

DOHS SOP# _____
Date DOHS Received _____
Departmental Approval _____
DOHS Approval _____

**STANDARD OPERATING PROCEDURE
FOR CARCINOGENS AND HIGHLY TOXIC MATERIALS**

Principal Investigator(s): _____

Location(s): _____

Chemical(s): **METALLIC MERCURY AND OTHER INORGANIC MERCURY COMPOUNDS**

1. **Purchasing:**

All purchases of this material must have approval from the Principal Investigator before ordering. The user is responsible to ensure that a current Material Safety Data Sheet (MSDS) is obtained unless a current one is already available within the laboratory. Quantities of this material will be limited to the smallest amount necessary to complete the experiment.

2. **Storage:**

Materials will be stored according to compatibility and label recommendations in a designated area: _____ . Storage areas will be regularly inspected by _____ to ensure safety. Periodic inventory reductions will be scheduled.

3. **Authorized personnel:**

Use of this material requires prior written approval from the PI or _____ ,
Title: _____ .(see Chemical Hygiene Plan for approval level requirements). Use will be limited to the following personnel (check all that apply):

Principal Investigator ____ Graduate students ____

Technical staff ____ Post doctoral employees ____ Undergraduates ____

Other (describe) _____

4. **Training requirements:**

The user must demonstrate competency and familiarity regarding the safe handling and use of this material prior to purchase. Training should include the following:

- X Review of current MSDS
- X Review of the OSHA Lab Standard
- X Review of the Chemical Hygiene Plan
- X Special training provided by the department/supervisor(Right to Know)
- X Review of the departmental safety manual

X Safety meetings and seminars

5. **Use location:**

Materials shall be used only in the following designated areas in room _____. Check all that apply:

demarcated area in lab (describe) _____

fume hood _____ glove box _____ other (describe) _____

Always provide secondary containment for apparatus containing mercury.

6. **Personal protective equipment:**

All personnel are required to wear the following personal protective equipment whenever handling this material (check all that apply):

Chemical safety goggles _____ Face shield _____ Gloves (type) 4 H gloves
Respirator (type) _____ Rubber apron _____ Lab coat _____ Tyvek clothing _____
Other (describe) _____

7. **Waste disposal:**

The authorized person using this material is responsible for the safe collection, preparation and proper disposal of waste unless otherwise stated below. Waste shall be disposed of as soon as possible and in accordance with all laboratory and University procedures.

Mercury is considered a hazardous waste and must be disposed of via the Department of Occupational Health & Safety. The Department of Occupational Health & Safety uses a vendor to recycle mercury. Please contact the Department of Occupational Health & Safety at 302-831-8475 for a waste pick up.

8. **Decontamination:**

- If the spill is small, clean up can be done by the lab personnel using a trapped vacuum line attached to a tapered glass tube, similar to a medicine dropper, disposable pipette or mercury sponge to pick up the mercury droplets. Mercury spill kits are available commercially and will usually include a small pump, sponges impregnated with a material to absorb mercury and which can be used to wipe up the area of a small spill. There is usually also an absorbent powder that reacts with mercury to form an amalgam. This can be very helpful for hard to reach places where mercury will hide.
- An amalgam, when applied to a small mercury spill, binds the mercury with another metal. This causes a chemical reaction, which inhibits vaporization. Since mercury vapor is highly toxic, treating pooled mercury with an amalgamating agent greatly reduces the dangers that even a minor spill could pose. There are commercially available kits that contain amalgamating agents. Lab Safety Supply is a good source vendor to use for commercial mercury kits.

9. Exposures:

Because of mercury's high toxicity the American Conference of Governmental Industrial Hygienist (ACGIH) has set its TWA (Time Weighted Average) for mercury vapor at 0.025 milligrams per cubic meter (mg/m^3), with no allowable STEL (Short term exposure limit). The immediately dangerous to life and health (IDLH) is set at $28 \text{ mg}/\text{m}^3$. Emergency procedures will be found in the MSDS.

Exposure controls:

- Whenever possible, less hazardous materials should be substituted for mercury. Mercury thermometers can be replaced with alternatives. Vacuum gauges can be used to replace manometers and oil diffusion pumps can replace mercury diffusion pumps.
- Absolutely no eating or drinking where mercury is used.
- Remember that mercury is heavier than air so vapors will collect near the floor.
- Whenever possible, this material should be used inside a fume hood.
- Mercury will absorb through the skin so 4H gloves should be used for clean up and general use.

Skin/eye contact--symptoms: Irritation, allergic reaction, metallic taste, digestive disorders, kidney and nerve damage, effects on brain.

First aid: Remove contaminated clothing and jewelry and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (15-20min). Get medical attention if needed.

Ingestion-- symptoms: nausea, vomiting, kidney damage, nerve damage

First aid: If vomiting occurs, keep head lower than hips to prevent aspiration. Get medical attention immediately.

Antidote: dimercaprol/oil, intramuscular; hemodialysis, penicillamin, oral; chelating agent. These substances should only be administered by a trained medical provider.

Inhalation--symptoms: irritation, allergic reaction, metallic taste, metal fume fever, nausea, vomiting, chest pain, difficulty breathing. For long term exposure: blue lines on gums, loosening of the teeth, nerve damage.

First aid: When safe to enter area, remove from exposure. Get medical attention.

10. **Spills:**

Spill cleanup materials to be used, location of materials, PPE to be used, disposal of cleanup materials, etc. Please be as complete as possible:

Mercury spills can be avoided by using supplies and equipment that do not contain mercury. Most mercury spills do not pose a high risk. The initial response to a spill of elemental mercury should be to isolate the spill area and begin cleanup.

- Mercury can be absorbed through the skin, inhaled or ingested. Extreme care must be taken when cleaning up a spill.
 - If the spill is small, clean up can be done by the lab personnel using a trapped vacuum line attached to a tapered glass tube, similar to a medicine dropper, disposable pipette or mercury sponge to pick up the mercury droplets. There are commercially available mercury spill kits that could be used for the clean up.
 - Mercury spill kits are available commercially and will usually include a small pump, sponges impregnated with a material to absorb mercury and which can be used to wipe up the area of a small spill. There is usually also an absorbent powder that reacts with mercury to form an amalgam. This can be very helpful for hard to reach places where mercury will hide.
 - Do not use a commercial vacuum cleaner.
 - Use 4H gloves for clean up.
 - Place residue, broken equipment, gloves, suction bulbs, etc. in heavy plastic bag or container for waste collection. Seal and label the bag or container.
 - Call the Department of Occupational Health & Safety on ext. 8475 for a waste pick up.
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- For larger spills the Department of Occupational Health & Safety will come with a piece of equipment to measure mercury vapor levels as well as a mercury vac to clean up the spill.

This SOP only covers elemental mercury and inorganic mercury compounds. Contact OHS for information on organomercury compounds.

11. **Emergency Phone Numbers:**

Campus Police 9-911

Occupational Health & Safety X8475

12. **Other Special precautions:**

Incompatible/reactive materials, useable shelf life, etc. Please be as specific as possible:

Incompatibilities: combustible materials, metals, amines, halogens, acids, oxidizing materials, metal carbide

Prepared by: _____

Date: _____

Reviewed by: _____

Date: _____

Revised by: _____

Date: _____

Revision Approved by: _____

Date: _____

A copy of the completed SOP must be filed with the University Chemical Hygiene Officer at Department of Occupational Health & Safety, 132 General Service Building.