

## **Safe Method of Use: Hazardous Substances of Higher Risk 3 Concentrated Phenol**

**Purpose:** This applies to **principal investigators (PIs), sector managers, designated laboratory person (DLPs)**, technical staff and students who use phenol within the University of Auckland.

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Phenol is highly corrosive to the skin and readily absorbed through it, whereupon it can affect the central nervous system and cause damage to the liver and kidneys. It is also a mutagen, and there is some evidence that phenol may be a reproductive hazard.

Phenol is a crystalline solid or a thick liquid with a sweet, tarry odor, and it ranges from colorless to pink in color. Synonyms for phenol include carbolic acid, benzophenol, and hydroxybenzene.

When heated, phenol will produce flammable vapors that are highly toxic (at just a few parts per million) and explosive (at concentrations of 3% to 10% in air).

**Ensure that glycerin (glycerol) is on hand whenever Phenol is handled – See Emergency Response Procedures on Page 3**

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### **Toxicity**

#### **Acute effects:**

Phenol is irritating and corrosive to the skin. Because it has a local anesthetic effect, little or no pain may be felt on initial contact.

However, skin in contact with phenol will generally turn white; later, severe burns may develop. Phenol is rapidly absorbed through the skin, and toxic or even fatal amounts can be absorbed through relatively small areas.

Ingestion of as little as 1 gram can be fatal to humans. Phenol can also cause severe damage to eyes and could cause blindness.

#### **Chronic effects:**

Repeated or prolonged exposure to phenol or its vapors can affect the central nervous system, liver, and kidneys.

Good work practices can help reduce hazardous exposures.

## A. Using Phenol Safely

- Ensure a copy of phenol Safety Data Sheet (SDS) is on hand and reviewed before handling the material.
- Work with pure phenol in a chemical fume hood, especially when heating it.
- Never heat or melt phenol in an incubator, microwave, drying oven, or similar appliance.
- Prevent phenol from contacting skin by wearing neoprene gloves and a laboratory coat. Change gloves frequently. Wear chemical goggles to protect the eyes.
- Ensure that there is immediate and unobstructed access to an eyewash/shower unit in the work area.
- Store phenol in a cool, dry, well-ventilated area, away from heated surfaces of ignition sources.
- Always wash hands thoroughly after handling phenol, even if gloves are used.

## B. Storage

- Phenol is a combustible acid. It must be stored away from strong oxidizers (such as nitric acid and bromine) and strong bases (such as potassium hydroxide).
- Store below eye level to prevent injuries in case of a spill.

## C. Personal Protective Equipment

- Eye protection in the form of safety glasses or goggles **shall** be used.
- Neoprene, viton/neoprene or butyl neoprene gloves **shall** be worn.

## D. Disposal

- Phenol waste should be placed in a container that is clearly labeled and has a securely sealed lid.

## E. Spills

- Spills of undiluted phenol should be considered serious and immediately cleaned up.
- If the spilled material is heated or is greater than 50 ml, remove ignition sources, and prepare for evacuation.
- Small liquid spills of 50 ml or less may be absorbed on paper toweling, vermiculite, or other absorbent material and placed in a sealed container or double plastic bags for proper disposal as hazardous waste.
- Be sure to wear gloves and other personal protective equipment when cleaning up small phenol spills.

## F. Emergency Response Procedures:

### Skin Exposure:

- Remove contaminated clothing. Swab contaminated area repeatedly with glycerin (glycerol). Olive or light vegetable oil may also be used. Do not use mineral oil.
- Seek medical attention immediately. Contamination and consequent absorption through the skin with larger amounts of phenol may produce rapid collapse and death.
- Rapid water dilution of phenol burns may increase systemic absorption by decreasing the extent of the coagulum and thus allowing greater absorption (*Ellenhorn and Barceloux: Medical Toxicology: Diagnosis and Treatment of Human Poisoning*).
- A copy of the MSDS and these emergency procedures must be also taken to the hospital.

### Eye Exposure:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.