

# Safe Handling Guide

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## Phenol [carbolic acid; hydroxybenzene] [108-95-2]

**Phenol (carbolic acid; hydroxybenzene)** is a highly corrosive chemical that can rapidly penetrate the skin, capable of causing systemic toxicity for even relatively small exposures. Phenol also has anesthetizing properties, which may allow burns to initially go unnoticed. Phenol is moderately volatile and has a sickeningly sweet odor. This odor generally provides adequate warning of hazardous concentrations in air. Phenol is a crystalline solid at room temperature but is commonly dissolved in water or organic solvents such as chloroform and methanol. Phenol solutions are used extensively in the biological sciences for the purpose of denaturing proteins during nucleic acid extractions.

There are unique first aid procedures for phenol exposures that differ from most other chemical exposures. Because phenol is absorbed by the skin so rapidly, attempting to wash off phenol with low pressure water (e.g. from a sink) can actually spread the exposure over a larger surface area of the body. Instead, for small exposures, personnel should flush or dab exposed areas with pharmaceutical-grade, low-molecular weight polyethylene glycol (PEG 300 or PEG 400), which binds to phenol and slows the absorption of phenol through the skin. For larger exposures or when PEG 300 or PEG 400 are unavailable, personnel should use an emergency deluge shower, which can more quickly wash off phenol from the skin.

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### SIGNAL WORD: DANGER



- Toxic if absorbed through skin, swallowed, or inhaled
- Causes severe skin burns and eye damage
- Suspected of causing genetic defects
- May cause damage to organs through prolonged or repeated exposure
- Toxic to aquatic life with long lasting effects

# PRECAUTIONS

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## Before starting work:

- Review manufacturer's [Safety Data Sheet](#) and additional chemical information.
- Ensure that a written experimental protocol including safety information is available.
- Be familiar with the [Western Emergency Response Guide](#) and the [Exposure Response and Spill Response Posters](#).
- Create the most dilute solutions available that will meet experimental needs. Use only as much as you need.
- Identify the location of the nearest eyewash and shower and verify that they are accessible.
- Locate and verify that at least 500mL of pharmaceutical-grade low-molecular weight polyethylene glycol (either PEG 300 or PEG 400) is immediately available for treatment of skin exposures.
- Locate and verify that appropriate phenol spill cleanup materials are available. A universal spill kit is sufficient for small phenol spills but should be supplemented with SilverShield gloves or other highly-rated gloves for phenol. Consult [AnsellGuardian Chemical Hand Protection Guide](#) or your preferred glove manufacturer. If only nitrile gloves are available, you must double glove and remove contaminated gloves as quickly as possible.
- Do not perform hazardous work alone when at all possible. If you must work alone, notify your supervisor beforehand and ensure that you have a plan for handling an emergency.

## During work:

- AVOID CONTACT! Wear appropriate PPE including:
  - Lab coat worn over long pants covering to the ankles and closed-toed non-woven footwear.
  - Chemical protective goggles.
  - Nitrile gloves for small volumes and low concentrations. For large volumes or concentrated stocks, consider a higher rated glove. Consider double layering gloves.
  - Work behind a sash or other barrier.
- AVOID INHALATION! Phenol is moderately volatile and has a sickeningly sweet odor. This odor generally provides adequate warning of hazardous concentrations, however, smell alone should not be used to indicate that a solution is safe to handle outside of a fume hood. Perform high concentration or crystalline handling operations in a certified chemical fume hood. Always work at least 6 inches into the fume hood and behind the sash.
- Keep all containers tightly closed when not in use and during transport.

## After completing the work:

- Dispose of phenol waste following WWU Hazardous Waste Procedures
  - Hazardous Waste Classification: Corrosive/Toxic
    - Store containers in designated secondary containment bin.
  - Remove all PPE
  - Wash hands and forearms thoroughly with soap and water before leaving the lab.



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# EMERGENCY PROCEDURES

## FIRST AID

**Call 360-650-3911 or 911 as soon as possible following exposure and follow procedures to get medical attention immediately, even if you do not feel pain. Anyone who assists in first aid response must first don appropriate PPE to prevent being exposed to phenol.**

## SKIN CONTACT

- Remove all contaminated clothing immediately. Phenol is able to penetrate most common clothing material, including leather.
- If the exposure area is limited and manageable, personnel should immediately begin flushing and/or dabbing the affected area with PEG 300 or PEG 400. In the event that these agents are unavailable, a 70% isopropyl alcohol solution has also been demonstrated to be more effective than water decontamination alone. In the event that none of these agents are available or the area of exposure is large, personnel should decontaminate using the emergency drench shower. **DO NOT USE A SINK** as the water pressure is generally not high enough to remove the phenol quickly enough, and this will spread the phenol over a larger surface area.
- Continue flushing or dabbing affected areas with PEG until there is no detectable odor of phenol, then skin can be washed under a sink with soap and water
- If the emergency drench shower was used, after 15 minutes, wash affected skin with soap and water.
- Call 360-650-3911 or 911 for emergency assistance and provide SDS sheet to responders/physicians.

## EYE CONTACT

- Using eyewash, flush eyes for a minimum of 15 minutes while holding eyelids open and away from exposed eye. Call 360-650-3911 or 911 for emergency assistance and provide SDS sheet to responders/physicians.
- Continue flushing with water until emergency medical personnel arrive.

## INHALATION

- Immediately move to fresh air.
- Call 360-650-3911 or 911 for emergency assistance and provide SDS sheet to responders/physicians.

## INGESTION

- Do not induce vomiting.
- Call 360-650-3911 or 911 for emergency assistance and provide SDS sheet to responders/physicians.

**In-depth first aid procedures can be found from the CDC's [Agency for Toxic Substances and Disease Registry](#)**



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# EMERGENCY PROCEDURES

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## SPILL RESPONSE

**Call EHS at 360-650-3064 M-F 8am-5pm for spill assistance.**

**Outside of those hours, call 360-650-3911 or 911.**

### Small Spills

- Alert others of the spill.
- Small spills can be cleaned by laboratory personnel who are aware of the hazards, trained in proper cleanup procedures and have access to proper PPE and cleanup equipment.
- Always wear appropriate PPE when cleaning up small spills.
- If the spill is crystalline phenol, carefully collect the crystals and then wet wipe residue with 70% isopropanol or ethanol solution. Use highly rated gloves (such as SilverShield). Minimize direct handling as much as possible.
- If the spill is liquid, wet paper towels in 70% isopropanol or ethanol solution and place over spilled material. Repeat as necessary to absorb all spilled material. Use highly rated gloves (such as SilverShield). Minimize direct handling as much as possible.
- Contain and label all cleanup materials (e.g., "Laboratory debris contaminated with phenol, isopropanol, water"), and follow the EHS Hazardous Waste disposal process.

### Large Spills

- Alert others of the spill.
- For large spills or any spill that you are not trained or comfortable handling, evacuate the area and call EHS at 360-650-3064 and/or emergency services at 360-650-.911 or 911.