

## Safety Note 32

# Clearing up spills of metallic Mercury

### 1 **PURPOSE**

The purpose of this safety note is to warn University staff and students about the ill effect of metallic mercury vapours and provide guidance on how to deal with a small mercury spill e.g. from a mercury-in-glass thermometer. Large spills of mercury e.g. in a scientific lab are out of scope for this note and are covered in the Code of Practice (CoP) for Spill Management. Such spills shall be considered in risk assessments for the work and dealt accordingly.

### 2 **INTRODUCTION**

Metallic Mercury can present a significant toxic challenge to those exposed to its vapours. **Inhalation of mercury vapour poses a major hazard to human health.** Significant amounts of toxic vapour can be released from even milligram quantities of metallic mercury, this can have serious effects on the health of persons in the room, particularly if exposed for a prolonged period.

Any event resulting in a spill of metallic mercury (small or large) should be immediately reported to the [Health and Safety Coordinator](#) for that area, and logged as an [incident](#) on the Health & Safety Services (HSS) online incident notification form, available [here](#).

### 3 **MERCURY HAZARD**

Metallic mercury vapours have both acute and chronic effects on human health. Acute effects are normally seen when exposures are high and include damage to the kidneys; lungs (causing coughing, difficulties in breathing and pneumonitis) and the central nervous system. Chronic exposure to significant quantities of mercury vapour can lead to dementia. In addition, chronic exposure can give rise to mercury deposits in the tissues (as oxidised and conjugated metabolites) which can take years to clear.

Due to its properties, a small droplet of metallic mercury, will slowly evaporate even at room temperature. However, a mercury-saturated atmosphere is unlikely to be created in a ventilated room. If the room is poorly ventilated, or if the spill is large, there may be areas of the room adjacent to the site of the spill that approach mercury vapour saturation.

The Work Place Exposure Limit of metallic mercury is quite low i.e.  $0.02 \text{ mg/m}^3$  or  $0.002 \text{ ppm}$  long-term exposure limit (8-hr TWA reference period)<sup>1</sup>. To explain it further let us take an example, a  $100 \text{ }\mu\text{l}$  drop of mercury weighs approximately  $1.36 \text{ g}$ . If this entire volume was to evaporate (unlikely under ambient conditions), it would create a maximum vapour concentration of  $19000 \text{ g m}^{-3}$  at  $25^\circ \text{C}$ . For an average sized room with full evaporation, only  $0.475 \text{ g}$  ( $34 \text{ }\mu\text{l}$ ) of metallic mercury shall be enough to create a saturated atmosphere at  $25^\circ \text{C}$ .

Fortunately, due to the low vapour pressure, it would take several weeks for the above-mentioned volume of mercury to vaporise. However, a droplet of this size may not be easy to find especially if the room has a wood-block floor, or wooden skirting

boards not sealed to the floor. As a result, an unattended/ uncleaned mercury spill could give rise to chronic exposure over many years. It is therefore imperative to clear up even the smallest spills of elemental/ liquid mercury – e.g. from a broken mercury-in-glass thermometer. In the long term the University shall endeavour to replace such thermometers with mercury-free alternatives.

#### **4 SPILL RESPONSE**

HSS holds easy-to-use mercury collectors and clean-up kits to deal with small mercury spills e.g. from a mercury-in-glass thermometer. Suitably competent staff can use the kit. For advice and assistance contact HSS on extension 8888.

All areas e.g. labs, that possess specialist equipment containing large volumes of metallic mercury must consider how to clear a mercury spill as part of their risk assessment as described in the CoP for Spill Management. They shall maintain a suitable clean-up kit, audit its content on a regular basis, train the users and rehearse the clean-up at least once a year.

#### **5 MERCURY SPILL/ COLLECTOR KIT. USE and DISPOSAL**

*(for small spills of metallic mercury e.g. from a mercury-in-glass thermometer)*

**The University mercury spill kit should be either a mercury collector or a clean-up kit**

##### **3.1 Mercury Collector (e.g. Sigma Aldrich catalogue no. Z189901)**



***A typical mercury collector (Whilst using the kit the user must wear gloves)***

##### **3.1.1 Contents**

A plastic jar with a perforated plate and a cap containing a foam pad  
1 x pair disposable nitrile gloves  
Copy of the safety note

##### **3.1.2 How to use the kit**

Secure the area and do not disturb the surface to stop the mercury from spreading or splitting into smaller droplets or fall on the floor. Put on protective gloves and increase ventilation by opening a window but avoid any wind blowing through the window.

To collect the spilled mercury quickly, just unscrew the lid with the foam pad, and press the pad firmly onto the spill. This pressure forces the mercury into the pad. When the lid is screwed back onto the jar, the pad is compressed against the jar's freestanding perforated plate, releasing the mercury into the jar bottom.

### **3.2 Mercury Clean-up kit**

This type of kit is also available from several suppliers but can quite easily be made in-house from easily available materials

#### **3.2.1 Contents**

- 1 x pack Sulphur powder
- 1 x pack Calcium Hydroxide
- 1 x empty waste jar good enough to hold the waste safely
- 1 x plastic scoop to take out 20 mg of Sulphur powder
- 1 x brush
- 1 x 10ml syringe
- 1 x pair disposable nitrile gloves
- Copy of the safety note

#### **3.2.2 How to use the kit**

Secure the area and try to stop the mercury from spreading or splitting into smaller droplets or fall on the floor if the spill is on a surface. Put on protective gloves and increase ventilation by opening a window but avoid any wind blowing through the window to avoid the Sulphur and Calcium Hydroxide from spreading.

Use firm but short strokes of the brush and move the globules/ droplets of mercury together to form one or as few as possible larger pool/ drop. Use the syringe to pick up as much mercury as possible.

Mix equal amount of Calcium Hydroxide and Sulphur and make a paste with as little water as possible if needed otherwise you might wish to use the mixed powders without water (dry powder works as effectively. Spread the mixture onto the spillage area using the brush; then brush the contaminated material into the scoop/ directly into the waste container, whichever is safe and convenient.

Replace the cap on the waste container tightly and store the container at an appropriate waste store (Please see section 3.3.).

### **3.3 Disposal**

Disposal of mercury must be arranged via [Sustainability Services](#). This will need to be disposed as hazardous waste, following the guidance on storage and disposal in Health and Safety Services CoP 48: Hazardous waste. Sustainability Services will assist with booking a collection via the University's relevant waste contractor. Where possible, the used spill kit should be collected by the waste contractor from in-situ – Sustainability Services cannot transport/move the waste.

If it's not possible to keep the used spill kit safely and securely at the place where the spill has occurred: the person clearing up the spill and/or the person responsible for the spill should identify an alternative temporary storage space. If necessary, they should

seek guidance from H&SS on the suitability of the storage space and on the safe transport/ movement of the waste. The process of identifying a suitable temporary storage space may require negotiation with Schools and Functions who have existing designated hazardous waste stores.

Cost of disposal will be recharged to the relevant individual/group/school/function who caused the spill.

#### 4. Version control

EDITION	KEEPER	REVIEWED	APPROVED BY	APPROVAL DATE
2	H&S Services	Every three years	UHSWC	March 2019

#### References:

1. Health and Safety Executive, 2018, *EH40/2005 Work Place Exposure Limits*. The Stationary Office, London [<http://www.hse.gov.uk/pUbns/priced/eh40.pdf>] Accessed February 28, 2019