**Lab-Specific Standard Operating Procedures for General Hazard Classes: Corrosive Materials**

**Introduction**

The hazard class Standard Operating Procedures (SOPs) provided by the Department of Environmental Health and Safety (DEHS) are intended as a voluntary resource to provide general guidance on how to work with these materials and to provide a template for laboratories to customize to fit their needs.

These SOPs templates should be used for materials with one hazard class and for procedures and materials requiring only basic PPE (i.e., lab coats, goggles, and nitrile gloves).

For more complex procedures and materials with multiple hazards these templates can be used as guidance when conducting your lab’s own risk assessment, and writing procedure specific SOPs.

If you have any questions about writing Standard Operating Procedures, chemical safety, hazard assessment, or any other research safety questions, contact your Departmental Safety Officer (DSO) or call your DEHS Research Safety Professional (612) 626-6002.

**Instructions**

All text or spaces in yellow are intended for customization by your laboratory. Fill in the information needed, customized for your lab’s accepted practices, materials used, available resources, etc. Consider which materials your lab uses in the hazard class, and what your lab is experienced with and feels comfortable handling. You can also add any specific information, best practices, or other lab-specific information you would like.

If you are unsure if a specific material or procedure requires its own SOP, contact DEHS for guidance.

When complete, ensure the SOP is approved by the lab’s PI and added to your lab’s safety manual and annual training. SOPs should be reviewed with all lab members annually, and should be reviewed and updated at a minimum of every 3 years.

**Lab-Specific Standard Operating Procedure**

**Safe Use and Handling of Corrosive Materials**

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| ***PI:*** | *Malone, S.* | ***Lab Location:*** | *Boynton W-132* |
| ***Issue Date:*** | *9/12/2016* | ***Revision Date:*** | *9/12/2019* |
| ***Prepared by:*** | *Clavin, C.* | ***Approved by:*** | *Peterson, N.* |

***Hazard Identification***

Corrosive material containers must be labeled at a minimum with the name of the contents and the word “Corrosive” or the GHS pictogram for corrosive materials, pictured to the right. Information on the specific hazards of specific materials can be found in their SDS.

Examples of corrosives in use in the Malone lab include:

* Example 1
* Example 2
* Example 3

***Risk Assessment***

The primary risks of working with corrosive materials are the potential for inhalation of mists resulting in lung damage, and burns or irritation resulting from accidental contact with the skin or eyes.

This SOP should not be used for nitric acid, perchloric acid, hydrofluoric acid, picric acid, piranha solutions, and aqua regia because of specific requirements and hazards. Chemical-specific SOPs should be written by your lab for use of these materials. Fact sheets containing additional information on some of these materials can be found in the Reserarch Safety [document library](https://dehs.umn.edu/document-library).

Corrosives may have additional hazards associated with them, such as toxicity, flammability, or peroxide formation. Materials with additional hazards are not addressed in this SOP – instead, a material-specific SOP must be written.

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| **Lab-Specific Working Limits** | |
| **Maximum Storage Amount** | *List the maximum amount of this hazard class that is allowed to be stored in your lab.* |
| **Maximum Scale** | *List the maximum amount of a chemical with this hazard class that your lab allows to be used at one time* |
| **Maximum Concentration (if applicable)** | *List the maximum concentration that your lab allows to be used* |
| **Working Temperature Range** | *List the general range of temperatures where your lab allows work with this hazard class. This can be very general, as all chemicals may be slightly different* |
| **Working Pressure Range** | *List the range of pressures where your lab allows work with this hazard class.* |
| **Allowable Container Types** | In general, corrosives should be kept in their original shipping containers. Otherwise, glass or plastic bottles are recommended. Glass containers may not be more than 1 gallon. No container may be larger than 5 gallons (20 L). |

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| **Transfer and Transportation Limits** | |
| **Maximum out of hood** | *List the maximum amount of corrosive material that your lab allows to be used/transferred outside of the hood.* |

***Control Plan***

*Storage and Transport*

* Store corrosives separate from incompatible materials. Corrosive gases should be stored separately from other corrosives.
* Inorganic and organic acids are incompatible with each other as well as being incompatible with bases, flammable liquids and solids, cyanide or sulfide containing chemicals, household bleach, window cleaner (ammonium hydroxide), oxidizers, metals, and other easily ignitable materials.
* Salts/crystals may accumulate on bottles or containers especially when acids and bases are stored in the same cabinet or if containers are not tightly closed. Regularly wipe down the threads inside the caps of bottles and containers to reduce accumulation. If you feel uncomfortable with doing this, contact DEHS at (612)-626-6002 for assistance.
* Plastic or glass bottles are recommended to prevent a reaction between the contents and the vessel.
* Corrosives should be stored in cabinets made of a corrosion-resistant material such as plastic, wood, and stainless steel. Special attention should be given to the hinges, shelf brackets, latches and any other metallic pieces for the presence of corrosion or the loss of integrity.
* When moving corrosives through public spaces, corrosive containers should be fully enclosed so the contents would be contained if the bottle was dropped or broken.
* Chemical storage cabinets must be kept closed. If the cabinet is not connected to ventilation, bungs must also be kept closed. If ventilated, the bottom bung should be used for venting because corrosive vapors tend to be heavier than air. If the cabinet venting stops working, clean the screen with a wire brush.
* If you are moving containers between campuses, or will be shipping any material, contact DEHS at (612)-626-6002 before doing so.

*Set-Up and Active Work*

* Containers with large openings, such as beakers, baths, or vats, may result in higher rates of vapor generation. Using these containers with ventilation controls, such as a fume hood, is recommended when the container will be uncovered and used for more than a few minutes.
* Dispensing or transfers of highly concentrated corrosives must be done in a fume hood or with other appropriate ventilation. Consider using ventilation for other transfers as well.
* Good transfer and dispensing technique includes securing the receiving container, transferring at a slow rate, minimizing turbulent flow, keeping close contact between containers, and using a funnel.

**Minimum PPE Requirements**

PPE requirements include:

* Lab coat (if applicable to your lab)
* Safety glasses/goggles (if applicable to your lab)
* Nitrile gloves (if applicable to your lab)
* Additional PPE (if applicable)

If procedure or material-specific PPE is required beyond the minimum listed above, another SOP should be available for that procedure or material. (Example: cartridge respirator, neoprene gloves, etc.)

***Spill & Accident Planning/What-If***

During lab-specific training, researchers should be informed where fire extinguishers, safety showers, alarm pull stations, and egress routes are. All labs are set up so that this emergency equipment is readily available and near exits.

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| **Lab-Specific Emergency Response Procedures** | |
| **Small Fire** | *Define what (if any) fires your lab allows to be handled internally. Describe lab-specific response procedures.* You are never required to attempt to extinguish a fire – it should only be attempted it if can be done safely and you are comfortable doing so. |
| **Large Fire** | Move away from the fire and contain it by shutting doors or sashes. Notify others and call 911. Pull the fire alarm as well, if available. Evacuate the area. |
| **Small Spill** | *List the maximum amount of spill that your lab is comfortable with and prepared for cleaning up yourselves. Describe your lab-specific response procedures.* |
| **Large Spill** | If the spill is larger than XX liters, >1 liter in a public area, reaches a drain, or is a stench chemical, contact DEHS for assistance at (612) 626-6002. Close sashes or doors to isolate the spill and evacuate yourself and others from the area. |
| **Utility Failure** | *Describe lab-specific procedures related to corrosive materials for responding to a power, water, or gas outage.* |

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| **Route of Exposure** | **Signs/Symptoms of Exposure** | **First Aid/Response** |
| **Inhalation** | Coughing, burning sensation, difficulty breathing | Move person to fresh air. Consider rinsing nose with water if severely irritated. Seek medical attention if symptoms do not improve. |
| **Eye Absorption/Contact** | Splashes into eyes, burning, stinging | Use emergency eyewash and rinse eyes for a minimum of 15 minutes. Seek medical attention |
| **Skin Contact** | Burning sensation (caused by the reaction with organic material) | Remove contaminated gloves or clothing, flush with large amounts of water at low pressure. If major exposure, use safety shower. If necessary, seek medical attention |
| **Ingestion** | Ingestion is unlikely in the standard lab setting. | Seek medical attention. |
| **Injection** | Injection is unlikely in the standard lab setting. | Seek medical attention. |

All fires, injuries, or damage to the facility must be reported to and investigated by DEHS. Injuries which require medical treatment require a First Report of Injury (FROI) to be filed.

***Waste Storage and Disposal***

* Plastic or glass bottles are recommended to prevent corrosion of the container.
* Glass containers may not be larger than 1 gallon.
* Mixing of an oxidizing acid with an organic material in the same waste bottle can cause over pressurization and explosion of the bottle. Ensure waste bottles are rinsed before use and prominently label and/or physically separate incompatible waste streams to reduce the possibility of accidental mixing.
* Neutralizing corrosive waste doesn’t always render it non-hazardous due to trace contaminants from your reaction mixture. These must be indicated on your waste form to prevent improper disposal. Possible contaminants may include metals, organics, azides, mercury, or others.
* More information on hazardous waste procedures and pick-up is available on the UHS [Regulated Waste](https://dehs.umn.edu/hazardous-waste-disposal-procedures) web page

In the Malone lab, hazardous waste is stored: *list the location of your hazardous waste storage area(s).*