Chemical Safety – Special Hazards

Safe Work Procedure (SWP – 016)

Mercury Metal

Last revised: November 19, 2026

Revision History

	Revision Date	*Author*	*Position*
1.	Nov 19 2026	Paraskevi Lagaditis	OHSE consultant

Document Approval

Approved by: Laboratory Safety Committee

__*Peter Oshkai*_____ _____ _*November 19, 2026*_____

Chair, Laboratory Safety Committee *Date Approved*

**This revision replaces all previous versions of this document. If a copy is printed, it is the users' responsibility to verify the copy is the most current version of the document.*

PURPOSE

To provide general guidance and instruction of the safe use in laboratories of mercury metal. Each lab must develop a lab-specific work procedure unique to the experiments and activities being performed (See procedure #7).

SCOPE

The SWP is a document to provide guidance to limit worker exposure from handling and disposal of mercury metal.

TRAINING

The following training is required to be completed prior to working with mercury metal:

- WHMIS
- Lab Safety for Lab Workers
- Lab SWP with documented signoff by the individual and their supervisor.

Refresher training in the General and Lab SWP must be provided when:

- there has been an extended timeframe of inactivity, or
- there has been an incident or injury, or
- 2 years has elapsed since the original training.

REGULATION AND POLICY

The University of Victoria will follow WorkSafeBC Occupational Health and Safety Regulation Part 30, and the University of Victoria Occupational Health, Safety & Environment Department.

RESPONSIBILITY

It is the responsibility of personnel undertaking activities with special hazards to complete all required training and adhere to these safe work procedures, including any additional lab or job-specific procedures.

It is the PI's or supervisor's responsibility to ensure that individuals working with special hazards have been trained prior to commencing work and have demonstrated competency in safely performing all duties associated with the special hazard in accordance with these procedures.

DEFINITIONS & ABBREVIATIONS

ACGIH – American Conference of Governmental of Industrial Hygienists

NIOSH – National Institute for Occupational Safety and Health

TWA – Time weighted average

IDLH – Immediately dangerous to life or health

McLeod gauge – a scientific instrument containing mercury metal used to measure low pressure

HAZARD

Mercury is a naturally occurring element that exists in several forms, mercury metal, inorganic mercury salts and organomercury compounds. Mercury metal is the most widely form of mercury found across many types of laboratories.

Mercury metal, also known as elemental mercury or historically referred to as quicksilver, is a shiny liquid metal at room temperature. Mercury metal is used in thermometers, manometers, fluorescent or UV lamps and some electrical switches. It is still used in amalgams for dental procedures. However, due to the toxicity of mercury metal there has been a shift to reducing the amount of mercury used in applications or introduction of safer alternative materials. An example of the latter approach is swapping out mercury thermometers for alcohol or digital thermometer.

When mercury metal is dropped, it breaks up into smaller droplets that can easily roll and accumulate in floor cracks or porous materials. The droplets can also become strongly attached to certain materials, in particular metals. Mercury metal can evaporate to become a vapour.

Mercury metal is a health hazard such that it is a neurotoxin. Health effects from mercury exposure depend on several factors such as the form of mercury, amount of mercury, how the person is exposed and exposure duration. In the case of mercury metal, inhalation of vapour is the highest risk of mercury exposure. The ACGIH 8h TWA of mercury metal vapour is 0.025 mg/m^3. The NIOSH IDLH of mercury vapour is 10 mg/m^3. It is important to use appropriate engineering controls (such as fume hoods) or administrative controls (such as operating procedures) to limit the extent of mercury metal vapour. If a spill occurs less that 10 mL (100 g) on non-porous surfaces, personal protective equipment, in particular respirators, will be required if adequate ventilation is not available. Adequate ventilation includes fume hoods, local extraction ventilation (LEV) or laboratories with at least 6 air changes per hour (ACH). Spills greater than 10 mL (100 g) and/or on porous surfaces will require a hazardous materials removal contractor. Porous surfaces include wood, carpet or upholstery.

Mercury is also an environmental hazard identified by the Government of Canada Environmental Protection Agency. If planning to order lab equipment that contains mercury, please notify OHSE as the equipment may need to be tracked and reported under the Products Containing Mercury Regulations. The regulations prohibit the import and manufacture of all products containing mercury with some exemptions, including a gradual phase out of the most common types of lamps, and lab equipment containing mercury.

HANDLING MATERIALS

Personal Protective equipment (lab coat, gloves, safety glasses)

Luer-lock syringe with wide gauge blunt needle (if transferring mercury metal)

SPILL RESPONSE MATERIALS

Sponge/foam collector

Mercury metal sponge/foam collectors are jars where a foam/sponge is attached to the lid. The jar contains a perforated plate. Using the lid, the foam is pressed on the mercury metal spill to absorb the liquid metal. The lid then is pressed down in the perforated plate in the jar to deposit the mercury metal. This action is repeated until all the spilled mercury metal has been collected.

Aspirators

Aspirators are handheld, manual pumps that take advantage of the high surface tension of mercury metal to suck up the spill in one action. They reduce the chance of accidental contact with the mercury metal spill. A disposable Luer lock syringe and needle can serve as an alternative if an aspirator is not readily available. Avoid using small diameter gauge needles. Avoid the use of pipettes to collect spills because pipettes do not have enough suction strength to pick up mercury metal (the density of mercury metal is 13.69 g/mL). Aspirators become less effective if the mercury metal spill is highly dispersed into tiny beads.

Mercon clean-up wipes

Mercon wipes are thin sorbent pads pre-moistened with a proprietary mixture that effectively absorbs and neutralizes mercury metal spills. The Mercon wipes are best used as a final wipe down of non-porous surfaces after the bulk of the mercury metal as been collected by sponge/foam collectors and/or aspirators.

Mercury vapour suppressant

Mercury vapor suppressant is a solution that is sprayed over the surface of large mercury spills and greatly reduce the vapors released by the spill. The spray is necessary for spills greater than 10 mL or 100 g.

Binding agents/amalgamation powders

Mercurisorb™ is a proprietary amalgamation powder to bind mercury metal and safely clean spills.

HgX® is a cost effective proprietary chelating mercury decontaminating powder consisting of a water soluble, non-hazardous, metallic-mercury/sulfide, a cleating compound and dispersing agent. It reacts rapidly forming a film over finely divided mercury metal beads and reacting to produce a non-vapourizing sulfide.

Sulfur powder is known a binding agent for mercury and can be used as a quick measure to cover mercury metals spills in laboratories. However, sulfur powder is not recommended as the first choice because sulfur powder is mildly toxic such that it causes skin irritation.

Mercury metal indicator

Indicator powders identify the presence of mercury metal. The powder is sprinkled over the suspect area and left for 24 hours. A pink to reddish brown or black area will appear if mercury is present.

PROCEDURES

1. **Handling**
    a) Don PPE (safety glasses, lab coat and gloves).
    b) Handle mercury metal within a fume hood.
    c) Cover or line the work surface with a disposable bench protector or secondary containment tray.
    d) Use secondary containment bins to transport mercury metal to the work area.
    e) Avoid using pipettes to handle mercury metal.
    f) Use a syringe to transfer mercury metal from the stock bottle.
        a. Ensure a Luer lock syringe is used if using a needle as well
        b. Ensure the widest diameter needle is used (e.g. 18 gauge)
        c. Use blunt needles.
    g) If using a McLeod gauge
        a. Ensure vacuum connection inlet is always covered with a rubber septum or stopper
        b. Avoid tipping the McLeod gauge backwards to prevent mercury metal from spilling out.
    h) If using a thermometer with mercury metal
        a. Ensure the thermometer does not directly touch hot plates
        b. Secure the thermometer to prevent from falling and breaking (e.g. use a clamp)
    i) Ensure all disposable waste contaminated with mercury metal is kept separate from general lab waste. See section 6. Waste Disposal

2. Storage

a. Store all bottles or containers of mercury metal in appropriate chemical cabinets.

b. Ensure caps/lids are secured on containers.

c. Keep containers of mercury metal in secondary containment

d. For large amounts of mercury metal stored, avoid the use of glass containers.

3. Spills

a. Follow OHSE's general spill response instructions.

b. Do not attempt to clean up any spill if not trained or comfortable. Seek assistance or call Campus Security (250-721-7599)

c. Specific steps for small spills less than 10 mL or 100 g on non-porous surface:

i. Contact OHSE for any mercury metal specific spills supplies not readily available in the lab.

ii. DO NOT

- use a vacuum cleaner or HEPA vacuum to clean up
- use a broom or brush to sweep mercury metal
- wash contaminated items in a washing machine

iii. Don PPE (lab coat, nitrile gloves, eye protection).

iv. Wear a respirator or increase ventilation in area if possible.

v. If broken glass is present, use tongs to collect and put into hazardous waste container.

- Ensure glass previously in contact with mercury metal is collected separately for disposal

vi. Use a flashlight at an angle to locate beads of mercury. Check a wide area beyond the spill.

vii. Use a sponge or aspirator for collection of mercury beads.

- Sponge: Mercury metal collector sponge/foam firmly against surface on which mercury was spilled. The pressure applied will open the cells in the foam pad so the individual globules of mercury can enter the cells. When pressure is released, the cells close. Screw lid firmly back onto jar to compress pad against perforated plate and release mercury into jar bottom.
- Aspirator: Follow instructions on set up and directions.

viii. If mercury metal has broken up and dispersed into smaller beads, sprinkle Mercurisorb™ or HgX® or sulfur powder onto the spill

- Use at least twice as much powder as volume of the spill
- Leave for several hours or overnight if possible
- Use sponge or foam collector or dust pan to collect into a waste container.

ix. Wipe surface with Mercon wipes to clean contaminated surfaces

x. Wipe shoes, gloves, and other contaminated items with Mercon wipes as needed

xi. Use mercury metal indicator to ensure spill is completely cleaned.

- Sprinkle indicator powder over the contaminated area
- Leave undisturbed for 24 hours
- Inspect powdered area for pink, reddish-brown or black spots
- If colours spots are found, repeat clean up procedures
- If no colours spots are found collect indicator powder and dispose

xii. Dispose all solid materials in contact with mercury metal and PPE via hazardous waste into enclosable bags and double bag.

xiii. Label all sealed bags as "Mercury metal contaminated waste". Keep separate from the Toxic & Contaminated Solids waste stream.

xiv. Affix a green hazardous waste pick up sticker on all waste containers and sealed bags.

xv. Submit an online request for hazardous waste pick up.

d. Specific steps for spills for volumes more than 10 mL or 100 g or smaller volumes on porous surfaces or unknown volumes:

xvi. Secure the area and warn others.

xvii. Immediately evacuate the area.

xviii. Post "do not enter" signs on the doors of the lab.

xix. Contact Campus Security at 250-721-7599.

e. Complete a Department Incident & Investigation Report to document and review the spill incident.

4. Decontamination

a. Dispose any clothing in contact with mercury metal, such as lab coats, as hazardous waste.

i. Do not wash mercury metal contaminated clothing in the washing machine because it will contaminate the washing machine and pollute the sewage system.

b. Dispose all gloves, disposal bench liners, syringes in contact with mercury metal as hazardous waste

c. Double bag all contaminated items in enclosable bags for hazardous waste removal.

d. Ensure all mercury metal contaminated waste is kept separate from the general lab waste.

5. Emergencies and First Aid

a. Call 911 to summon an ambulance if there is a medical emergency.

b. Call Campus Security at 250-721-7599 for first aid.

c. If material has contacted the eyes, use emergency eyewash and flush for at least 15-20 minutes.

d. For skin contact, flush affected area with running water for at least 15-20 minutes.

e. For inhalation, move immediately to fresh air and seek medical attention immediately.

f. Report emergency to PI/supervisor and OHSE as soon as possible.

6. Waste Disposal

a. Keep all mercury metal contaminated waste separate from general lab waste.

b. Label all waste containers or bags as “Mercury metal contaminated waste”.

c. Affix a green hazardous waste pick-up sticker on all containers or bags

d. Submit an online request for hazardous waste pick-up from OHSE

7. Lab SWP

In additional to this general SWP, each lab that is using mercury metal requires a Lab specific SWP that includes specific procedures:

a. Handling

b. Decontamination

c. Waste disposal

d. Spill response

REFERENCES

1. United States Environmental Protection Agency. (2026, November 6). *Basic Information about Mercury*. https://www.epa.gov/mercury/basic-information-about-mercury

2. United States Environmental Protection Agency. (2026, November 6). *Basic Information about Mercury*. https://www.epa.gov/mercury/health-effects-exposures-mercury

3. WorkSafeBC (2026, June 15). *Exposure Limit* Mercury – Elemental, as Hg https://elimit.online.worksafebc.com/substance/mercury-elemental-as-hg/

4. United States Environmental Protection Agency. (2026, November 6). *Basic Information about Mercury*. https://www.epa.gov/mercury/what-do-if-mercury-thermometer-breaks

5. University of British Columbia. (January 2021). *CHEM-SWP-003 Mercury Spill Clean up*. https://riskmanagement.sites.olt.ubc.ca/files/2021/01/CHEM-SWP-003-Mercury-Spill-Clean-Up.pdf