

Safe Method of Use 21: Mercury spills

Purpose: This applies to **principal investigators (PIs), sector managers, designated laboratory person (DLPs)**, technical staff and students who use mercury or mercury containing equipment within the University of Auckland.

Mercury-containing devices are commonly 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).

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 fetus. 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 vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

Mercury can present exposure hazards under the following conditions:

- Mercury thermometers in ovens may break if the oven's temperature rises above the thermometer's capacity.
- Inadequate pressure-system connections in may release mercury into the air at high velocities, which will atomize the mercury into extremely small particles and spread it over a large surface area.
- Spills not cleaned up promptly may vaporize faster than the room's ventilation can safely remove toxic fumes.
- Short term low level exposures do not usually cause any significant health effects, but spills should be cleaned up promptly to minimise the possibility of long-term exposure occurring. Liquid mercury vapourises readily at room temperature, and this can lead to significant mercury vapour levels being present from liquid spills.
- Most mercury spills in the University involve only a small amount of liquid from a broken thermometer. These spills can usually be cleaned up fairly easily by laboratory staff with the right equipment and knowledge.

- Thorough clean-up is important to prevent chronic exposure. 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.

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 vapors 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.

Clean-Up

- A lab coat and disposable gloves must be worn during cleanup of mercury spills to prevent skin absorption or contamination of clothing.
- The best way to collect mercury is to use an index card or rubber squeegee to form a pile that can be sucked up or amalgamated.
- 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.
- 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. 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.
- 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.

- After all visible mercury has been collected, the area should be washed with sodium thiosulphate (photographic fixer) solution to further decontaminate area once mercury has been collected.
- All mercury wastes must be managed and disposed as hazardous waste to be disposed by an approved chemical waste contractor.

Contact:

Hazards and Containment Manager to arrange for disposal