

## **Chemical Risk Management Protocol**

### **Safe Methods of Use (SMOU)**

# **Mercury**

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# 1 Purpose

This Safe Method of Use (SMOU) applies to principal investigators (PIs), laboratory managers, designated laboratory person (DLPs), and all staff and students who direct or participate in the use of mercury at the University of Auckland.

Note: the word 'shall' denotes a mandatory requirement and the word 'should' denotes a recommendation.

# 2 Mercury use in the University

Mercury-containing devices may be used in laboratories and workshops to measure temperature (thermometers and thermostats), pressure (sphygmomanometers, barometers and manometers), liquid density (hydrometers), and humidity (hygrometers, psychrometers and barometers).

→ **Replace mercury devices with non-mercury substitutes if available.**

## **Mercury can present exposure hazards under the following conditions:**

- Mercury-containing equipment such as thermometers break and release mercury.
- Mercury thermometers in ovens may break if the oven's temperature rises above the thermometer's capacity.
- Inadequate pressure-system connections may release mercury into the air at high velocities, which will atomise the mercury into extremely small particles and spread it over a large surface area.
- Spills not cleaned up promptly may vaporise faster than the room's ventilation can safely remove toxic fumes.

### 3 Health Effects of Mercury

Mercury is a potent neurotoxin and can cause long lasting, human health effects.

Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing foetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems. Short-term exposure to high levels of metallic mercury vapours may cause effects including lung damage, nausea, vomiting, diarrhoea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

Short term low level exposures to elemental mercury do not usually cause any significant health effects.

### 4 Cleaning a Spill

Spills shall be cleaned up promptly and thoroughly to minimise the possibility of long-term exposure occurring. If mercury is not cleaned up using appropriate methods, it can remain trapped in crevices and cracks, and continue to vapourise over a long period of time.

1. Wear a lab coat and disposable gloves
2. Move the mercury into a pile using an index card or rubber squeegee.

**Under no circumstances should mercury be swept with a broom or vacuumed with an ordinary vacuum cleaner. These procedures will disperse mercury more quickly into the air and spread the contamination.**

3. Beads of mercury can be sucked up with a disposable pipette, a water-trapped vacuum line attached to a disposable pipette or a hand-operated vacuum pump. Alternatively strips of adhesive tape can be used, being careful to avoid skin contact.

OR

Mercury-absorbing powders, if available, can be used to amalgamate mercury. Materials such as sulphur powder, calcium polyphosphide with excess sulphur,

zinc dust or proprietary products like Mercurisorb, HgX can be used. Sprinkle these compounds on contaminated area, using at least twice as much powder as volume of spill. Mix well if possible. Allow time for mercuric sulphide etc to form.

4. Mercury waste and materials used in spill cleanup must be promptly placed in a sealed bottle or in a double layer of plastic bags and labelled for disposal as hazardous waste.
5. After all visible mercury has been collected, the area should be washed with sodium thiosulphate (photographic fixer) solution to further decontaminate the area.

All mercury wastes must be managed and disposed as hazardous waste to be disposed by an approved chemical waste contractor. Contact the Hazards and Containment Manager for advice regarding disposal.

## 5 Best Management Practices

The following is a list of “best management practices” that can be implemented by faculty, staff, and students:

- Replace mercury devices with non-mercury substitutes if available.
- Avoid inhaling mercury vapours by working in a fume hood, or well-ventilated area, and away from heat.
- Store mercury-containing reagents and waste in tightly capped and shatter-resistant containers away from sinks and drains.
- Gloves must be worn at all times when cleaning up mercury. Some forms of mercury are very readily absorbed through the skin.
- Small spills of mercury, such as broken thermometers, must be cleaned up immediately by laboratory personnel.