**** PHENOL ****

# **Introduction**

Phenol is an aromatic organic compound used in many research laboratories. It exists in the form of a solid (natural form) or a liquid (manufactured form). Phenol solid is colorless-to-white when pure. Liquid appears as a colorless liquid when pure, otherwise pink or red. This chemical has a distinct odor that is sickeningly sweet and tarry. Common uses include: reagent synthesis, polymer synthesis, tissue preservation, and DNA/RNA extraction. Phenol can be found in disinfectants and commercial reagents such as TRIzol and QIAzol. Due to its toxicity and quick skin absorption rate, phenol can pose a significant hazard to lab personnel.

Note: *This fact sheet is not intended to replace the Safety Data Sheet provided by the manufacturer.*

# **Hazards**

* Corrosive and toxic. Phenol will degenerate proteins
* Short term exposure can cause irritation and skin/eye burns (with the potential for permanent blindness). Long term or high exposure levels can lead to liver/kidney damage as well as adverse effects on the heart and central nervous system.
* Liquid phenol can penetrate the skin very quickly and, if phenol is left on the skin, it will cause severe burns and lead to cell death. However, burns may not be immediately painful or visible. This is due to the local anesthetic effects of phenol and the time delay between its absorption and appearance of burn symptoms.
* In addition to the local burn symptoms, sufficient absorption of phenol may cause systemic effects to humans resulting in rapid poisoning. Any exposure covering more than a few cm2 of skin is potentially fatal and must be considered as a medical emergency.
* Presence of phenol as a concentrated solution in chloroform further enhances the ability of phenol to be absorbed by the skin compared to that of phenol by itself.
* Disposable gloves are rapidly penetrated. Phenol can permeate through 8 mil nitrile gloves within 10 minutes; 3-minute permeation time for 4 mil nitrile glove. Permeation is quicker when combined with chloroform.

# **Best Practices**

* Develop written standard operating procedures for handling phenol and train personnel on hazards.
* Phenol should be used in a fume hood when working with large volumes, stock solutions, and making formulations and dilutions.
* Refer to the SDS and glove selection charts for appropriate glove selection.
* Heavy weight (8 mil) neoprene disposable gloves are recommended for incidental contact. If working with phenol concentrations >70% or there is extended contact, use chemical resistant gloves (butyl rubber, Viton, Barrier or Silver Shield gloves) instead of disposable.
* If using disposable gloves, double gloving is recommended. Change gloves frequently and immediately discard gloves after accidental contact.
* Wear safety glasses or goggles.
* NEVER use phenol in areas which do not have ready access to an eyewash and a safety shower.
* NEVER handle phenol while working alone.
* Maintain a stock of low-molecular-weight poly(ethylene glycol) (PEG) such as PEG 300 or PEG 400 for treatment of potential exposures. These can be used to remove the phenol on the skin after exposure.

# **Storage requirements**

* Store in a cool, dry, ventilated area away from sources of heat or ignition.
* Store separately from strong oxidizing agents, strong bases, strong acids, halogens and other incompatible materials.
* Always store liquid phenol inside a labeled secondary container.

# **Disposal**

* Phenol and phenol:chloroform mixtures should be collected as hazardous waste for disposal by OEHS.
* Small tubes of phenol waste can be collected in 5-gallon hazardous waste pails, instead of emptying tube contents into a liquid waste tote, minimizing potential contact.

# **Exposure Response & Contacts:**

* **Contact with eyes:** Immediately flush with copious amounts of tepid water for at least 15 minutes. Seek medical attention immediately.
* **Skin contact:** DO NOT immediately rinse the site with water. Instead, treat the site with low-molecular-weight poly(ethylene glycol) (PEG) such as PEG 300 or PEG 400, for at least 15 minutes until smell is no longer detectable, followed by gently wiping away. Small amounts or low flow water can expand phenol over a larger area instead of rinsing it off. Use liquid soap or safety shower if PEG is not available. Seek medical attention immediately by calling WSU Police at (313) 577-2222.
* **Inhalation**: Move the victim to area with fresh air. Do not perform mouth-to-mouth resuscitation. Seek medical attention immediately by calling WSU Police at (313) 577-2222.
* **Ingestion**: Rinse mouth. Do NOT induce vomiting. Seek medical attention immediately by calling WSU Police at (313) 577-2222.
* **Principal Investigator (PI):** *(Add relevant phone number)*
* **WSU Public Safety:** 313-577-2222, emergency transportation
* **Henry Ford Occupational Health – Harbortown**

3300 East Jefferson, Suite 100

Detroit MI 48207

(313) 656-1618

Monday – Friday 8:00 AM to 6:30 PM

* **Detroit Receiving Hospital - Emergency Room:** 313-745-3355

**Henry Ford Hospital – Emergency Room**: 313-916-8742

Available outside of occupational health clinic hours

* **Office of Environmental Health and Safety:** 313-577-1200, spills or clean-up

# **For more information**

1. National Research Council. (2011). Working with Chemicals. In Prudent Practices in the Laboratory (p. 136). Washington, D.C.: The National Academies Press.
2. [Phenol](https://www.cdc.gov/NIOSH/TOPICS/PHENOL/). (2019, November). Retrieved from National Institute for Occupational Safety & Health
3. [Phenol (pubchem.ncbi.nlm.nih.gov)](file:///C%3A%5CUsers%5Csekanayaka%5CDesktop%5CEdits%5CPhenol%5C19-012F_FactSheet%20Phenol_LR_ADA_SAE.docx)