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ercury is a potent neurotoxin and environmental contaminant that should be handled with extreme care. It is essential that all laboratory personnel handling mercury understand its properties and are aware of correct handling procedures.

OCCURRENCE AND APPLICATIONS

- Naturally occurring mercury ores e.g., cinnabar
- Mining - used to extract metals via amalgamation
- Laboratory use - thermometers, dental amalgams
- Electricity - calomel electrode, fluorescent light bulbs, some electrical switches
- Inorganic salts and organic compounds - e.g., dimethyl mercury, methylmercury, HgO, HgS

HAZARD DETAILS

Mercury is a naturally occurring metal present in several forms including elemental (i.e., colloidal mercury, liquid silver, quicksilver), inorganic (e.g., mercuric chloride, mercuric sulfide, mercuric acetate) and organic (e.g., methylmercury, dimethylmercury, ethylmercury) states.



Each form differs in degree of toxicity and thus, its effect on the body. Absorption can occur via skin and eye contact, inhalation, and ingestion. Once mercury

is absorbed in the gastrointestinal tract it can be transported freely throughout the body leading to damage of the brain, kidneys, and to developing fetuses via chronic or acute poisoning.

Organic compounds of mercury tend to be more toxic than elemental or inorganic mercury as this form of mercury is readily absorbed through the skin resulting in a more acute response. However, when working with elemental mercury, there is still an extreme hazard that lies primarily in the exposure to mercury liquid and vapor. This often results in absorption of small amounts of mercury over time leading to chronic poisoning. For these reasons, the surface of elemental mercury shall not be exposed to the atmosphere outside of a fume hood.

CHEMICAL PROPERTIES

- Synonyms - quicksilver, metallic mercury, liquid silver; CAS#: 7439-97-6
- Heavy liquid; m.p. -38.829°C Density 13.53 g/cm³
- Silver-white in color
- Alloys well with other metals (e.g. gold, silver) to produce amalgams.
- Vaporizes at room temperature and presents as colorless and odorless toxin; v.p. 0.0012 mm Hg.
- Does not react with most acids; reacts with hydrogen sulfide and sulfur flakes.

Additional information regarding the hazards of mercury vapor is well-illustrated in the 2008 [Elemental Mercury Vapor Visualization](#) video published by Michael B. Blayney.

HAZARD MITIGATION

- Ensure mercury users understand safety requirements regarding proper use, storage, waste disposal, and spill response as outlined in the [Chemical Hygiene Plan \(CHP\)](#) and subsequent safety data sheets (SDS).
 - Provide hard copies of current SDSs in the vicinity of any work with materials of very high acute health hazard (e.g., mercury-containing compounds).



Toxic



Hazardous
to Health



Dangerous
to the
Environment



- Generate standard operating procedures (SOP) for use of mercury-containing compounds and thermometers. Ensure that users review SOPs on an annual basis and are trained by experienced lab personnel.
- Always select appropriate PPE. Refer to the SDS for additional information about proper PPE selection and contact labsafety@usc.edu for any consultation.
- DO NOT wear metal hand and wrist jewelry when using mercury or mercury compounds. Contact of mercury with metal jewelry may result in immediate adsorption of mercury to form an amalgam, resulting in the jewelry becoming a toxic health hazard. It is not possible to decontaminate the jewelry, as mercury enters the structure of the metal and does not merely contaminate the surface. Dispose of contaminated jewelry as hazardous waste.
- Use mercury-containing compounds and instruments in a fume hood, when possible.
- DO NOT use mercury thermometers in ovens or heating blocks.

SPILL RESPONSE

Improper cleaning of mercury spills may result in the formation of microscopic droplets which can vaporize rapidly at room temperature and pose a long-term health hazard. A specialized, mercury vacuum cleaner - operated by USC Hazardous Materials Division (HazMat) - is needed to capture all mercury droplets.

For mercury spills of any quantity, immediately restrict access to the area, evacuate, and notify DPS. Refer to CHP Section 10.6 for additional information on mercury spill response. **NOTE:** Check all PPE in contact with the spill (including shoes) very carefully for contamination. Mercury-contaminated PPE and clothing should be bagged and labelled as hazardous mercury waste.

MERCURY THERMOMETER REPLACEMENT

Use of elemental mercury thermometers is strongly discouraged. Replace with digital and/or ethanol-based products.

MERCURY ACCIDENT RESPONSE AND FIRST AID

DPS Emergency
(213) 740-4321 UPC; (323) 442-1000 HSC



California Poison System
24-hour emergency treatment advice - **800-222-1222**.

Skin Exposure

- Immediately flush affected area with water for at least 15 minutes while removing all contaminated clothing and jewelry.
- Cover irritated skin with emollient or anti-bacterial cream after flushing.
- If necessary, have a colleague contact DPS for emergency medical attention. Provide a copy of the SDS to emergency responders upon arrival.

Eye Exposure

- Immediately flush with water at emergency eyewash station for at least 15 minutes, holding eyelids open.
- If necessary, have a colleague contact DPS for emergency medical attention. Provide a copy of the SDS to emergency responders upon arrival.

Inhalation

- Move exposed person to fresh air if safe to do so.
- If victim is breathing, loosen victim's clothing and maintain the airway.
- If the victim is not breathing, immediately contact DPS and perform CPR (if certified) until medical assistance arrives. Be careful to avoid exposure to chemical poisoning via mouth-to-mouth resuscitation.
- Provide a copy of the SDS to emergency responders.

Ingestion

- Immediately contact DPS for emergency medical attention. Provide a copy of the SDS to emergency responders upon arrival.
- Do not induce the victim to vomit or drink any beverage unless instructed by qualified medical personnel.

RESOURCES

Centers for Disease Control and Prevention - [Mercury Factsheet](#)
Toxic Substances Portal - [Mercury](#)
World Health Organization - [Mercury and health](#)
[USC Chemical Hygiene Plan](#)

