

## Standard Operating Procedure

### Phenol

Researchers should not use Phenol until they have read and fully understood these safe operating procedures. However, reading these procedures does not substitute for hands-on training. New users of Phenol must work under the close supervision of an experienced user.

BEFORE working with Phenol, read the relevant Material Safety Data Sheets (MSDS)/ Safety Data Sheets (SDS) and understand the hazards. The safety sheet must be reviewed before using an unfamiliar chemical and periodically as a reminder.

#### 1. This standard operating procedure (SOP) is for a

Specific laboratory procedure or experiment

Examples: synthesis of chemiluminescent esters, folate functionalization of polymeric micelles

Generic laboratory procedure that covers several chemicals

Examples: distillation, chromatography

Generic use of specific chemical or class of chemicals with similar hazards

Examples: organic azides, mineral acids

#### 2. Chemical Description

At room temperature, phenol is a translucent, colorless, crystalline mass, a white powder, or a thick, syrupy liquid. The crystals are hygroscopic and turn pink to red in air. When pure, phenol has a sweet, tar-like odor that is readily detected at low concentrations (0.05 ppm in air). Phenol is soluble in alcohol, glycerol, petroleum, and, to a lesser extent, water.

Phenol:

- is poisonous, corrosive, and flammable.
- affects the central nervous system and targets the liver and kidneys.
- is mutagenic and possibly teratogenic.

Phenol is a common chemical used on campus for activities such as tissue preservation and DNA/RNA extraction. Phenol can be a component in a commercial reagent (e.g. QIAzol, TRIzol) or prepared as part of a mixture in the laboratory (e.g. chloroform:phenol). Because phenol solutions are an integral part of routine life science applications, their hazards may be taken for granted. Make

no mistake about it, however. Phenol can be very dangerous and the hazards are not just those of a typical corrosive.

### 3. Risk assessment

The hazards of phenol are two-fold. It is both a corrosive (can cause severe burns) and toxic (absorbed phenol acts as a systemic toxin). In one case, death resulted from ingestion of as little as 15 mL. Liquid phenol can penetrate the skin with efficiency approximately equal to that of inhalation. Deaths have been reported for exposures of 25% or more of body surface area. Phenol has an anesthetic effect and can cause severe burns that may not be immediately painful or visible. The threshold concentration of human skin damage from phenol is 1.5%. It can cause permanent eye injury and blindness.

Phenol is absorbed rapidly from the lungs into the bloodstream, however, because of its low volatility, the inhalation hazard is limited. The odor threshold of phenol is about 100 times lower than the OSHA PEL. There is adequate warning when hazardous concentrations exist.


There have been a number of phenol splashes to the face that have occurred. Most of the workers involved were not wearing appropriate personal protective equipment (such as the basics - lab coats, safety glasses or goggles, or suitable gloves), and it was just luck that the phenol did not splash in their eyes. While none of these exposures were significant enough to cause systemic effects, facial burns could have caused permanent scarring.

### 4. Symptoms of Phenol Exposure

The most common route of occupational exposure for phenol is skin contact and absorption. Phenol does not readily form a vapor at room temperature and is unlikely to pose an inhalation hazard unless it is heated or misted. Additionally, it has a distinct, sweet, acrid, odor that is detected by most people at levels well below the OSHA airborne permissible exposure limit (PEL).

Phenol burns and intoxications can be life-threatening. Symptoms include:

1. Eye Contact: Severe irritation, permanent damage, blindness.
2. Inhalation: Respiratory irritation, sore throat, headache, and shortness of breath.
3. Ingestion: Phenol is very toxic; death can occur rapidly following ingestion. Symptoms include irritation, swelling, burns and damage to the mouth, throat and stomach, internal bleeding, vomiting, diarrhea, decreased blood pressure, shock, collapse, coma and death.
4. Skin Contact: Initial exposure can cause numbness or slight tingling, so contact may not be immediately apparent. However, even minor contact can result in burns, blisters, permanent skin damage and gangrene. Absorption of phenol through skin can result in phenol toxicity with symptoms including muscle weakness, tremors, loss of coordination, shock, sudden collapse, coma, convulsions, organ damage and death. When phenol contacts the skin, a white covering of precipitated protein forms. It soon turns red and eventually sloughs off, leaving the surface stained slightly brown. If phenol is left on the skin, it will penetrate rapidly and lead to cell death and gangrene.

5.	<b>Safety equipment</b>
5.a.	<u>Engineering Controls</u> : Phenol should be used in a fume hood when working with stock solutions and making formulations and dilutions. Even when working with small amounts of dilute phenol, the best practice is to work in a fume hood because of the splash protection the sash provides and the ability of the hood to contain emissions especially in the event of a spill.
5.b.	<p><u>Personal Protection Equipment</u>:</p> <p style="text-align: center;"><b><u>All PPE should be inspected for wear, cracks or tears</u></b></p> <ol style="list-style-type: none"> <li>a. <u>Eye/Face Protection</u>: Chemical splash goggles that meet the ANSI Z.87.1 1989 standard must be worn whenever handling Phenol chemicals.</li> <li>b. Ordinary prescription glasses will NOT provide adequate protection unless they also meet this standard.</li> <li>c. Fume hood sash shall be properly positioned to provide splash, spray and mist protection.</li> <li>d. A face shield (in addition to goggles) may also be necessary. Consider that small facial burns caused by splatter may not be life threatening but can result in permanent disfiguration.</li> <li>e. <u>Skin Protection</u>: Lab coat, long sleeves, closed toe shoes, long pants at a minimum.</li> <li>f. If body splash potential exists, wear a butyl rubber or neoprene apron.</li> <li>g. No shorts are allowed</li> <li>h. <u>Hand Protection</u>: Hand protection needs to be selected based on projected use (concentration and exposure).</li> <li>i. For working with phenol at concentrations &gt;70%, butyl rubber, Viton, Barrier and Silver Shield gloves provide good resistance.</li> <li>j. Neoprene and polyvinyl alcohol are suitable for short term work (resistance to breakthrough within 1-4 hours) but should be thicker than 0.3 mm (11.8 mil).</li> <li>k. Thin disposable gloves are generally for splash protection only and should immediately be removed if phenol gets on them. Ansell (<a href="http://www.ansellpro.com/index.asp">http://www.ansellpro.com/index.asp</a>) recommends</li> <li>l. “NeoTouch®”(neoprene) or DermaShield (proprietary poly-chloroprene blend) for splash protection when working with 10% phenol solutions. A good practice is to use a heavy weight disposable (0.2 mm; 8 mil) and double glove.</li> <li>m. In general, nitrile is not recommended as a material of choice when working with phenol. Ansell has a useful interactive site for choosing gloves based on phenol</li> <li>n. concentration</li> <li>o. for phenol-chloroform mixtures, use Viton or heavyweight (&gt;15 mil) nitrile.</li> <li>p. DO NOT USE LATEX!</li> </ol> 

1. Emergency Showers and Eyewashes: Any laboratory using phenol (or any corrosive/caustic chemical) must have an emergency eyewash station accessible within 10 seconds and located in the same room the hazard is being used. Emergency showers must be accessible within 10 seconds and can be located within the room or in the hall way.
2. Administrative Controls: Never work alone when using phenol. Procedures requiring the use of phenol should have written safety SOPs associated with them.
3. Fire Extinguisher
  - a. A Class ABC fire extinguisher must be available within 10 seconds travel time from where Phenol chemicals are used.
  - b. If a Class ABC sand may be used for small fires
  - c. DO NOT attempt to extinguish large fires or if you are not comfortable to extinguish fires
4. Phenol First Aid Kit
  - a. Laboratories that use phenol are provided a kit for first aid treatment of dermal exposure. The kit should be located in a visible area where the phenol work is being done (for instance, in the fume hood), or nearby with the location clearly posted. The principal investigator or laboratory manager should train all persons working with phenol on how to respond to a phenol exposure and how to use the kit.
  - b. Included in the kit is a bottle of PEG 400. This bottle is meant to treat small areas of exposure, such as might occur when using DNA/RNA extraction kits.
  - c. The recommended contents of the kit and instructions for use are listed. The expiration date of the PEG is on the tag sealing the kit. Please monitor this date and replace as necessary and inspect the integrity of the other items in the kit, such as the gloves, to replace as necessary.

Contents: <b>Phenol Skin (Dermal) Exposure First Aid Kit*</b>	
1.	Pre-packaged gauze pads, 4" x 4" (~4)
2.	Polyethylene Glycol 400, 500 mL
3.	gloves
4.	Instructions for use
5.	Small plastic bag (for collecting waste gauze pads)

\*Please see attached instruction and SDS for Phenol kit

6.	<b>Transport, and storage, receiving requirements</b>
	<ol style="list-style-type: none"> <li>1. Phenol chemicals should be Store in a cool, dry, ventilated area away from sources of heat or ignition</li> <li>2. Store separately from reactive chemicals, combustible materials, and bases.</li> <li>3. Keep out of direct sunlight.</li> <li>4. Avoid dust formation and control ignition sources</li> <li>5. Store containers on shelves below eye level</li> </ol>
7.	<b>Special handling procedures</b>
	<ol style="list-style-type: none"> <li>1. Use caution when centrifuging phenol. Centrifugation produces aerosols enhancing exposure via inhalation. <ol style="list-style-type: none"> <li>i. If you suspect a tube has broken or a rotor has failed, wait 10 minutes prior to opening the centrifuge and/or rotor lid. This allows aerosolized phenol to settle out.</li> <li>ii. Open them in the fume hood if at all possible.</li> <li>iii. After centrifuging, always open bottles or tubes in a fume hood to prevent exposure to aerosols.</li> </ol> </li> <li>b. Never heat or melt phenol in an incubator, microwave, drying oven or similar device.</li> <li>c. Have a phenol spill/exposure kit available</li> <li>d. SOPs</li> <li>e. Review your protocol prior to beginning the procedure (every time)</li> <li>f. Inspect your PPE for cracks, holes, signs of wear.</li> <li>g. Clearly label ALL bottles (stocks and wastes)</li> <li>h. Use the smallest amount possible</li> <li>i. Keep in a tightly closed container</li> </ol> <ol style="list-style-type: none"> <li>2. Chloroform and Phenol Mixtures. <p>Phenol is often used in combination with chloroform in nucleic acid purification procedures. Unfortunately, chloroform rapidly degrades both neoprene and nitrile. Ansell has recently developed a relative thin glove (ChemTek® 380214T) consisting of a 4 mil outer layer of Viton® rubber over a 4 mil layer of butyl rubber which provides &gt;90 minutes breakthrough resistance to chloroform/phenol solutions.</p> </li> </ol>

1. Eye: **Rapid and immediate decontamination is critical.** Flush with copious amounts of water for at least 15 minutes, lifting eyelids occasionally. Remove contact lenses if easily removable without additional trauma to the eye. Do not interrupt flushing. Get medical attention immediately.
2. Inhalation
  - a. Responder should immediately help victim to fresh air if it is safe to do so
  - b. Call 911 and tell them you have a phenol exposure
  - c. Tell the lab PI and Teri Anderson (362-7833)
  - d. Provide the SOP and SDS in kit to emergency responders
3. Ingestion:
  - a. Do not induce vomiting.
  - b. If victim is conscious and able to swallow, give 4-8 oz (1 c) of milk or water, castor oil or other vegetable oil. Castor oil (or vegetable oil) dosage should be between 15 and 30 cc.
  - c. Call 911 and tell them you have a phenol exposure
  - d. Tell the lab PI and Teri Anderson (362-7833)
  - e. Provide the SOP and SDS in kit to emergency responders
4. Skin Contact: **Rapid and immediate skin decontamination is critical** to minimize phenol absorption. Anyone assisting the victim should wear protective clothing and gloves. Note: If victim's clothing is heavily soaked, off-gassing of vapors can contaminate the responder! Appropriate respiratory protection must be worn. Do not assist. Call 911.
  - a. **Small Exposures.**
    - a) NOTE: Dilution of phenol in water enhances dermal absorption of phenol
    - b) Rapidly remove contaminated clothing (including anything leather like belts or watchbands) and either irrigate or wipe exposed areas immediately and repeatedly with low-molecular-weight polyethylene glycol (PEG 300 or PEG 400).
      - (1) Open up Gauze pads
      - (2) Pour glycol on pads (soak it)
      - (3) GENTLY wipe excess phenol from affected area until visible and odor of phenol are removed
      - (4) Wash with soap and water

- (5) Throw gauze pads in the provided bag along with contaminated PPE
  - (6) Move victim to fresh air if safe to do so
  - c) Treatment should be continued until there is no detectable odor of phenol.
  - d) If PEG is not available, a glycerin or vegetable oil solution can be used instead. **Do not use mineral oil**
  - e) If neither of these are available, irrigation with a source of high-density drenching water (such as an emergency shower) will reduce phenol uptake, but lesser amounts of water will merely dilute the phenol and expand the area of exposures. If using the shower or other, shower for at least 15 min.
  - f) Tell the lab PI and Teri Anderson (362-7833)
  - g) Provide the SOP and SDS in kit to emergency responders
  - h) Label bag used to collect the used gauze wipes/PPE as “Hazardous Waste – Phenol Contamination”.
  - i) Contact EHS (277-2753) regarding disposal. Double bag any contaminated clothing and dispose of as hazardous waste.
- b. **Large Exposures.** First aid treatment is similar to as that for small exposures except the amount of surface area to be decontaminated must be considered.
- a) If the amount of phenol on the skin is more than can be quickly removed by swabbing or irrigating with PEG, then an emergency shower should be used and 911 should be called immediately. A high-density shower is preferable to reduce phenol uptake. Lesser amounts of water will merely dilute the phenol and expand the area of exposure. If possible, use PEG after the initial decontamination. Otherwise, the victim should stay in the shower until the emergency responders arrive to aid.
  - b) NOTE: Dilution of phenol in water enhances dermal absorption of phenol
  - c) Rapidly remove contaminated clothing (including anything leather like belts or watchbands) and either irrigate or wipe exposed areas immediately and repeatedly with low-molecular-weight polyethylene glycol (PEG 300 or PEG 400).
    - (1) Open up Gauze pads
    - (2) Pour glycol on pads (soak it)
    - (3) GENTLY wipe excess phenol from affected area until visible and odor of phenol are removed
    - (4) Wash with soap and water

(5) Throw gauge pads in the provided bag along with contaminated PPE

(6) Move victim to fresh air if safe to do so

d) Treatment should be continued until there is no detectable odor of phenol.

e) If PEG is not available, a glycerin or vegetable oil solution can be used instead. **Do not use mineral oil**

f) If neither of these are available, irrigation with a source of high-density drenching water (such as an emergency shower) will reduce phenol uptake, but lesser amounts of water will merely dilute the phenol and expand the area of exposures. If using the shower or other, shower for at least 15 min.

g) Tell the lab PI and Teri Anderson (362-7833)

h) Provide the SOP and SDS in kit to emergency responders

i) Label bag used to collect the used gauze wipes/PPE as "Hazardous Waste – Phenol Contamination".

j) Contact EHS (277-2753) regarding disposal. Double bag any contaminated clothing and dispose of as hazardous waste.

**5. If you are ALONE... (which hopefully you won't ever be working like that)**

a. Remain calm!

b. Remove contaminated clothing

c. Begin using polyethylene glycol, glycerol, or vegetable oil to remove dermal contamination

d. Wash yourself in the emergency shower or sink with soap and water for 15 minutes

e. Use eyewash for eye exposures

f. If ingested, administer castor oil or vegetable oil, but never give anything to an unconscious person

g. Call 911 and tell them you have been exposed to phenol, and give your exact location

h. Tell the lab PI and Teri Anderson (362-7833)

i. Provide the SOP and SDS in kit to emergency responders

**6. For any exposure, double-bag contaminated clothing and personal belongings. Get medical attention. Even if the exposure is small, it is still important to be evaluated by a medical professional to determine if follow-up treatment is necessary. Contact Center for Occupational Environmental Health Promotion at (505) 272-8043 or for more serious exposures go to the Emergency Room.**



**Emergency procedures****1. Small liquid spills (<50 ml )**

- a. If you do not feel comfortable cleaning up the spill, call Teri or EHS for help (never put yourself at risk!)
- b. May be absorbed with sand, vermiculite or other noncombustible absorbent material.
- c. Pick up (use non-sparking tools and equipment; do not use combustible materials such as corn whisks or brooms)
- d. Place in a sealed container for proper disposal as hazardous waste. Do not dump down the drain or into the trash.

**2. If the spilled material is heated or is greater than 50 ml**

- a. Remove ignition sources
- b. Evacuate the laboratory
- c. Close the doors
- d. Call Teri (362-7833) or Bobby (604-6102) or EHS (277-2753 or [afterhours] 951-0194) or UNM Police at 277-2241 or dial 911.

**3. Dry spills**

- a. If you do not feel comfortable cleaning up the spill, call Teri for help (never put yourself at risk!)
- b. Clean up spills in a manner that does not disperse
- c. dust into the air
- d. Reduce airborne dust and prevent scattering by moistening with water-do not flood
- e. Pick up spill (use non-sparking equipment; do not use combustible materials such as corn whisks or brooms)
- f. Place in a sealed container for proper disposal as hazardous waste. Do not dump down the drain or into a waste basket.
- g. Ingestion
  - i. If swallowed, immediately administer castor oil or other vegetable oil. Castor oil (or vegetable oil) dosage should be between 15 and 30 cc
  - ii. Never give anything by mouth to an unconscious person.
  - iii. Call 911 and tell them you have a phenol exposure
  - iv. Tell the lab PI and Teri Anderson (362-7833)
  - v. Provide the SOP and SDS in kit to emergency responders
- h. If you are ALONE... (which hopefully you won't ever be working like that)

- i. Remain calm!
- ii. Remove contaminated clothing
- iii. Begin using polyethylene glycol, glycerol, or vegetable oil to remove dermal contamination
- iv. Wash yourself in the emergency shower or sink with soap and water for 15 minutes
- v. Use eyewash for eye exposures
- vi. If ingested, administer castor oil or vegetable oil
- vii. Call 911 and tell them you have been exposed to phenol, and give your exact location
- viii. Tell the lab PI and Teri Anderson (362-7833)
- ix. Provide the SOP and SDS in kit to emergency responders

4. Administer first aid as appropriate.

- a. Alert people in the vicinity
- b. Remain nearby to advise emergency responders.
- c. Contact EHS, UNM Police, PI, and Chemical Safety Coordinator.

10. **Waste disposal**

*Identify amounts of waste anticipated and appropriate disposal procedures. Segregate waste by hazard class (for example, flammable, corrosive) and state (solid, liquid), label appropriately, and place in the laboratory's hazardous waste cabinet.*

**1. Disposal of Phenol solid contaminated material**

- a. Pipet tips, gloves and other contaminated debris should be collected as hazardous waste.
- b. Bags are ok for dry solids, as long as the bags are sealed closed and labeled properly and there are no free-flowing liquids.
- c. Sharps (needles) must go in puncture-resistant containers.
- d. Do not place dry solids contaminated with chemicals in red or orange biohaz bags.

**2. Disposal of Phenol compounds and waste containing phenol compounds**

- a. Phenol compounds in manufacture's label may be disposed of as hazardous waste
  - i. Containers must be in good condition or bagged to prevent spillage
  - ii. Lids must fit and be closed when not in use or for pick up
- b. If phenol compounds that are part of a mixture may be disposed of as hazardous waste
  - i. Containers must be compatible with the mixture of waste
  - ii. Containers must be in good condition
  - iii. Containers must remain closed when not in use and for pick up
  - iv. All secondary containers for waste must be labeled with the:

1. Hazardous Waste Label
  2. Listing of Contents of the waste
  3. Hazards of the mixture (EHS labels have boxes to check for these for ease of use)
  4. Large 5-gallon metal cans should not be filled more than 75% of capacity to allow for expansion
3. Fill out the Waste Pickup Request located at <https://ehs.unm.edu/waste-management/index.html>
4. Waste label templates are located at <https://ehs.unm.edu/waste-management/index.html>

**11. Training requirements**

*List the general and laboratory-specific training required*

- Hazard Communication
- Hazardous Waste Management
- Glove Box Training
- Basic Safety Training
- Other: Phenol Training

**Additional training requirements**

*List additional, local training requirements.*

1. Additional training requirement

Additional training requirement

**12. Approval**

*Standard operating procedures must be approved by the laboratory manager and directorate safety coordinator.*

Laboratory manager (*name, signature, date*): \_\_\_\_\_

Directorate safety coordinator (*name, signature, date*): \_\_\_\_\_

**Additional approvals**

*List subject matter experts consulted for approval:*

Person consulted

Person consulted

**Additional prior approvals required**

*List any tasks that require prior approval by the principal investigator or laboratory manager (for example, use of restricted chemicals and other higher hazard chemicals and running of higher hazard operations):*

Task requiring prior approval

Task requiring prior approval

# Instructions

## Phenol Skin (Dermal) Exposure First Aid

**Emergency Number: 277-2241 or 911**  
**Teri Anderson: 505-362-7833 (cell phone)**

**NOTE:** This procedure is **NOT** for eye exposure. For eye exposure, flush with water in an eyewash station for at least 15 minutes and call 911 immediately.

1. Remove contaminated clothing, including any leather items such as watch bands or belts.
2. Put on safety glasses and silver shield gloves (but don't put on the gloves if you are treating yourself and your hands are contaminated with phenol).
3. Open up a few packages of gauze pads.
4. Pour polyethylene glycol liberally on to one of the gauze pads.
5. Gently wipe off excessive phenol on exposed area. Discard the gauze pad in the small plastic bag in the kit.
6. Take a new gauze pad, add polyethylene glycol, and continue to clean off exposed area. Discard the pad. Repeat with a new gauze pad and application of polyethylene glycol until all visible traces of phenol have been removed from the skin.
7. Continue to gently wipe skin (do not scrape or irritate the effected skin area) with polyethylene glycol soaked gauze pads until no odor of phenol remains, changing the gauze pad frequently.

### **Follow-up:**

8. Even if you feel it unnecessary to call 911 and get emergency help, please go to Employee Occupational Health (272-8043) for evaluation to determine if follow-up treatment is necessary. Don't forget to fill out an accident report!

9. Double bag any contaminated clothing. Label both the bag and the small zip-lock bag used to collect the used gauze wipes as "Hazardous Waste – Phenol Contamination". Contact EHS (277-2753) regarding disposal.
10. Replace the contents of the kit with new, unused items

**SAFETY DATA SHEET**

Version 8.4 Revision Date 04/17/2021 Print Date 11/06/2021

**4 SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifiers**

Product name : Phenol

Product Number : P3653

Brand : Sigma-Aldrich

Index-No. : 604-001-00-2

CAS-No. : 108-95-2

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified uses : Laboratory chemicals, Synthesis of substances

**1.3 Details of the supplier of the safety data sheet**

Company : Sigma-Aldrich Inc.3050

SPRUCE ST

ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765

Fax : +1 800 325-5052

**1.4 Emergency telephone**

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-

527-3887 CHEMTREC (International) 24

Hours/day; 7 Days/week

**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 3), H301 Acute toxicity,

Inhalation (Category 3), H331 Acute toxicity, Dermal

(Category 3), H311 Skin corrosion (Category 1B), H314

Serious eye damage (Category 1), H318 Germ cell

mutagenicity (Category 2), H341

Specific target organ toxicity - repeated exposure (Category 2), Nervous system, Kidney, Liver, Skin, H373

Short-term (acute) aquatic hazard (Category 2), H401 Long-term

(chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 + H311 + H331

Toxic if swallowed, in contact with skin or if inhaled.

H314

Causes severe skin burns and eye damage.

H341

Suspected of causing genetic defects.

H373

May cause damage to organs (Nervous system, Kidney, Liver, Skin)

through prolonged or repeated exposure.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P260

Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P271

Use only outdoors or in a well-ventilated area.

P273

Avoid release to the environment.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P310 + P330

IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

Rinse mouth.

P301 + P330 + P331

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353

IF ON SKIN (or hair): Take off immediately all contaminated

clothing. Rinse skin with water/ shower.

P304 + P340 + P310

IF INHALED: Remove person to fresh air and keep comfortable

for breathing. Immediately call a POISON CENTER/ doctor.

P305 + P351 + P338 + P310

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

P308 + P313

IF exposed or concerned: Get medical advice/ attention. P362

Take off contaminated clothing and wash before reuse.

P391

Collect spillage.

P403 + P233

Store in a well-ventilated place. Keep container tightly closed. P405 Store

locked up.

P501

Dispose of contents/ container to an approved waste disposal plant.

## 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Vesicant., Rapidly absorbed through skin.

## 5 SECTION 3: Composition/information on ingredients

### 3.1 Substances

Synonyms : Hydroxybenzene

Formula : C<sub>6</sub>H<sub>6</sub>O

Molecular weight : 94.11 g/mol

CAS-No. : 108-95-2

Sigma-Aldrich - P3653

EC-No. : 203-632-7  
 Index-No. : 604-001-00-2

Component	Classification	Concentration
<b>Phenol</b>		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Muta. 2; STOT RE 2; Aquatic Acute 2; Aquatic Chronic 2; H301, H331, H311, H314, H318, H341, H373, H401, H411 Concentration limits: >= 3 %: Skin Corr. 1B, H314; 1 - < 3 %: Skin Irrit. 2, H315; 1 - < 3 %: Eye Irrit. 2, H319;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

**6 SECTION 4: First aid measures**

**5.1 Description of first-aid measures**

**General advice**

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**7 If inhaled**

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**8 In case of skin contact**

After contact with skin: rinse out with polyethylene glycol 400 or a mixture of polyethyleneglycol 300/ethanol 2:1 and wash with plenty of water. If neither is available wash with plenty of water. Immediately take off contaminated clothing. Call a physician immediately.

**9 In case of eye contact**

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

**10 If swallowed**

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralize.

**5.2 Most important symptoms and effects, both acute and delayed**

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

**5.3 Indication of any immediate medical attention and special treatment needed**

No data available



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**11 SECTION 5: Firefighting measures**

**5.4 Extinguishing media Suitable**

**extinguishing media**

Water Foam Carbon dioxide (CO<sub>2</sub>) Dry powder

**12 Unsuitable extinguishing media**

For this substance/mixture no limitations of extinguishing agents are given.

**5.5 Special hazards arising from the substance or mixture**

Carbon oxides

Combustible.

Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

**5.6 Advice for firefighters**

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

**5.7 Further information**

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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**13 SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Keep away from

heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

**6.2 Environmental precautions**

Do not let product enter drains.

**6.3 Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

**6.4 Reference to other sections**

For disposal see section 13.

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**14 SECTION 7: Handling and storage**

**7.1 Precautions for safe handling**

**Advice on safe handling**

Work under hood. Do not inhale substance/mixture.

**15 Advice on protection against fire and explosion**

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

**16 Hygiene measures**

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

**7.2 Conditions for safe storage, including any incompatibilities**

**Storage conditions**

Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Light sensitive. Store under inert gas. Air sensitive.

Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

**7.3 Specific end use(s)**

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

**Ingredients with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Phenol	108-95-2	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	5 ppm 19 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		C	15.6 ppm 60 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	5 ppm 19 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		PEL	5 ppm 19 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

**Biological occupational exposure limits**

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Phenol	108-95-2	Phenol	250mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

## 8.2 Exposure controls

### Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

#### 17 Personal protective equipment

##### Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

#### 18 Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time:  
480 min

Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.2 mm Break through time:  
56 min

Material tested: Dermatrill® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mailsales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

#### 19 Body Protection

Flame retardant antistatic protective clothing.

#### 20 Respiratory protection

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

#### 21 Control of environmental exposure

Do not let product enter drains.

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## 22 SECTION 9: Physical and chemical properties

### 10.1 Information on basic physical and chemical properties

10.1.1 Appearance                      Form: solid

10.1.2 Odor                                stinging

10.1.3 Odor Threshold	No data available
10.1.4 pH	ca.5 at 50 g/l at 20 °C (68 °F)
10.1.5 Melting point/freezing point	Melting point/range: 40 - 42 °C (104 - 108 °F) - lit.
10.1.6 Initial boiling point and boiling range	182 °C 360 °F - lit.
10.1.7 Flash point	79.0 °C (174.2 °F) - closed cup
10.1.8 Evaporation rate	No data available
10.1.9 Flammability (solid,gas)	No data available
10.1.10 Upper/lower flammability or explosive limits	Upper explosion limit: 9.5 %(V) Lower explosion limit: 1.3 %(V)
10.1.11 Vapor pressure	0.53 hPa at 20.0 °C (68.0 °F)
10.1.12 Vapor density	3.2 at 20 °C(68 °F) - (Air = 1.0)
10.1.13 Relative density	No data available
10.1.14 Water solubility	87 g/l at 25 °C (77 °F)
10.1.15 Partition coefficient: n-octanol/water	log Pow: 1.47 at 30 °C (86 °F) - (ECHA), Bioaccumulation is not expected. 715 °C (1319 °F) at 1,013 hPa
10.1.16 Autoignition temperature	No data available
10.1.17 Decomposition temperature	
10.1.18 Viscosity	No data available
10.1.19 Explosive properties	No data available
10.1.20 Oxidizing properties	No data available

## 10.2 Other safety information

Surface tension	38.2 mN/m at 50.0 °C (122.0 °F)
Relative vapor density	3.2 at 20 °C (68 °F) - (Air = 1.0)

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## 23 SECTION 10: Stability and reactivity

### 10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

### 10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .Contains the following stabilizer(s):

Hypophosphorous acid (0.15 %)

### **10.3 Possibility of hazardous reactions**

No data available

### **10.4 Conditions to avoid**

Strong heating.

### **10.5 Incompatible materials**

rubber, various plastics, various alloys, various metals, Strong oxidizing agents

### **10.6 Hazardous decomposition products**

In the event of fire: see section 5

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## **24 SECTION 11: Toxicological information**

### **11.1 Information on toxicological effects Acute**

#### **toxicity**

Acute toxicity estimate Oral - 100.25 mg/kg  
(Calculation method)

No data available

Acute toxicity estimate Inhalation - 4 h - 0.5108 mg/l (Calculation method)

Inhalation: No data available

Acute toxicity estimate Dermal - 660.99 mg/kg (Calculation method)

LD50 Dermal - Rat - female - 660 mg/kg (OECD Test Guideline 402)

No data available

**Skin corrosion/irritation** Skin - In vitro study Result: Causes burns. (OECD Test Guideline 431)

### **25 Serious eye damage/eye irritation**

Eyes - Rabbit Result:

Corrosive

(OECD Test Guideline 405)

Causes serious eye damage. Risk of blindness!

### **Respiratory or skin sensitization** Sensitization

test: - Guinea pig Result: negative

Remarks:

(IUCLID)

### **26 Germ cell mutagenicity**

Suspected of causing genetic defects.

Test Type: Mutagenicity (mammal cell test): chromosome aberration. Test system: Chinese hamster ovary cells

Metabolic activation: Metabolic activation Method: OECD

Test Guideline 473

Sigma-Aldrich - P3653

Result: positive

Test Type: Mutagenicity (mammal cell test): micronucleus. Test system: Chinese hamster ovary cells  
Metabolic activation: with and without metabolic activation Method: OECD  
Test Guideline 487  
Result: positive

### **27 Carcinogenicity**

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

### **28 Reproductive toxicity**

No data available

### **29 Specific target organ toxicity - single exposure**

No data available

### **30 Specific target organ toxicity - repeated exposure**

May cause damage to organs through prolonged or repeated exposure. - Nervous system, Kidney, Liver, Skin

### **31 Aspiration hazard**

No data available

## **11.2 Additional Information**

RTECS: SJ3325000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Circulatory collapse, tachypnea, paralysis, Convulsions, Coma.

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Circulatory collapse, tachypnea, paralysis, Convulsions, Coma., necrosis of mouth and G.I. Tract, Jaundice, respiratory failure, cardiac arrest

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence Stomach -

Irregularities - Based on Human Evidence

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**32 SECTION 12: Ecological information****12.1 Toxicity**

Toxicity to fish flow-through test LC50 - *Onchorhynchus clarki* - 8.9 mg/l - 96 h(US-EPA)

Toxicity to daphnia and other aquatic invertebrates static test EC50 - *Ceriodaphnia dubia* (water flea) - 3.1 mg/l - 48 h(US-EPA)

Toxicity to algae static test EC50 - *Pseudokirchneriella subcapitata* (algae) - 61.1 mg/l - 96 h (US-EPA)

Toxicity to bacteria static test IC50 - microorganisms - 21 mg/l - 24 h  
Remarks: (ECHA)

**12.2 Persistence and degradability**

Biodegradability aerobic - Exposure time 100 h  
Result: 62 % - Readily biodegradable.(OECD Test Guideline 301C)

**12.3 Bioaccumulative potential**

Bioaccumulation *Danio rerio* (zebra fish) - 5 h  
at 25 °C - 2 mg/l(Phenol)

Bioconcentration factor (BCF): 17.5(OECD Test Guideline 305)

Remarks: Does not bioaccumulate.

**12.4 Mobility in soil**

No data available

**12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

**12.6 Other adverse effects**

No data available

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**33 SECTION 13: Disposal considerations****13.1 Waste treatment methods**

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.





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## REFERENCES

Canadian Centre for Occupational Health and Safety. CHEMINFO: Phenol.

<http://ccinfoweb2.ccohs.ca/cheminfo/Action.lasso?-database=cheminfo&-layout=Display&-response=detail.html&-op=eq&CHEMINFO+RECORD+NUMBER=29E&-search>

Agency for Toxic Substances and Disease Registry. Medical Management Guidelines for Phenol. <http://www.atsdr.cdc.gov/MHMI/mmg115.html>

MSDS. Note that most MSDS have not incorporated the use of PEG into their first aid recommendations. Here is an exception:

<http://www.caledonlabs.com/upload/msds/5523-1e.pdf>

Monteiro-Riviere, N. A., A. O. Inman, H. Jackson, B. Dunn and S. Dimond. 2001. Efficacy of topical phenol decontamination strategies on severity of acute phenol chemical burns and dermal absorption: in vitro and in vivo studies in pig skin and Industrial Health. Toxicology and Industrial Health. 17:95-104

Ruth A Lawrence Poison and Drug Information Center (serving the Finger Lakes Region): 1-800-222-1222 (or 1-585-275-3232). [www.fingerlakespoison.org](http://www.fingerlakespoison.org).

Cornell Environmental Safety and Health Phenol First Aid and PPE, Laboratory Safety Program, (blanantantly copied), 10/07/10.

[https://sp.ehs.cornell.edu/lab-research-safety/documents/phenol\\_first\\_aid\\_and\\_ppe.pdf](https://sp.ehs.cornell.edu/lab-research-safety/documents/phenol_first_aid_and_ppe.pdf)

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<https://www.sigmaaldrich.com/US/en/sds/aldrich/w322318>