



Phenol

Principal Investigator (PI) Approval is Required Prior to Performing this Procedure

Description

This standard operating procedure outlines the handling and use of phenol. 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 phenol.

Phenol is used as a reagent in chemical analysis. It causes burns and risk of serious damage to eyes. Phenol is toxic by inhalation, in contact with skin and if swallowed.

Potential Hazards

- Phenol is very hazardous in case of skin contact – it is corrosive, toxic, and can cause irritation. Initially, it can cause numbness or slight tingling, so employees may not be immediately aware of contact. If absorbed through the skin it can cause muscle weakness, tremors, loss of coordination, shock, sudden collapse, coma, convulsions, organ damage, and death. It may cause severe eye injury (including blindness) if it contacts the eyes, and is extremely toxic (fatal) by ingestion.
- Inhalation exposure is less likely – it does not evaporate easily at room temperature, but can be inhaled if heated and/or misted, or in the case of a large spill. If inhaled, phenol can cause upper respiratory irritation, lung damage, and CNS impairment.
- For more safety information, refer to Prudent Practice's [Laboratory Chemical Safety Summary for Phenol](#).

Occupational Exposure Limits (OELs):

- MIOSHA PEL and ACGIH TLV: **5 ppm**, 8-hour TWA

Engineering Controls

An eyewash (preferably eyewash/drench hose combination unit) must be located in the immediate area. If medium-large quantities are used (>~100 ml of 100% phenol), a safety shower is also required. Contact Environment, Health and Safety at (810) 766-6763 for an assessment of the need for a safety shower if one is not available. Work with large open containers should be performed only in a chemical fume hood. Small amounts can be handled safely on the bench top, as long as skin contact is avoided.

Work Practice Controls

- Designate areas where phenol is stored or manipulated.
- It is highly recommended that labs using phenol (or reagents containing phenol – e.g., TRIzol) have polyethylene glycol 300 or 400 (PEG-300 or PEG-400) on hand in case of dermal exposure.
- Purchase in the smallest container that is practical for lab use.
- Purchase in a shatter-resistant container if available (such as PVC-coated glass).
- Keep containers closed as much as possible.
- Use in the smallest quantities and lowest concentration practicable for the experiment being performed.

- After work with phenol is complete, wipe down work area with soap and water solution.

Personal Protective Equipment

- Wear neoprene or doubled nitrile laboratory gloves, safety glasses, and lab coat. If gloves are splashed, remove them immediately and put on a new pair of gloves. If splashes may occur, wear a face shield with chemical splash goggles, and an impervious apron over the lab coat.
- If phenol and chloroform will be used together, please note that chloroform easily penetrates nitrile gloves and can degrade them, allowing phenol to contact the skin. Plan work to avoid glove contact and change gloves immediately if there is a splash. If extensive work with phenol and chloroform is done in the lab, consider the reusable [ChemTek Viton/Butyl glove](#) made for work with both of these chemicals (or they can be used for spill clean-up).

Transportation and Storage

- Transport phenol in secondary containment, preferably a polyethylene or other non-reactive acid/solvent bottle carrier.
- Keep container in cool, well-ventilated area.
- Keep container tightly closed and sealed until ready for use.
- Store in secondary containment away from moisture, strong oxidizers, strong caustics, plastics, rubber, nitric acid, water + heat, and chemically active metals, such as aluminum and magnesium powder, sodium, potassium, and lithium.
- Store below eye level.
- Avoid storing on the floor.
- Avoid ignition sources.

Waste Disposal

Handle and store hazardous waste following the guidelines above for work practice controls, transportation and storage. Because most spent, unused and expired chemicals/materials are considered hazardous wastes, they must be properly disposed of. ***Do not dispose of chemical wastes by dumping them down a sink, flushing in a toilet or discarding in regular trash containers, unless authorized by UM Flint EHS.*** Contact Environment, Health and Safety (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.



For an actual chemical exposure/injury:

- Remove contaminated clothing. Flush exposed eyes or skin with water for at least 15 minutes. Seek medical attention (see below).
- If a small area of skin has been exposed to phenol, swab polyethylene glycol 300 or 400 (PEG-300 or 400) onto the affected area immediately and repeatedly until the smell of phenol is no longer evident, then seek medical attention. If PEG-300 or 400 is not available, flush area with COPIOUS amounts of water (such as from a drench hose or safety shower) for at least 15 minutes, then seek medical attention.

- For larger areas of exposed skin or eye exposure, flush area with COPIOUS amounts of water for at least 15 minutes, and then seek immediate medical attention. Please note that using high-density water irrigation will reduce phenol uptake, but if lesser amounts of water are used it will merely dilute the phenol and increase the area of exposure.
- For situations with risk of inhalation exposure (including spills of powder outside of a chemical fume hood), remove all persons from the contaminated area.
- If an ambulance is needed, call the UM-Flint Department of Public Safety (DPS) at 911 to request assistance.

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
<p>Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710</p> <p>Hurley Medical Center One Hurley Plaza Flint, MI 48503 (810) 262-9000</p> <p>McLaren Hospital Flint 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000</p>	<p>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</p> <p>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</p>	<p>Downtown Flint 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550</p> <p>Genesys East 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351</p> <p>Genesys North 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397</p> <p>Genesys South 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm</p>

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

Spill Procedure

- When a spill occurs, **personal safety should always come first.**
- Alert and clear everyone in the immediate area where the spill occurred.

- Employees in the area should be prepared to clean up minor spills, including most spills confined to the chemical fume hood. Wearing double nitrile gloves, splash goggles, face shield and lab coat (and impermeable apron, if available), use absorbent pads to absorb spilled material. After spill has been completely absorbed, wipe down contaminated area with soap and water solution. Lab personnel should take great care to avoid skin contact with phenol. If skin contact does occur, follow the instructions outlined for exposures/unintended contact in the section above.
- Contaminated PPE and clean-up materials should be placed in a clear plastic bag. Call EHS at (810) 766-6763 to arrange for waste pick-up.
- **If a large spill occurs, leave the lab and call UM-Flint DPS at 911 to request assistance from EHS.** Do not take any action to cover the spill. Post a warning on the lab and do not allow others to enter. Have a person available that has knowledge of the 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 phenol.

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

Principal Investigator _____

Revision Date _____