**University of Arizona**

**Phenol Standard Operating Procedure**

*[This is a template. Fill in all necessary blanks and delete all highlighted areas when complete. Add any sections necessary for your laboratory. This will be appended to your Laboratory Chemical Hygiene Plan.]*

**Title:**  **Click here to enter the title of your SOP.**

**Approval Holder (AH):** Click here to enter text **Approval #:** Click here to enter text

**Approval Holder Phone Number(s):** Click here to enter text

**Approval Safety Coordinator (ASC):** Click here to enter text

**Approval Safety Coordinator Phone Number(s):** Click here to enter text

**Department:** Click here to enter text

1. **Purpose**

This standard operating procedure (SOP) is intended to provide guidance on how to safely Describe the procedure or process this SOP will address in Enter AH’s name’s laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before Describe the procedure or process this SOP will address. If you have questions concerning the requirements within this SOP, contact your Approval Holder (AH) or Approval Safety Coordinator (ASC).

1. **Scope**

*[Describe when this SOP applies and to whom this SOP applies.]*

1. **Hazard Description**

*[Describe the hazards presented by the procedure or process this SOP addresses. What makes it hazardous? Provide an example, if applicable.]*



Phenol is often a component of the commercial product Trizol, mixed with chloroform. Phenol is acutely toxic and corrosive. As a corrosive, phenol can cause serious eye damage and skin burns if exposure occurs. Phenol is readily adsorbed through intact skin and is highly toxic to cells. Cellular damage and death at the site of entry results in a chemical burn, which may be extremely serious. There can be a time delay between absorption of phenol and the appearance of burn symptoms and phenol is a local anesthetic which numbs sensory nerve endings; for both these reasons, phenol contamination may not be noticed until considerable absorption and damage has occurred. Skin exposures may go undetected for some time as it has some anesthetic properties. Therefore, careful attention should be paid to gloves to ensure that penetration or tearing have not occurred. Phenol also has some significant toxicity properties and can be fatal in small doses. Long-term exposure may damage the liver or kidneys.

1. **Process & Hazard Controls**

*[Describe the steps needed to set up and complete the procedure or process in safe manner following the* [*hierarchy of controls*](https://www.cdc.gov/niosh/topics/hierarchy/default.html)*. Use as much detail as is necessary to ensure all laboratory workers can complete the procedure or experiment safely.]*

* 1. **Elimination/Substitution**

*[Describe any eliminations of hazardous chemicals or processes; alternatively, any substitutions with less hazardous alternatives that could be used to accomplish the task. Delete this section if you are unable to eliminate or substitute.]*

* 1. **Engineering Controls**

*[Describe any engineering controls (e.g. fume hoods, gas cabinets, local exhausts, blast shields, etc.) that are used to safely accomplish the task.]*

* Fume hood:
  + It is advisable to use a fume hood when working with materials which are toxic by inhalation. If your protocol does not permit the handing of such materials in a fume hood, contact EH&S to determine whether additional respiratory protection is warranted.
  1. **Work Practices**

*[Describe any work practices (e.g. staggering schedules, additional cleaning measures for particulates, etc.) that are used to safely accomplish the task.]*

* Phenol should not be handled while working alone. Purchasing, working and storage quantities should be kept as small as possible.
* Phenol is commonly supplied as a solid lump and chipping at the material may result in flying crystals entering clothing and causing burns. Warm the container in a water bath and pipette out the melted phenol.
  1. **Personal Protective Equipment**

*[Describe the personal protective equipment needed to adequately protect laboratory workers when performing the process or procedure addressed by this SOP. Ensure to specify any personal protective equipment beyond the minimum (i.e. safety glasses, lab coat, gloves, long pants and closed-toed shoes).]*

* **Hand and Arm Protection**: Elbow-length, acid resistant gloves should always be used when creating, working with, or cleaning up aqua regia solutions.
* **Face and Eye Protection**: Safety goggles are a minimum protection; the use of a face shield with eye protection is strongly recommended to protect both the eyes and face from splashes.
* **Body Protection**: A 100% cotton lab coat should be used and can be combined with an acid resistant apron to prevent exposure to the body.
* **Respiratory Protection**: Respirators may be required if exposures are not able to be adequately controlled by the use of engineering controls or other means. All uses of respiratory protection require RLSS assessment and consultation (for assessment of work, selection of respirator and filtration, and OSHA-mandated medical clearance and fit testing). Contact [rlss-ppe@arizona.edu](mailto:rlss-ppe@arizona.edu) with any questions or concerns.
  1. **Transportation and Storage**

*[Describe how to safely transport and/or store (e.g. ventilated cabinet, flammable cabinet, under inert blanket, etc.) the hazardous chemical(s) or processes.]*

* Store away from strong oxidizers and any other materials that may be chemically incompatible.
* Containers must be stored below eye level and away from heat.
* Transport in a closed, leak proof container around campus/building. Do not take personal vehicles.

1. **Spills, Cleanup & Disposal**

*[Describe how to safely end the procedure or process, clean up the process or spills, and/or dispose of any waste generated.]*

* **Spill and Exposure**
  + Immediately remove contaminated clothing and shoes; DO NOT flush effected area with water. Instead, treat with a low-molecular weight poly(ethylene glycol) (PEG) such as PEG 300 or PEG 400 for at least 15 minutes.
  + Get medical attention immediately.

Spill response should always follow the [University Chemical Hygiene Plan](https://rgw.arizona.edu/sites/default/files/cs-univeristy_chemical_hygiene_plan.pdf) Section 8.2.

**Exposure Response**

|  |  |  |  |
| --- | --- | --- | --- |
| **Inhalation** | **Ingestion** | **Skin Contact** | **Eye Contact** |
| After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately  apply artificial respiration, if necessary also oxygen. | 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 | After contact with skin: rinse out with polyethylene glycol 400 or a mixture of polyethylene  glycol 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. | After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.  Remove contact lenses. |

1. **Enter Additional Section Title**

*[Add as many sections as necessary to adequately describe how to safely perform the procedure or process addressed by this SOP.]*

1. **References**

* UCLA Phenol SOP: <https://ucla.box.com/s/pt9bciqphdcu8a6l1n7jms3tas1j660n>
* USC SOP: https://ehs.usc.edu/research/lab/sop/sop-phenol/