

Mercury



Where is it found?

❖ Elemental form:

- ⌘ in barometers, blood pressure instruments, thermometers, and other pressure-sensing instruments
- ⌘ Some batteries for small electronic devices
- ⌘ Small amounts in fluorescent and energy saving light bulbs.
- ⌘ in floodlights, streetlights, and other outdoor or powerful lights
- ⌘ as a catalyst in the chemical manufacturing industry
- ⌘ to conduct electricity in thermostats.
- ⌘ in dental amalgams
- ⌘ in the mining industry to extract gold and silver ores

❖ Mercuric chloride:

- ⌘ in the manufacture of disinfectants, other chemicals, and as a catalyst;
- ⌘ in photography and embalming

In Nature:

- ❖ Mercury released into the environment is converted into methyl mercury by bacteria. The methyl mercury will then build up in the tissues of fish and shellfish. Humans (and other animals) may also be poisoned by eating these fish or shellfish.
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Substance name	Mercury & compounds
Molecular formula	Mercury (Hg); Mercury bichloride (HgCl ₂); Methyl Mercury (CH ₃ Hg ⁺)
Synonyms	Mercury: Quick Silver, Liquid silver, hydragyrum. <i>Mercury bichloride: Mercuric bichloride, mercuric chloride, Bichloride of Mercury, Corrosive Sublimate, Mercury perchloride, Mercury (II) Chloride, Mercury chloride, perchloride of mercury, sublimate</i>

Physical properties:

Mercury, a naturally occurring element, is an odourless, very heavy, silver white, liquid metal. *Mercuric chloride is an odourless, white powder or crystal.* Both mercury and mercuric chloride are slightly volatile at ordinary temperatures.

Mercury:

Melting Point (°C): -39

Boiling Point (°C): 357

Specific Gravity: 13.6g/cm³ at 25°C

Vapor Pressure (mm Hg/21°C): 0.002

Mercuric chloride:

Melting Point (°C): 277

Boiling Point (°C): 320

Specific Gravity: 5.4

Vapor Pressure (MM Hg/21°C): 1.3

Chemical properties:

Pure mercury is stable and does not tarnish at ordinary temperatures. It will form alloys with most metals. It is not soluble in water or most other liquids, but will dissolve in lipids (fats and oils). It is an excellent conductor of electricity.

Mercuric chloride and methyl mercury are both soluble in most organic solvents. Mercuric chloride is soluble in water, methyl mercury is not.

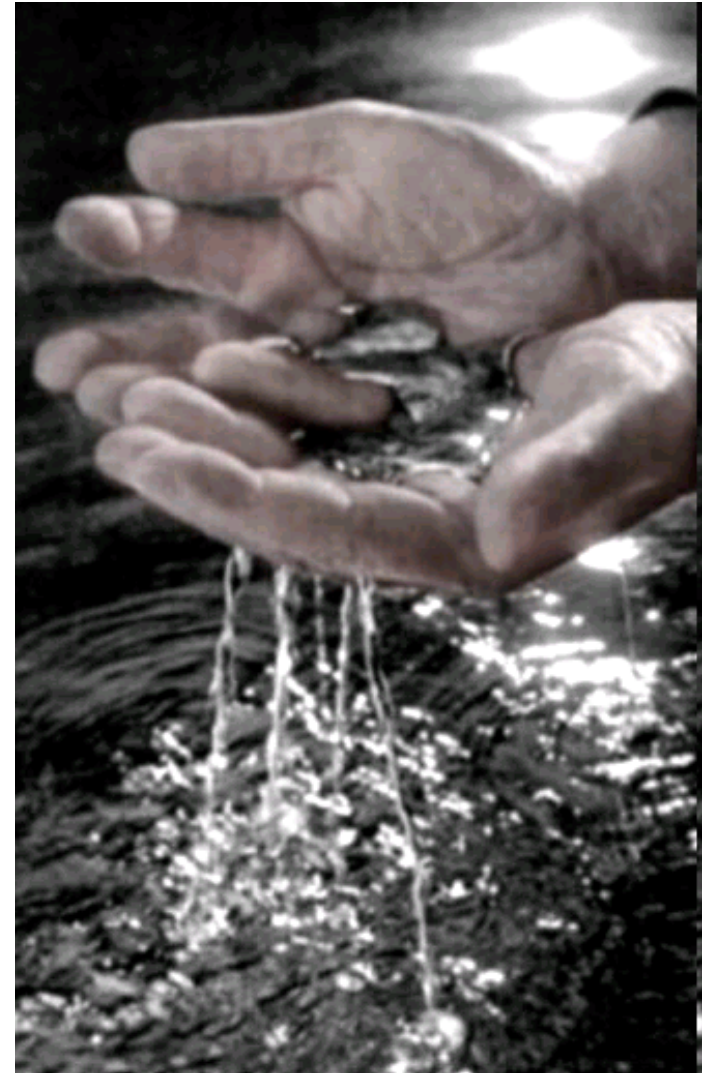
Safety Topic: Mercury



- Exposure:
 - ❖ Vapor inhalation, contact through skin, ingestion
 - ❖ primarily when breathed as a vapor where it can be absorbed via the lungs
 - ⌘ *Human lungs readily absorb 75-85% of inhaled elemental mercury vapor, allowing it to diffuse across the alveolar membranes and attack red blood cells and the central nervous system.*
 - ❖ exposure occurs when elemental mercury is exposed to the air, particularly in warm or poorly-ventilated indoor spaces.

Effects of exposure

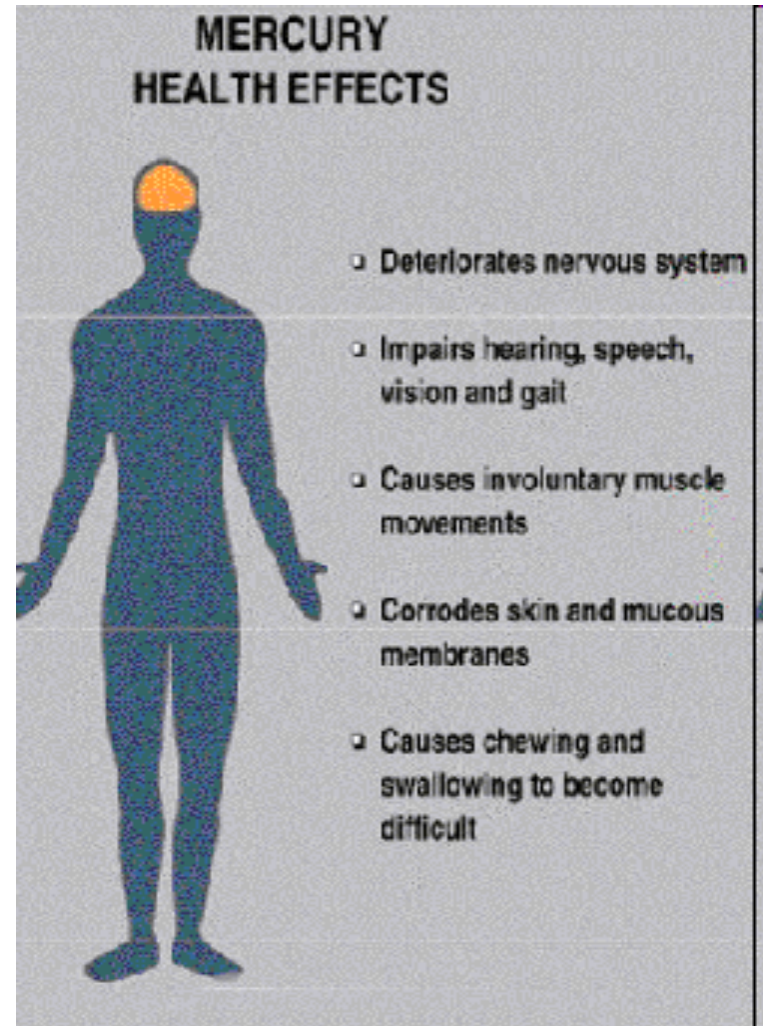
- The **nervous system** is very sensitive to all forms of mercury.
- Exposure to high levels of any types of mercury can permanently **damage the brain, kidneys, and developing foetus.**
- Effects on brain functions:
 - ❖ irritability, shyness, tremors, changes in vision or hearing and memory problems.
- High exposures of mercury vapor may cause:
 - ❖ chest pain, shortness of breath, and a build up of fluids in the lungs (pulmonary oedema) that **can be fatal.**
- Methyl mercury and mercury metal vapours are especially harmful, because more mercury reaches the brain.
 - ❖ Long term exposures may cloud the eye. Contact with mercuric chloride can cause burns to the skin and permanent damage to the eyes.
- Mercury also **accumulates in the body.**



Symptoms of exposure

- Symptoms of exposure include:
 - ❖ Coughing, swelling, flushing, vomiting, diarrhea, fever, tremors, shortness of breath, chest pains, vision problems, erratic behavior (irritability, shyness), increased blood pressure and heart rate.
 - ❖ At higher exposures there may be kidney effects, respiratory failure and death.

Can be tested for in urine, blood samples, hair, scalp. Chelating treatment available.



How to clean up small spills

(<2 tablespoons)



- **Evacuate** the area, people not involved in clean up should leave the room
- Take off gold/metal items (mercury amalgamates)
- Wear gloves: nitrile, latex, rubber
- **Surround and contain**
- Ventilate but turn off recirculation.
 - ❖ **Open external** windows/door, **close internal** ones.
- **Do not vacuum, Do not sweep, Do not machine wash contaminated clothing**
- **Sweep up** beads of mercury into a container (**plastic, air tight** avoid glass/wood/cardboard)
 - ❖ Inspect the spill zone with a bright light to illuminate any hidden droplets.
 - ❖ Scrape mercury toward the center of the spilled area away from any carpet, fabric or porous surfaces.
 - ❖ **Use a plastic squeegee, plastic dust pan or stiff index card.**
 - ❖ If necessary, the droplets can be suctioned by using an eye dropper or syringe without a needle. Adhesive tape strips may also be used to clean up any tiny remaining mercury droplets.
- **Dusting with sulphur/Zinc powder** can help bind Hg and reduce vapor pressure and also help ease collection
- Seal waste call for disposal. **Do not throw in thrash/sink/incinerate.**
- For minor spills in MIT inform safety personnel in charge.