# University of Arizona

## Mercury and OrganomercuryStandard Operating Procedure

*[This is a template. Fill in all necessary blanks and delete all highlighted areas when complete. Add any sections necessary for your laboratory. This will be appended to your Laboratory Chemical Hygiene Plan.]*

**Title:**  **Click here to enter the title of your SOP.**

**Approval Holder (AH):** Click here to enter text **Approval #:** Click here to enter text

**Approval Holder Phone Number(s):** Click here to enter text

**Approval Safety Coordinator (ASC):** Click here to enter text

**Approval Safety Coordinator Phone Number(s):** Click here to enter text

**Department:** Click here to enter text

1. **Purpose**

This standard operating procedure (SOP) is intended to provide guidance on how to safely store, handle, use, and dispose of mercury and organomercury in Enter AH’s name’s laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before Describe the procedure or process this SOP will address. If you have questions concerning the requirements within this SOP, contact your Approval Holder (AH) or Approval Safety Coordinator (ASC).

1. **Scope**

*[Describe when this SOP applies and to whom this SOP applies.]*

1. **Hazard Description**

*[Describe the hazards presented by the procedure or process this SOP addresses. What makes it hazardous? Provide an example, if applicable.]*



**Mercury** is primarily used in the manufacture of industrial chemicals or for electrical/electronic applications. It can be found in some thermometers, especially older ones or ones which are used to measure high temperatures. Mercury is also found in the gas phase in fluorescent lamps. It is a reproductive toxicant and acutely toxic by inhalation. Mercury is a silver liquid metal that vaporizes at temperature as low as 10 degrees Fahrenheit/ - 12 degrees Celsius.

**Organomercury** compounds are substances with at least one mercury-carbon bond. These substances are primarily used in organic synthesis or as antiseptics and fungicides. Low molecular weight organomercury compounds (e.g. dimethylmercury) can easily penetrate human skin and protective materials. Organomercury compounds are acutely toxic by all exposure routes, and dimethyl mercury is also carcinogenic and flammable.

1. **Process & Hazard Controls**

*[Describe the steps needed to set up and complete the procedure or process in safe manner following the* [*hierarchy of controls*](https://www.cdc.gov/niosh/topics/hierarchy/default.html)*. Use as much detail as is necessary to ensure all laboratory workers can complete the procedure or experiment safely.]*

* 1. **Elimination/Substitution**

*[Describe any eliminations of hazardous chemicals or processes; alternatively, any substitutions with less hazardous alternatives that could be used to accomplish the task.]*

* When possible, use a mercury-free compound or an alternative compound such as carbon dioxide and sulfur hexafluoride.
* Use alcohol/glycol instead of mercury thermometers.
  1. **Engineering Controls**

*[Describe any engineering controls (e.g. fume hoods, gas cabinets, local exhausts, blast shields, etc.) that are used to safely accomplish the task.]*

All operations involving Mercury and Organomercury compounds should be carried out in a certified chemical fume hood, glovebox, or a hard-ducted biosafety cabinet to keep airborne level below recommended exposure limits. Contact RLSS for assistance in choosing the correct ventilated device for your specific application.

**Fume hoods or other RLSS approved local exhaust ventilation are required for the use of this compound.**

* 1. **Work Practices**

*[Describe any work practices (e.g. staggering schedules, additional cleaning measures for particulates, etc.) that are used to safely accomplish the task.]*

* Under no circumstances should you sweep mercury with a broom or vacuum with an ordinary vacuum cleaner. These procedures will disperse mercury vapors and droplets quickly into the air and spread the contamination.
* Training and signage must be done prior to working with Mercury and organomercury compounds
* Do not work alone; ensure another person who is familiar with your work and mercury hazards is in the area.
* Ensure that you are working on a non-porous surface since mercury easily collects in tiny cracks and scratches.
* Use wet cleaning techniques and wet absorbent mats when using mercury and organomercury compounds.
* Use materials and containers appropriate for mercury use and remain aware of potential incompatibilities. Mercury vapor can penetrate some plastics. Therefore, glass containers/materials work well. Keep in mind, however, that glass is fragile – overpack glass containers in plastic containers. Additionally, consider placing mercury absorbent material in the overpack container so that any potential spilled mercury is amalgamized immediately. Mercury absorbent powders are commercially available and commonly contain zinc.
  1. **Personal Protective Equipment**

*[Describe the personal protective equipment needed to adequately protect laboratory workers when performing the process or procedure addressed by this SOP. Ensure to specify any personal protective equipment beyond the minimum (i.e. safety glasses, lab coat, gloves, long pants and closed-toed shoes).]*

* **Hand and Arm Protection**: Nitrile gloves typically provide adequate protection against minor splashes. Silver Shield/4H gloves worn underneath nitrile gloves can provide added protection when handling large quantities or whenever dimethylmercury is used. Do not wear latex gloves.
* **Body Protection**: 100% cotton recommended.
* **Eye protection**: safety goggles, face shield if there is a splash hazard.
* **Respiratory protection**: All respiratory protection requires RLSS assessment and approval; for exposures that require respiratory protection, contact RLSS at rlss-chem-support@arizona.edu.
  1. **Transportation and Storage**

*[Describe how to safely transport and/or store (e.g. ventilated cabinet, flammable cabinet, under inert blanket, etc.) the hazardous chemical(s) or processes.]*

* Clearly label storage container as "Mercury - DO NOT OPEN OUTSIDE OF FUME HOOD” and use GHS compliant label.
* Collect mercury waste in a tightly sealed glass container. Overpack the glass waste container in a plastic container with a tight- fitting lid.
* Keep all containers tightly closed when not in use and during transport.
* Storage Group AT [High Acute Toxicity]
  + Store in designated plastic (polyethylene) secondary container.
  + Store in original containers or other appropriate containers (see section above)
  + Store mercury in a cool, dry, well-ventilated space. Also, mercury can be mildly corrosive – avoid storage in a metal cabinet.

1. **Spills, Cleanup & Disposal**

*[Describe how to safely end the procedure or process, clean up the process or spills, and/or dispose of any waste generated.]*

**Spills and Cleanup**

Spill response should always follow the [University Chemical Hygiene Plan](https://rgw.arizona.edu/sites/default/files/cs-univeristy_chemical_hygiene_plan.pdf) Section 8.2. Please find general guidance below:

* Clean up very small amounts of mercury using an index card or rubber squeegee to form a larger bead that you can vacuum with a HEPA device or amalgamate.
* Place mercury waste and all materials used in spill cleanup in a sealed bottle or in a double layer of plastic bags
* After you have collected all visible mercury, wash the area with a detergent solution, rinse, and allow drying before use.
* If unknown or more than a very small amount, treat this as a major spill and contact RLSS.

**Exposure Response**

|  |  |  |  |
| --- | --- | --- | --- |
| **Inhalation** | **Ingestion** | **Skin Contact** | **Eye Contact** |
| Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if  victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket  mask equipped with a one-way valve or other proper respiratory medical device. Immediate  medical attention is required. | Do not induce vomiting. Call a physician or Poison Control Center immediately. | Wash off immediately with soap and plenty of water while removing all contaminated  clothes and shoes. Immediate medical attention is required. | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.  Immediate medical attention is required. |

**Disposal**

* Do not mix mercury compounds with other solvent waste.
* Contact risk management services hazardous waste for disposal guidance: [hazmat@arizona.edu](mailto:hazmat@arizona.edu) or 520-621-1790.

1. **Enter Additional Section Title**

*[Add as many sections as necessary to adequately describe how to safely perform the procedure or process addressed by this SOP.]*

1. **References:**

* <https://www.uta.edu/campus-ops/ehs/chemical/docs/SOP-mercury.pdf>
* <https://ehs.unl.edu/sop/s-metallic_mercury.pdf>
* <https://ucla.app.box.com/s/hq60eohvm1fsokh5we2z1dmveagvduhi>
* <https://www.epa.gov/mercury/storing-transporting-and-disposing-mercury>
* <https://www.ehs.harvard.edu/sites/default/files/lab_safety_guideline_mercury.pdf>