact EH&S so a respiratory protection analysis can be performed. Respirators should be used under any of the following circumstances:

- As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
- When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
- Regulations require the use of a respirator.
- An employer requires the use of a respirator.
- There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
- As PPE in the event of a chemical spill clean-up process
- Lab personnel intending to use/wear a respirator mask must be trained and fit-tested. This is a regulatory requirement. Contact EH&S 8-8411 regarding respirator clearance.

### Hand Protection:

Gloves must be worn. Use proper glove removal technique to avoid any skin contact. Nitrile gloves are recommended. Check the resources below for the most suitable glove.

**NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with the specific oxidizing liquids or solids being used.

Refer to glove selection chart from the links below:

[http://www.ansellpro.com/download/Ansell\\_8thEditionChemicalResistanceGuide.pdf](http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf)

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

### Eye Protection:

ANSI approved properly fitting safety glasses or chemical splash goggles are required. A face shield may also be appropriate depending on the specific application.

### **Skin and Body Protection:**

Laboratory coats must be worn and be appropriately sized for the individual and buttoned to their full length. Laboratory coat sleeves must be of sufficient length to prevent skin exposure while wearing gloves. Personnel should also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed.

### **Hygiene Measures:**

Wash thoroughly and immediately after handling. Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.

## **Section 6 – Engineering Controls**

Use of corrosives should be conducted in a properly functioning chemical fume hood whenever possible. The chemical fume hood must be approved and certified by EH&S and have a face velocity between 85 – 125 feet per minute.

## **Section 7 – First Aid Procedures**

### **If inhaled:**

Move into the fresh air immediately. Consult a physician. If not breathing give artificial respiration and seek immediate medical attention.

### **In case of skin contact:**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash any contaminated clothing before reuse. Thoroughly clean shoes before reuse. Consult a physician.

### **In case of eye contact:**

Check for and remove any contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Seek immediate medical attention.

### **If swallowed:**

Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Seek immediate medical attention.

## **Section 8 – Special Handling and Storage Requirements**

- Do not over purchase; only purchase what can be safely stored in the laboratory.
- Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Avoid formation of dust.
- Always use inside a chemical fume hood.
- Note: In case you need to dilute the concentration of acids, always add acid to water.
- Keep container upright & tightly closed in a dry and well-ventilated place.
- Containers which are opened must be carefully resealed and kept upright to prevent leakage.
- Keep away from sources of ignition. Avoid heat and shock or friction when handling.
- Store in original container. Acids should not be stored in metal containers.

- Keep away from incompatible materials. Acids and bases should not be stored together. Organic acids and Oxidizing acids must be stored separately or with proper secondary containment (see below).



Fig.1- Demonstration of proper use of secondary containment with Organic and Oxidizing acids

- Use in the smallest practical quantities for the experiment being performed.
- Work must be conducted in a chemical fume hood if the chemical is irritating to the eyes or respiratory system, and/or is toxic by inhalation.
- Containers should remain closed when not in use.
- Containers should be labeled appropriately. Label should indicate the name of the chemical(s) in the container. Avoid using chemical abbreviations (acceptable if a legend is present in the lab) and formulae.
- Containers should be in good condition and compatible with the material.
- Transport all corrosives in secondary containment, such as polyethylene or other non-reactive acid/solvent bottle carrier.
- Corrosives must be segregated from incompatible materials. Incompatibilities will be noted in Section 10 of the SDS, “Stability and Reactivity”.

## Section 9 – Spill and Accident Procedures

### Chemical Spill Dial 8-1911

Immediately evacuate area and ensure others are aware of the spill. If there is an imminent threat of a fire, pull the nearest fire alarm station to evacuate the building and dial 8-1911. If the spill is minor and does not pose a threat to personnel, contact EH&S at 8-8411 during normal business hours (7:30 AM – 4:30 PM) for spill cleanup assistance (dial 8-1 911 if spill occurs after hours and assistance is needed).

### Chemical Spill on Body or Clothes:

Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention; dial 8-1911.

### Chemical Splash into Eyes:

Immediately rinse eyes and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention; dial 8-1911.

## Section 10 – Medical Emergency

### Life Threatening Emergency, After Hours, Weekends And Holidays:

Dial 8-1911

### Non-Life Threatening Emergency:

Immediately report injury to supervisor and complete the First Report of Injury.

## **Section 11 – Waste Disposal Procedures**

### **Label Waste:**

Corrosive waste cannot be disposed of down the drain. When possible, do not mix acidic and basic waste streams. Make sure the waste container(s) is properly labeled; label should indicate all of the contents of the container. EH&S provides hazardous waste labels free of charge, contact [dennis.daye@marquette.edu](mailto:dennis.daye@marquette.edu) to obtain labels.

### **Store Waste:**

Store hazardous waste in closed containers, and in a designated area.

### **Dispose of Waste:**

Complete a Chemical Waste Pickup Request Form to arrange for disposal by EH&S. Contact [dennis.daye@marquette.edu](mailto:dennis.daye@marquette.edu) or visit the EH&S webpage for questions.

[http://www.marquette.edu/riskunit/environmental/documents/waste\\_disposal\\_form.pdf](http://www.marquette.edu/riskunit/environmental/documents/waste_disposal_form.pdf)

No oxidizing liquids or solids are permitted to be poured down the drain.

## **Section 12 – Safety Data Sheet (SDS)**

A current copy of the SDS for the specific corrosive chemical being used must be made available to all personnel working in the laboratory at all times. To obtain a copy of the SDS, refer to Marquette's MSDS library

[http://www.marquette.edu/riskunit/environmental/documents/msds\\_library.pdf](http://www.marquette.edu/riskunit/environmental/documents/msds_library.pdf) or contact the chemical manufacturer. Many manufacturers' SDSs can be found online on websites such as Sigma-Aldrich (<http://www.sigmaaldrich.com/united-states.html>) or Siri MSDS Index (<http://hazard.com/msds/>).

## **Section 13 – Protocol/Procedure (Additional lab protocol may be added here)**

Not applicable at this time.

**NOTE:** Any deviation from this SOP requires approval from PI.

**Section 14 – Documentation of Training (signature of all users is required)**

- Prior to conducting any work with corrosives, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last one year.

**I have read and understand the content of this SOP:**

Name	Signature	Date
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