# Working Safely with Phenol Guideline

# Section 1 - Purpose and Scope

(1) All workers and students at The University of Queensland (UQ) have a duty under the Work Health and Safety Act 2011 to ensure the risk of exposure to phenol and its compounds is eliminated or minimised as far as practicable. The purpose of this Guideline is to detail the hazards and the control measures required when working with phenol and its compounds. It applies to all UQ workers and students who work with phenol and phenol containing reagents at UQ.

# Section 2 - Risk Management

### Risk Assessment and Control

(2) Phenol is widely used in biological science laboratories at UQ in combination with other reagents to selectively extract biomolecules from solution. Phenol is also a reagent used in organic chemistry and has medical uses such as inhibiting nail growth when applied locally to the nail bed. Phenol causes chemical burns of the skin and is a significant hazard to the eyes. It also has moderate systemic toxicity.

(3) Pure phenol is a white crystalline solid; it is volatile and highly corrosive. It should not be used to prepare solutions for extracting DNA and proteins. These solutions can be obtained pre-prepared, which eliminates handling phenol in concentrated form. However, extraction reagents such as TRIzol® contain up to 60% phenol and are a significant hazard to eyes, skin and organs.

(4) Where phenols cannot be eliminated or substituted from laboratory use, a thorough risk assessment must be carried out and recorded in UQSafe with reference to the safety data sheet (SDS). Safe handling and spill procedures must be documented as part of safe work procedures and personal protective equipment (PPE) must be appropriate to the task and as recommended in the SDS. Phenolic reagents are often used with centrifuges and the risk of loss of containment due to leakage or tube breakage must be taken into account.

(5) The following guidelines should be applied for working with phenol:

a. Work should be undertaken in a fume cupboard using appropriate PPE such as chemical protective gloves (e.g. vinyl or neoprene), safety glasses, lab coat and covered shoes.
b. Additional PPE, where indicated by the risk assessment, may include overalls, chemical safety goggles, face shield and a fit-tested respirator with type A-P filter.
c. The risk of skin contact is increased where abnormal events such as a spill or container leakage occurs. Workers are to be aware of where the laboratory spill kit is located and how to use it. In addition, workers must be aware of the first aid kit location and special treatment requirements for phenol (see ‘First Aid’ provisions below).
d. Polyethylene Glycol (PEG) 300 or PEG 400 must be kept within first aid supplies along with a copy of the ‘Advice to Doctor’ report and phenol ‘First Aid’ report which is generated via the ‘Emergency Report’ button in Chemwatch, in areas where phenol is used.
e. Phenolic solutions should be stored in a cool, well ventilated and secure area, incompatibilities include oxidising agents, reducing agents, bases and metals (see SDS for full listing).
f. The use of aluminium, copper and brass alloys are to be avoided in storage and process equipment.

g. A spill protocol should be developed and communicated to users. All spills are cleaned up quickly and safely.
h. Phenols are harmful to aquatic organisms and dried residues in containers still present a hazard when empty. Return all containers and liquid waste must be labelled and returned to the Chemstore for disposal.

### Training and Competency

(6) Staff and students working in laboratories with chemicals are required to complete additional online training for laboratory and chemical safety.

(7) In addition to this training, workers handling phenol must read the SDS, be aware of the associated hazards and receive specific training from their Supervisor on:

a. the chemical properties;
b. health effects resulting from exposure;
c. specific safe work procedures;
d. safe use of any plant involved in the process;
e. safe storage and disposal procedures;
f. correct use and selection of PPE;
g. emergency spill procedures;
h. emergency procedures; and
i. first aid treatment for exposed workers, including the location of PEG 300 or PEG 400.

(8) Prior to permitting workers to undertake tasks or activities using phenol, Supervisors should:

a. verify and document worker competency;
b. provide specific training and induction; and
c. provide an appropriate level of supervision.

(9) The local site safety inductions conducted by local Work Health and Safety Coordinators (WHSCs) and/or Laboratory Managers are an important complement to this process.

(10) Local First Aid Officers are also to be made aware of the use of phenol in the area, the appropriate first aid response and kit contents specific to the treatment.

# Section 3 - Emergency Procedures

### Spills

(11) Phenol is harmful to aquatic organisms and where possible spills should be contained and prevented from entering the sewer system. A suitable spill kit should be on hand where phenol is being used and stored for this purpose.

(12) Potential spills of this chemical must be assessed as part of the risk assessment and prior to handling this substance. Refer to the Chemical Spill and Response Procedure for further information.

#### Major Spill Process

(13) The area is to be cleared of personnel, persons moved upwind and everyone prevented from entering the area.

(14) Security is to be contacted (phone 3365 5555 or the contact displayed on the Emergency Procedures Cards for the area). Also contact the local WHSC, HSW Manager and if needed, the First Aid Officer.

(15) There is to be no access to the area unless a person appropriately trained and wearing full body protective clothing and self-contained breathing apparatus.

(16) The spilled substance must be prevented from entering drains or water courses if this can be done without entering the area.

**Minor Spill Process**

(17) Waste is to be removed regularly and spills cleaned up immediately.

(18) Prior to cleaning up a spill, a person must don appropriate PPE, such as chemical protective gloves (e.g. vinyl or neoprene), safety glasses, lab coat and covered shoes. Additional PPE, where indicated by the risk assessment, may include overalls, chemical safety goggles, face shield and a fit-tested respirator with type A-P filter.

(19) Avoid all contact with skin and eyes.

(20) Small liquid spills can be absorbed using paper towels or commercially available absorbent such as vermiculite – equipment that generates dust must not be used.

(21) Materials used for clean-up are to be sealed in a suitable container e.g., double plastic bag or sealed plastic container, and disposed of through UQ Chemwaste. The SDS should be referred to for further information on suitable storage, including incompatibilities.

(22) The spill area can be cleaned with soap and water.

## First Aid

(23) It is important that where phenol and phenolic compounds are handled, workers are aware of the appropriate first aid management, as the time lapse after initial body contact can be critical for minimising damage to body tissues. First aid kits should contain PEG 300 or PEG 400 preparations to treat phenol burns at the scene of an incident. For further details, see First Aid Treatment for Burns Guideline, including Chemical Burns.

(24) First Aid Officers should avoid contact with contaminated skin, clothing, and equipment. They should also avoid inhalation of vapours or aerosols in the contaminated area.

(25) First Aid Officers must protect themselves by wearing PPE outlined in the SDS including:

a. Gloves e.g. vinyl or neoprene (noting glove selection is critical to preventing breakthrough and dermal absorption).
b. Eye-protection (goggles or face shield if there is still a splash risk).
c. Laboratory coat or protective overalls.

(26) All exposures should be referred to a medical practitioner for immediate follow up. A copy of the SDS, along with a copy of the phenol ‘Advice to Doctor’ report and phenol ‘First Aid’ report, should accompany casualties to enable appropriate treatment. All incidents are to be reported in UQSafe.

(27) For any exposure (regardless of the exposure) seek medical attention. Contaminated clothing and personal belongings must be double bagged.

**Skin Contact**

(28) Rapid and immediate skin decontamination is critical to minimise phenol absorption.

**Small Exposure**

(29) Rapidly remove contaminated clothing including belts and watches and irrigate or wipe exposed areas immediately and repeatedly with low-molecular-weight polyethylene glycol (PEG 300 or PEG 400).

(30) Treatment should continue until there is no detectable odour of phenol.

(31) If PEG is not available, a glycerine solution may be used. 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 an emergency shower, it should be for at least 15 to 20 minutes.

**Large Exposure**

(32) As per small exposure except for the amount of surface area to be decontaminated. In the case of a large surface area, an emergency shower should be used. 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.

(33) If possible, PEG should be used after the initial decontamination. The affected person should stay in the shower until the emergency responders arrive.

**Eyes**

(34) Rapid and immediate decontamination is critical.

(35) If the casualty is wearing contact lenses, they are to be removed if possible, ensuring no additional trauma. All hands assisting removal must not be contaminated with phenol. Refer to the Eye Protection Guideline for further guidance on wearing contact lenses in laboratory environment.

(36) The eyes must be flushed with copious amounts of water for at least 15 to 20 minutes, lifting eyelids occasionally. Do not interrupt flushing. Do not use PEG 300 or PEG 400 preparations on eyes.

(37) Seek medical attention immediately.

**Inhalation**

(38) Remove casualty to fresh air and seek medical attention.

# Section 4 - Roles, Responsibilities and Accountabilities

## Supervisors

(39) Supervisors for their area of responsibility are responsible for:

a. ensuring SDS's are available to all staff via Chemwatch;
b. ensuring risks assessments are completed and risks are eliminated or minimised as far as reasonably practicable;
c. providing supervision and training in the safe use of phenol;
d. providing assistance with the risk assessment process where required and approve them ensuring they are comprehensive;
e. ensuring all controls outlined in the assessment are followed by workers and providing instruction where they

are not;

f. ensuring the provision of adequate PPE for the activities and tasks and that spill kits are in place, and training in the use of PPE and spill management;
g. ensure the appropriate emergency equipment is supplied;
h. ensuring that all incidents involving these materials are investigated as soon as possible and that corrective actions (including review and modification of risk assessment and safe work procedures) are implemented to prevent recurrences; and
i. incidents and hazards as reported in UQSafe are investigated.

## UQ Workers and Students

(40) Be aware of the risk assessment in relation to working with phenol and follow all requirements to minimise risks.

(41) Participate in the risk assessment process to ensure the risk controls are both practical and effective.

(42) Use the required PPE and ensure it is fitted correctly and in good condition, report any issues with PPE to the Supervisor.

(43) Stop work immediately and notify the Supervisor if lab safety equipment is faulty, or you believe the safe work controls are not working effectively.

(44) Report any usage of the spill kit contents so that restocking can be undertaken.

(45) Report any incidents and hazards in UQSafe involving phenol.

## First Aid Officers

(46) First Aid Officers for their area of responsibility are responsible for:

a. conducting a thorough risk assessment to ensure adequacy of first aid facilities and kits in the workplace, and that the appropriate emergency equipment is supplied;
b. ensuring any PPE that needs to be used in a first aid emergency is in good condition;
c. maintaining the workplace first aid kit on a monthly basis including:
    i. recording use of its items
    ii. replenishing items as required
    iii. ensuring it remains fit for purpose;
d. maintaining current first aid training competencies; and
e. ensuring any injuries or hazards are reported in UQSafe.

(47) Further guidance on first aid responsibilities is available from the First Aid in the Workplace Code of Practice 2021 and First Aid Management Procedure.

## Status and Details

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