

NDMRB-RA-036

Risk Assessment: Working with Phenols

Scope

Phenol is used routinely in the laboratory, mainly for preparation of nucleic acids and as a standard laboratory reagent. It is highly toxic and can be rapidly absorbed across the skin. Additionally, small quantities on the skin can act as an anaesthetic at first, and may cause extensive damage before any pain is felt.

Before commencing work with phenol for the first time you must be familiar with the CoSHH assessment for the particular type of work with phenol you are undertaking. If such an assessment has not been undertaken, your supervisor should ensure that one is completed and that the control measures required are implemented. Basic safety information can be obtained from the material safety data sheet (MSDS) which should be supplied with your stock phenol.

The first level of control is elimination. Do you need to use phenol or is there a less hazardous technique available? If there is you should use that. N.B. Many proprietary nucleic acid extraction systems use phenol under a trade name - consult the material safety data sheet for the exact contents.

If phenol is required, only purchase the amount you need to complete your project and try to purchase it in a form you can readily use i.e. molecular biology grade pre-equilibrated with water or buffer at the appropriate pH for your needs - this reduces the amount of handling and exposure required. **DO NOT RE-DISTIL PHENOL**, high quality phenol is routinely available obviating the need for this extremely hazardous operation.

Users must be competent and fully aware of the hazards involved with working with phenol. Students and staff of limited experience must be closely supervised when handling phenol-containing solutions and colleagues working nearby should also be made aware that phenol is being used.

Name of assessor:	Andrea Keepence-Keyte – Laboratory Manager	Date of Assessment:	Sept 2015	Review Date:	Every 3 years
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Risk Matrix:

Risk Matrix		Likelihood			
		High	Medium	Low	Negligible
Consequence	Severe	High	High	Medium	Effectively Zero
	Moderate	High	Medium	Medium/low	Effectively Zero
	Insignificant	Medium/Low	Low	Low	Effectively Zero
	Negligible	Effectively Zero	Effectively Zero	Effectively Zero	Effectively Zero

Risk Assessment:

Hazard (Cause and consequence)	Affected Groups	Existing controls	Risk	Further Action
Exposure to skin, eyes, airways and mucous membranes	Staff	<p>The current (1998) long-term exposure limit (LTEL) for phenol is 5 parts per million with a short-term exposure limit (STEL) of 10 ppm. Phenols should therefore always be handled in a fume cupboard to ensure the STEL is not exceeded. Ensure no naked flames are in use nearby; phenol is flammable.</p> <p>Ensure appropriate personal protective equipment is specified for the type of operation being undertaken. Due to the aggressive nature of phenol, labcoats, safety specs, and gloves (Butyl rubber is most appropriate but not nitrile) must always be worn as a minimum. Additionally, sturdy footwear should be worn to prevent splashes to feet in the event of a spillage. All of these measures should be clearly specified in the CoSHH assessment. PPE is the last line of defence should other control measures fail and an accident occurs. Its importance cannot be over-emphasized for work with phenol.</p>	Medium	None
Splash to skin/eyes	Staff	<p>Polyethylene glycol 300 (PEG 300) solution should always be readily available for use in the event of a spill on skin. Phenol partitions preferably into PEG 300 from the skin. Ensure the internal stopper of the stock PEG 300 bottle is removed so that it can be quickly dispensed if required. Contaminated clothing should be removed and any exposed skin washed with copious quantities of water (to remove any non-absorbed phenol lying on the skin surface) for several minutes before applying PEG 300. Both the victim and anybody assisting should avoid secondary contamination from the washings and contaminated clothing - gloves should be worn. Do not scrub the contaminated area as this will tend to both spread the contamination and drive any phenol further into the skin.</p> <p>PEG 300 should not be used on eyes, these should be washed with copious quantities of water. Organic solvents should not be used to</p>	Medium	None

		remove contaminating phenol as they will tend to assist the transport of phenol into the skin. All phenol skin burn casualties should be taken to Accident and Emergency at the John Radcliffe Hospital for an assessment. In the event of any phenol injury to the eyes, the casualty should be taken to the Eye Hospital at the back of the Radcliffe Infirmary (even if they have skin burns as well). The appropriate hospital should be telephoned to let them know the casualty is coming so they are prepared in advance to provide necessary attention.		
Control of spill of phenol	Staff	Spillages should be absorbed with vermiculite (which should be readily available in laboratories routinely using phenol) and disposed of as for normal phenol waste.	Medium	None

Phenol should be contained in shatter-proof vessels (HDPE or polypropylene) and large volumes (> 1 litre) should not be handled except with extreme caution and only where absolutely necessary. Secondary containment must be used for transportation outside the laboratory. Phenol should not be dispensed using bottle-top pumps as it can crystallize in the dispensing lines causing a blockage. If no alternative is available then the pump must be thoroughly rinsed through with solvent (alcohol) and allowed to dry before storing. NB phenol plasticizes polycarbonate and polystyrene. Do not use these materials for containing phenol.

Waste disposal

In order to minimise contact with phenol wastes, no attempt should be made to empty small quantities from Eppendorf tubes etc. into larger containers. Instead, a suitable leak-proof container (i.e. one designed to hold liquids, not solids) should be chosen into which the phenol solutions complete with contaminated glass- or plastic-ware can be placed.

In practical terms, small items of plastic ware containing or contaminated with phenol and phenol/chloroform (microfuge tubes, pipette tips etc.) should be disposed of directly into a suitable plastic container (such as a used 500ml HDPE bottle) on your bench. When full this should be sealed and placed in a large leak proof container as should larger phenol-contaminated or phenol-containing plastic ware (conical [Falcon] tubes, pipettes etc.). **DO NOT ACCUMULATE STOCKS OF LIQUID PHENOL WASTE** for disposal i.e. do not decant from plastic ware to larger bottles or beakers on your bench - cap small volumes and place in bench waste container.

Wide-mouthed HDPE bottles are available with a 500ml capacity from SLS on R12.

When the bottles are full please dispose of through the hazardous chemical waste route. Please see the relevant lab manager to arrange disposal

Signed By Author:

Approved by (sign and print):

Reviewed by:

Review date: