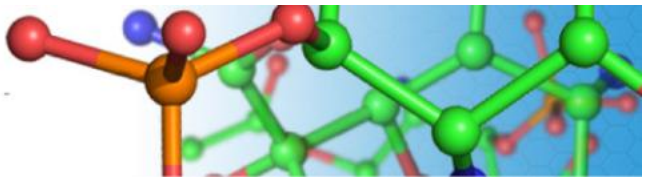
DEPARTMENT OF CHEMISTRY & CHEMICAL BIOLOGY



Phenol Standard Operating Procedure (SOP)

Location		
Principal Investigator		
Purchase Details	Container Size	
	Concentration	
	Supplier/Product Number	
Storage	Specific Sublocation	
Use Information	Designated work area	
	Maximum quantity in Use	
	Other Chemicals Used with Phenol	
	PPE Storage Location	
Phenol Exposure Kit Contents	• 1 L polyethylene glycol (PEG-300 or PEG-400) • SilverShield laminate gloves, Viton, or Viton-butyl gloves • 25 gauze pads or sponges • Gallon Ziploc bags for waste • Copy of Phenol First Aid Procedures • Large squeeze bottle of liquid soap	
	Location of Exposure Kit	
Waste Information	Location & Container Type	

1. Purpose

The purpose of this Standard Operating Procedure is to establish safe handling, storage, use, emergency response, and disposal procedures for phenol (CAS No. 108-95-2). Phenol is considered a highly hazardous chemical because it is rapidly absorbed through intact skin and may cause severe burns, systemic poisoning, organ damage, and death.

2. Hazard Identification

Phenol presents significant health hazards through skin contact, inhalation, ingestion, and eye exposure.

Acute Hazards

- Toxic by skin absorption
- Severe skin burns
- Severe eye damage
- Harmful if inhaled
- Harmful if swallowed
- Central nervous system toxicity
- Kidney damage
- Liver damage
- Cardiovascular effects

Phenol rapidly penetrates skin and may cause serious systemic poisoning before symptoms are recognized. Areas exposed to phenol may initially become numb, causing delayed recognition of injury.

Exposure Symptoms

Skin Exposure

- Whitening or blanching of skin
- Pain or numbness
- Chemical burns
- Tissue destruction
- Systemic toxicity

Eye Exposure

- Severe irritation
- Corneal injury
- Permanent vision damage

Inhalation Exposure

- Respiratory irritation
- Headache
- Dizziness
- Pulmonary injury

Ingestion

- Severe burns to digestive tract
- Systemic toxicity
- Potentially fatal poisoning

3. Engineering and Administrative Controls

Purchasing

- Purchase the smallest quantity necessary
- Purchase in shatter-resistant containers whenever possible
- Maintain a stocked Phenol Exposure Kit before beginning work

Storage

- In a cool, dry, well-ventilated area
- In secondary containment
- Away from heat and ignition sources
- Away from strong oxidizers
- Away from strong acids and bases
- Below eye level whenever practical

Do not store phenol in cold rooms used for food or biological materials.

Engineering Controls

The following controls are required:

- Functioning chemical fume hood for transfers, heating, or open handling
- Accessible emergency eyewash
- Accessible safety shower
- Spill response materials immediately available

Administrative Controls

- Designate and label a Phenol Work Area
- Post a Phenol Hazard Alert sign
- Maintain a stocked Phenol Exposure Kit
- Restrict access during phenol procedures

4. Personal Protective Equipment (PPE)

Minimum Required PPE:

- Fully buttoned lab coat
- Long pants
- Closed-toe shoes
- Chemical splash goggles
- Two pairs 4-mil thick nitrile gloves or one pair of 8-mil nitrile gloves with extended cuffs

For splash hazards or larger quantities:

- Face shield over goggles
- Chemical-resistant sleeves
- Chemical-resistant apron

Recommended Gloves

For extended work, spill response, or large-volume handling:

- Silver Shield® laminate gloves
- Viton® gloves
- Viton®-butyl gloves

Contaminated gloves must be removed immediately.

5. Mandatory Two-Person Protocol

A second trained person must be present whenever:

- More than 100 mL of phenol is handled
- Phenol is heated
- Large-scale extractions are performed
- Pure phenol is transferred between containers
- Any procedure presents elevated splash or exposure risk

The second individual must:

- Remain in the immediate area
- Know the location of the Phenol Exposure Kit
- Know emergency shower and eyewash locations
- Be capable of initiating emergency response procedures

The second person shall not be simultaneously engaged in another hazardous operation.

6. Handling Phenol

Before beginning work:

1. Review this SOP and the SDS
2. Inspect PPE
3. Verify eyewash and safety shower access
4. Verify Phenol Exposure Kit availability
5. Prepare waste containers

During use:

- Work with the minimum quantity necessary
- Keep containers closed when not in use
- Avoid splashing
- Avoid skin contact
- Avoid heating whenever possible
- Do not work alone when two-person requirements apply

Phenol-Chloroform Mixtures: Phenol and chloroform mixtures present additional hazards because chloroform rapidly penetrates many glove materials and may compromise glove protection. When handling phenol/chloroform mixtures:

- Minimize glove contact
- Change gloves immediately after contamination
- Consider Viton® or Silver Shield® gloves for extended work

After use:

- Decontaminate work surfaces using soap and water
- Properly dispose of waste
- Wash hands thoroughly

7. Waste Disposal

All phenol-containing waste must be managed as hazardous chemical waste. Collect the following as hazardous waste:

- Unused phenol
- Phenol solutions
- Phenol/chloroform mixtures
- Contaminated gloves
- Wipes and absorbents
- Disposable PPE

Requirements:

- Use compatible containers
- Keep containers closed except when adding waste
- Label containers with full chemical names
- Do not dispose of phenol in sinks, drains, or regular trash
- Submit waste pickup requests through UNM EHS procedures

8. Spill Procedures

Minor Spills (<100 mL)

Only trained personnel may clean up minor spills.

Required PPE:

- Silver Shield®, Viton®, or Viton®-butyl gloves
- Splash goggles
- Lab coat

Procedure:

1. Alert nearby personnel
2. Don appropriate PPE
3. Absorb spill using compatible absorbent materials
4. Place cleanup materials into hazardous waste containers
5. Wash contaminated surfaces with soap and water

Major Spills (>100 mL)

1. Stop work immediately
2. Evacuate the area
3. Restrict access
4. Call 911 if there is injury or immediate danger
5. Contact UNM EHS for spill response assistance: Environmental Health & Safety (EHS) 505-277-2753; EHS Duty Officer Pager 505-951-0194

Do not attempt cleanup if exposure risk exists.

9. First Aid Procedures

Any phenol exposure should be treated as a medical emergency.

Phenol rapidly penetrates skin and may cause life-threatening systemic toxicity.

Skin Exposure

1. Move away from contamination source
2. Remove contaminated clothing immediately
3. Begin decontamination immediately
4. Apply PEG 300 or PEG 400 using soaked gauze pads
5. Continue application until phenol odor is removed
6. If PEG is unavailable, use soap and copious water
7. Seek immediate medical attention

Large-area exposures require emergency medical treatment.

Eye Exposure

1. Immediately flush eyes with water
2. Continue flushing for at least 15 minutes
3. Hold eyelids open during irrigation
4. Seek immediate medical attention

Inhalation

1. Move person to fresh air
2. Seek medical evaluation
3. Call 911 if breathing difficulty occurs

Ingestion

1. Do not induce vomiting
2. Rinse mouth if conscious
3. Call 911 immediately
4. Seek emergency medical care

Reporting

All phenol exposures, regardless of severity, must be reported to:

- Principal Investigator
- Safety Coordinator
- UNM Environmental Health & Safety

10. Other Emergencies

Fire or Medical Emergency – Call 911

Life-Threatening Emergency, After Hours, Weekends and Holidays – Call 911

Non-Life-Threatening Emergency – Call EHS at 505-277-2753 to seek assistance and report the incident.

11. Training Requirements

All personnel working with phenol must:

- Read and understand this SOP
- Review the Safety Data Sheet (SDS)
    - Demonstrate competency with: Fume hood operation, Hazardous waste management, Emergency procedures, and Spill response procedures.

Training must be documented before independent work with phenol.

Principal Investigator SOP Approval

By signing below, the Principal Investigator certifies that this SOP accurately reflects the hazards and controls associated with phenol and provides sufficient information for safe laboratory use.

_____

Signature Printed Name/Title Date

Researchers in lab with phenol: I have read and understand this SOP.

Name	Signature	Date