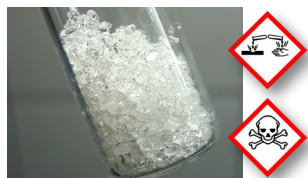


FACT SHEET: Phenol

Safe Use and Handling



Phenol is commonly used in research and clinical laboratories. It is highly toxic and easily absorbed through intact skin, making it especially hazardous. **It is critical that phenol users understand its properties and practice safe handling procedures.**

NEED TO KNOW:

- Phenol is rapidly absorbed through the skin. Even small exposures can cause serious injury.
- Review SOPs and SDS **BEFORE** working with phenol.
- If possible, work with phenol in a chemical fume hood.
- **ALWAYS** wear appropriate gloves and eye protection.
- Ensure immediate access to emergency eyewash/shower.

MORE INFO:



PHENOL CHARACTERISTICS:

- Pure phenol (CAS No.: 108-95-2) is a volatile solid with a strong, distinctive “sweet” odor. Concentrated solutions are commonly used in “phenol-chloroform extraction” for isolating DNA/RNA.
- Phenol is often purchased in pre-mixed reagents such as QIAzol™, TRIzol™, or TRI Reagent™.
- Phenol-chloroform mixtures are highly hazardous as it penetrates most glove materials more rapidly than 100% phenol.

HAZARD INFORMATION:

Phenol is readily absorbed by all routes of exposure. After exposure, you may not feel any pain as phenol numbs sensory nerve endings. Deep chemical burns and systemic poisoning may result.

Exposure to phenol of more than a few cm² of skin (e.g., size of a quarter) can cause serious injury or even death and should be considered a medical emergency.

HAZARD REDUCTION:

- Phenol users must review all Safety Data Sheets (SDSs)
- Develop a standard operating procedure (SOP) for safe use of phenol, and ensure users are trained.
- Use phenol in a fume hood whenever possible. Fume hoods must be used if phenol is heated, sprayed, powdered, used in large quantities, or presents a splash hazard.
- **ALWAYS** wash hands after removing gloves. Glove penetration is a concern when working with phenol (see glove guide below).
- Phenol is often purchased as a solid lump; rather than chip solid, warm phenol solid in a container in a water bath and pipette out necessary liquid phenol.
- Wear lab coat, safety goggles, and gloves. **All contaminated PPE must be immediately discarded! NOTE:** Heavily contaminated PPE including lab coats may need to be disposed of as hazardous waste.
- Phenol/chloroform mixes are typically vortexed/centrifuged in DNA prep applications. Extra care should be taken to make sure centrifuge tube lids are firmly closed during these processes. Wait several minutes to open tubes.
- Clearly label all phenol-containing materials as acute toxicants.
- Consult OEHS for respiratory protection requirements.
- Decontaminate work areas and equipment after use.

GLOVE GUIDE:

Glove Material	Brand Name	Level of Protection		Glove Precautions & Limitations	Additional Information
		Phenol or aq. phenol	Phenol-chloroform		
Disposable nitrile & neoprene	Halyard, MICROFLEX®, CURAD, etc.	Low	Very Low	Double-gloving strongly recommended; Splash protection only. Gloves must be immediately changed if contaminated.	Minimal breakthrough time; almost immediate if chloroform is present. For phenol and aqueous phenol, neoprene provides slightly better protection. Use thicker grades of disposable gloves.
Laminate film	Barrier™, Silver Shield™	Excellent	Good	Poor ergonomics. Dispose after use.	Good choice for emergency response e.g., spill clean-up, to assist with decontamination.
Butyl	ChemTek™ butyl	Excellent	DO NOT USE	Easily penetrated by low polarity solvents including chloroform.	Reusable; clean thoroughly before removal; may be extremely slippery when wet.
Viton™ & Viton™-coated butyl	ChemTek™ butyl/Viton™	Excellent	Excellent	Dissolved/degraded by ketones; do not clean with acetone.	

FACT SHEET: Phenol

Safe Use and Handling, cont.

SPILL RESPONSE:

Spill clean-up should **ONLY** be performed by individuals familiar with phenol and its hazards. If an individual is exposed to phenol, decontamination and first aid **ALWAYS** takes priority over spill response.

- Wear appropriate PPE (e.g. laminate film gloves. **Disposable nitrile gloves are inadequate**).

Minor Spill (< 50 mL) (simple spills – e.g., spills NOT running under cabinets):

- Wipe up using absorbent material - work from outside of spill towards middle to minimize spreading.
- After visible spill is eliminated, decontaminate spill area with water and detergent.
- Double-bag contaminated absorbent material and contaminated PPE and label as solid hazardous waste.
- Call TUPD to report minor incident and request hazardous waste pick-up in OEHS using: [Hazardous Waste Collection Form](#).

Major Spill (> 50 mL):

- If there is no immediate threat, place absorbent material on/around spill to minimize spreading; promptly leave site.
- Prohibit access and notify surrounding labs/workers.
- If spill is outside fume hood, promptly evacuate lab to prevent exposure to vapor.
- Call TUPD and provide full details (e.g., what was spilled, how much, when, and where). Lock door and place “DO NOT ENTER” signage.

PHENOL FIRST AID KIT:

Phenol users must keep a first aid kit with the following:

- 1 liter polyethylene glycol, 300 or 400 molecular mass (e.g., Kollisol[®] PEG 400). PEG may help extract phenol that is absorbed by upper layers of the skin.
- Large cotton roll (e.g., VWR 470161-446).
- Wiping cloths (e.g., VWR 500030-610 or -611).
- Large poly bags for waste (e.g., Ziploc[®]).
- Laminate film gloves (e.g., Barrier[®], Silver Shield[®]). **DO NOT put gloves on contaminated hands!**
- Large squeeze-bottle of liquid hand soap (**NOT** a pump dispenser).
- Copy of this Fact Sheet and printed SDSs for the specific phenol and/or phenol-containing reagents.

PHENOL ACCIDENT RESPONSE AND FIRST AID:

SKIN EXPOSURE

DO NOT DELAY IN WASHING OFF EXPOSED AREAS. Do not attempt decontamination using ethanol, isopropanol, or other solvents as they can increase phenol absorption!

- Immediately remove all contaminated clothing and avoid any further contact with phenol. **NOTE:** Due to phenol’s anesthetic properties, pain may not be felt on initial contact. Affected area may turn white. Severity of burns may not be initially apparent as full tissue damage takes time.
- Wear laminate film gloves if assisting in decontamination.

LARGE AREA EXPOSURES (MORE THAN A FEW CM²)

- **MEDICAL EMERGENCY! Potentially fatal systemic toxicity may ensue.** Wash all contaminated areas with large amounts of soap and water (safety shower/drench hose). Phenol is not easily soluble in water and insufficient water may spread it over more skin. Soap helps disperse and remove phenol.

- After thoroughly washing for at least 15 minutes, continually swab with PEG until medics arrive. If PEG is not available or of insufficient quantity, continue under shower until medics arrive.
- Have a colleague contact Tulane DPS for emergency medical attention: (504)-865-5911 (Uptown) or (504)-988-5555 (Downtown)

SMALL EXPOSURES

- Apply exposed area with polyethylene glycol (PEG 300 or 400) until odor is gone.

EYE EXPOSURE

- Immediately flush eyes in eyewash station for at least 15 minutes holding eyelids open.
- Ask a colleague to contact Tulane DPS for emergency medical attention: (504)-865-5911 (Uptown) or (504)-988-5555 (Downtown).

NOTE: 24-hour emergency treatment advice may be obtained from the Louisiana Poison Control Center at (800)-222-1222.

ADDITIONAL RESOURCES:

- CDC/NIOSH: [Occupational Health Guideline for Phenol](#)
- PubChem/NIH: [Phenol Safety and Hazard Information](#)
- ATSDR: [Toxic Substances Portal: Phenol](#)