



COSHH ASSESSMENT: COP3

Application of the controls specified below are intended to ensure that the risk of exposure associated with the given activities and hazards of the chemical substances in use will be reduced to a negligible level.

Title:	COSHH ASSESSMENT : COP 3
Activity:	Handling of pyrophoric liquids in Chemistry laboratories. This includes all liquids carrying the Hazard phrase H250 or risk phrase R17.
People at risk:	All staff working in the local area whilst the above operations are undertaken.
Maximum scale: <i>(Reactions on a scale greater than this must be approved in writing by a senior chemist)</i>	Operations involving up to 1 litre of flammable liquid, containing a maximum of 1 mol of pyrophoric material.
Global Harmonised Hazard Phrases and associated labels of materials covered by this assessment:	<div></div> <p>H250: Catches fire spontaneously if exposed to air.</p>
Chemical Risk Phrases and associated CHIP symbols of materials covered by this assessment:	<div> F</div> <p>R17: Spontaneously flammable in air</p>
Risk of exposure:	As any exposure of the liquid to air will probably result in fire, any spillage and subsequent ignition presents the major risk. The liquids are also liable to be volatile and highly flammable organic compounds, and/or corrosive in nature. Secondary risks therefore arise from potential inhalation of vapours or via skin absorption due to contact with the liquid.

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Control measures:

Use of pyrophoric liquids

Safety information for the compound is available from the appropriate MSDS which should always be consulted in addition to the bottle label (which can be obsolete).

Storage and transportation

Whenever possible, do not order more than the minimum material that is required for the task in hand. Arrange for, or undertake, the prompt disposal or destruction of all unwanted materials or active residues upon completion of work.

Where storage of pyrophoric liquids is required, ensure that they are kept in a well-ventilated area away from heat sources and direct sunlight, taking into account any manufacturer's instructions.

Primary container must be appropriately Nescofilmed. Regularly inspect stored containers and their labelling. Arrange for the safe disposal or destruction of any materials with damaged or corroded packaging or labelling.

Wherever practicable, keep pyrophoric materials apart from each other, and separate from oxidising or other flammable materials.

Reaction Hazards:

All reactions MUST be assessed with any compounds having "high-energy" functional groups undergoing thermal hazard testing prior to use.

The temperatures of any reaction must not exceed 150°C or the B.Pt. of the chemical, whichever is the lower unless deemed safe by calorimetry (DSC/TSU).

Consideration should be given to the practicalities of finally quenching the reaction with reference to the amount of pyrophoric material in excess of reaction requirements.

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Control measures (continued):

Engineering/ containment:

All operations regarding pyrophoric materials should be conducted in a fume cupboard. The sash must be appropriately lowered to give adequate protection to the operator during reagent transfer and reaction.

Ensure that all other flammable materials exterior to the reaction vessel and transfer system are removed from the fume cupboard prior to use.

Prior to use, confirm all extraction or containment systems as:

- Clean
- Free from physical obstructions (e.g. unwanted equipment) and unwanted chemicals.
- Functional and performing to expected criteria (e.g. fume cupboard flow ≥ 0.4 m/sec) within their test or service intervals.

All transfers of liquid reagents must be conducted under a suitable inert atmosphere (nitrogen or argon), taking into account any recommendations made by the manufacturer. The transfer of pyrophoric liquids can only be done via a cannula compatible with the reagent being used, including the solvent component. The use of any syringe is not an acceptable method to transfer pyrophoric liquids. The pressure should never rise above that of the Schlenk line and flow will be established by venting the receiving vessel to ensure that the differential pressure between the reservoir and the receiver will be sufficient.

Prior to the start of transfer, the bottle of pyrophoric reagent, the transfer system and receiving vessels must be:

- Checked as damage-free
- Suitably supported for example by clamping
- Suitably purged with the inert gas
- Confirmed as dry and leak-free

Addition rates of pyrophoric reagents must be slow. Appropriate vessel cooling and/or condenser capacity must be available such that a slight over-addition does not give rise to an uncontrollable exothermic reaction. **Additions must not be left unattended.**

The material should be used or safely destroyed or otherwise disposed of as soon as is practically possible.

All reactions left unattended must be fully labelled

Where materials may be left in other containers, use clearly visible signage to indicate:

- Name and quantity of the hazardous material in use
- Associated hazard

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Control measures (continued):

Personal Protective Equipment:

For more details, click on:
[Approved Personal Protective Equipment](#)

- Safety glasses
- Clean laboratory coat
- Gloves: for
 - *Solids*: Nitrile gloves
 - *Liquids*: Nitrile gloves

This equipment is intended for “splash protection” only.

Ensure that high occupational hygiene standards are maintained during operations, e.g.

- Clean up any spillages promptly - see below.
- Promptly change and safely dispose of any contaminated PPE
- Do not remove potentially contaminated equipment from the work area until adequately decontaminated
- Always wash hands following glove use

Personnel and/or area restrictions:

The chemist undertaking transfer of pyrophoric chemicals must inform colleagues in the working area of his/her intended operation.

At least one other person must be within hailing distance during all materials handling operations.

All practical work involving the handling of these compounds must be carried out in accordance with the chemistry department lone working procedure.

Spillage containment:

All transfers of pyrophoric liquids must be carried out in a fume cupboard, with a container placed underneath the reaction vessel, which is large enough to contain the whole reaction mixture.

Very small spillages or leaks giving rise to smouldering may be quenched immediately using water or a water-wet cloth, or doused with a non-flammable solid absorbent, e.g. sand or sodium hydrogen carbonate.

Larger spills may be doused with a non-flammable solid absorbent, e.g. sand or sodium hydrogen carbonate then sealed in an appropriate container for disposal

Fire Precautions:

Ensure appropriate extinguishers are available (e.g. dry powder) for use on chemical fires.

In the event of any fire, immediately sound the alarm and contact the fire department (dial 3333) or instruct someone to do so, evacuate the immediate area and only attempt to tackle the fire if you feel competent to do so and if you are not putting yourself or others at risk.

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Control measures (continued):

Disposal of wastes and residues

All reaction wastes or reagent residues must be rendered inactive by controlled addition to a well-stirred quench solution prior to disposal. Ensure that all equipment is thoroughly decontaminated prior to removing from contained or extracted areas.

Record the use of any quenching agents that may be used for rendering residues harmless in lab notebooks.

All waste material and residues must be disposed of according to the hazardous waste disposal guideline.

Occupational Health Controls:

First Aid

All operations should be conducted in an area supported by a trained first-aider.

Chemist should ensure that eyewash and emergency safety showers are accessible and have been recently tested and confirmed as functional prior to the start of work.
First aid support is available via emergency number 3333.

In the event of personal contamination (e.g. contact with skin or eyes), flush the affected area with water and call 3333 to request assistance.

Health Surveillance requirements:

None

Environmental monitoring requirements:

None

Author:

Michael Paradowski

Reviewed by: Date:

Eddy Viseux, 11/04/2014

Assessment approvals:

Approvals:

Name:

Signature:

Date:

Approved by Safety Delegate:

Michael
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Approved by Organic faculty PI:

Eddy Viseux

Version number and summary of changes:

Version 2: modification of the transferring technique of pyrophoric liquids from their container to a receiver vessel. Prohibition of the use of syringes.

I hereby confirm that proper techniques on how to safely use pyrophoric liquids have been demonstrated to me by the head of the laboratory or his nominee and in accordance with COP 3.

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