

# MERCURY

## Introduction

Mercury, also called quicksilver, is a chemical element with the symbol Hg (hydrargyrum meaning watery or liquid silver) and atomic number 80 with atomic weight of  $200.59 \text{ g}\cdot\text{mol}^{-1}$ . Mercury is only metal which is liquid at ordinary temperature; in fact it is liquid at 298 Kelvin. Mercury is sometimes called quicksilver because of its silvery-white appearance. It is naturally occurring heavy, odorless, lustrous liquid metal found in three forms: metallic; inorganic and organic. Organic form of mercury is of highest toxic among other forms.

Mercury is a natural component of the earth, with an average abundance of approximately  $0.05 \text{ mg/kg}$  in the earth's crust, with significant local variations. Nepal do not mine the mercury eventhough there is some potential deposits in Ganesh Himal, Rasuwa and Makwanpur.

The two properties that make mercury extremely unmanageable are bio-accumulation and bio-magnification. Bio-accumulation is the retention of the toxic substance in the tissues, especially muscles. Bio-magnification is the process by which the toxic metal increases in concentration as it moves up the food chain. Nursing infants are the highest in the food chain and can be exposed to dangerously high level of this element.

## Uses of Mercury and Its Compounds

Mercury is used to make thermometers, diffusion pumps, barometers, mercury vapor lamps, mercury switches, pesticides, batteries, dental preparations, antifouling paints, pigments, and catalysts. Many of the salts and organic mercury compounds are important.

According to Custom Department of Nepal, elemental mercury, mercury based measuring equipment (thermometer & sphygmomanometer etc.) and lighting system (tube light, CFL etc.) are being imported very large quantities (see bar diagrams). Mercury can be found in a variety of medical devices and medicines including vaccines. Mercury continues to be used in thermometers, thermostats, sphygmomanometer (blood pressure measuring devices) and dental amalgam and Thiomersal as children's vaccine preservative. From the study conducted by CEPHEd in 2008, on an average 50-100 bed hospital have been found to breaking 50-100 thermometer per month, thus releasing high amount of mercury into the environment. Similar study of 20 Different dental hospitals and clinics in Kathmandu

## MERCURY (Hg)

**Color:** Silvery

**Crystal Structure:** Rhombohedral

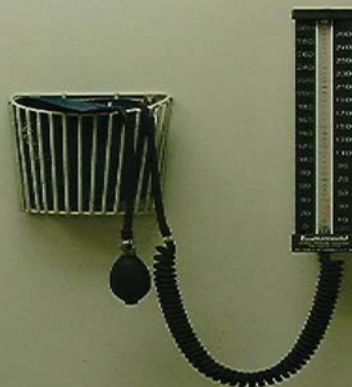
**Atomic Number:** 80

**Atomic Weight:**  $200.59(2) \text{ g}\cdot\text{mol}^{-1}$

**Density:**  $13.534 \text{ g}\cdot\text{cm}^{-3}$

**Melting point:**  $-38.83 \text{ }^\circ\text{C}$

**Boiling point:**  $356.73 \text{ }^\circ\text{C}$



Valley, on an average 1 gram of Mercury is being used to fill/restore four dental patient.

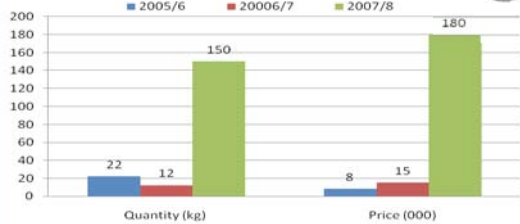
In the academic setting, mercury, mercury based equipment and salts are used. Mercury can be also used in Laboratory as Barometers, Thermometer, viscosity apparatus, chemical, Hydrometers etc. This especially brought for carrying out the particular laboratory experiments. Student have found to be touched, inhaled, taken on plate or paper and played with elemental mercury. About 60 per cent of the students do not know about health impact of mercury. Despite all these, none of institution have any written instruction on proper handling of Hg.

The best way to eliminate the exposure is to phase out mercury based equipments and chemicals in favor of the many safer alternatives available on the market. Healthcare facilities, academic institutes, research laboratory, etc as institutions of healing and educating people should first phase out mercury, mercury containing chemicals and devices where safer alternative are available.

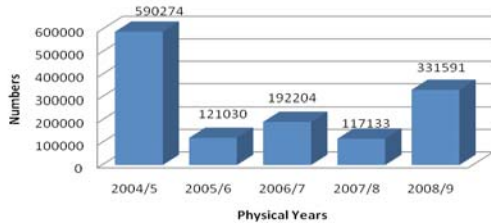
At household level, there are numerous appliances used have found to have mercury in it. For example batteries, electrical switches, lighting system all kinds of mercury tube light including heavily promoted CFL. People are not at all aware of health impact of mercury as well as safe handling of things at the end of its life and found to be disposed with the regular domestic waste. That ends up by the bank of river and/or any temporary landfill sites.

Because it is a powerful neurotoxin, great care must be taken to protect people from spill. This fact sheet aid hospital, household academic institute in implementing mercury disposal practices to help minimize the exposure to workers, patients, children staffs, students etc and the environment to this toxic metal.

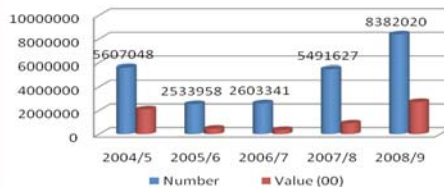
### Import of Elemental Mercury in Nepal



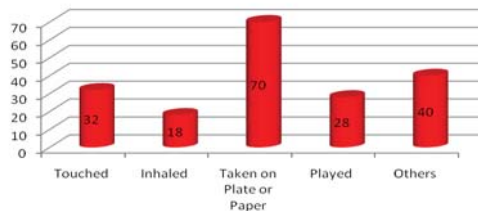
### Import of Mercury Thermometer



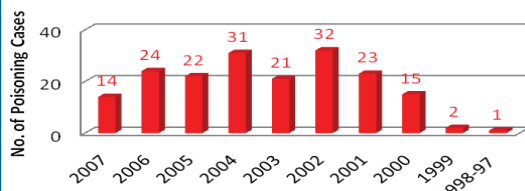
### Import of Fluorescent Lamp in Nepal and Its Value (00)



### Maximum Percentage of studied Students among selected academic institution (School & Colleges) in Kathmandu Valley



### Mercury Poisoning and Suidal Cases in Nepal (Lohani SP, Nepal S, NDPIC 2009)





### Six things you should NEVER do

1. Never use a vacuum cleaner to clean up mercury: the vacuum cleaner will vaporize the mercury and drastically increase exposure in the area.
2. Never use a broom to clean up mercury: it breaks up the mercury droplets and moves them around, making it harder to decontaminate the area.
3. Never pour mercury down the drain: it can lodge in the plumbing, and contaminate the septic tank and sludge in sewage treatment plants.
4. Never wash mercury- contaminated items in a washing machine: mercury can contaminate the sewage system and the washing machine.
5. Never continue wearing shoes and clothing that might have been contaminated in the mercury spill: this increases the wearer's exposure and helps spread contamination.
6. Never burn shoes, clothing, fabric or anything that has been contaminated with mercury: this puts mercury into atmosphere.

### Health Impact of Mercury

- Mercury is highly toxic in all its elemental, inorganic and organic forms.
- It readily absorbed through skin and reaches to the brain crossing over skin and blood brain barrier.
- It may fatal if inhaled and harmful if absorbed through skin.
- It causes harmful effects to the nervous, digestive, respiratory, immune systems, kidneys and lung damage.
- Exposure to it may result tremors, impaired vision and hearing, paralysis, insomnia, emotional instability.
- It also causes developmental deficits during pregnancy and childhood (WHO 2005).
- A drop of mercury enough to cause contamination of a ponds (>8 ha) beyond expectable level of fish consumption.

### Nepalese Experience of the Mercury Poisoning

- A patient exposed with breakage of mercury thermometer in his mouth has admitted to the nearby hospital in Biratnagar and start vomiting blood, ultimately die off.
- A worker at the medical equipments suppliers center at Kathmandu once highly exposed to mercury spillage. He had develop immediate vomiting and his watch color changes instantly.
- A lady having mercury amalgam feeling in her tooth have develop chronic headache. Up on long investigation, she suggested to remove the mercury dental amalgam feeling, she has relive from the headache now.

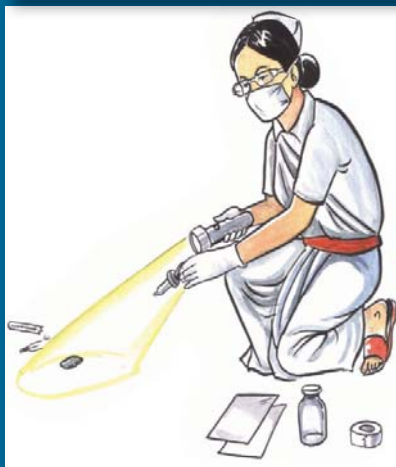
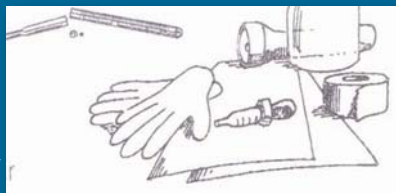


## How to Clean up a Mercury Spill

To clean up the spill you will need gloves, an eyedropper, 2 pieces of stiff paper or cardboard, 2 plastic bags, sticky tape, a flashlight, and a glass container with water in it.

When a thermometer or other item containing mercury breaks, the mercury scatters as small pieces.

1. Keep people and animals away from the spill area.
2. Turn off any heaters, fans, or air conditioners, and open windows to let air in.
3. Do not touch the mercury. Open windows or doors.
4. Remove watches and jewelry. Mercury sticks to other metals.
5. Shine a flashlight on the area to make the mercury easier to see, even during the daytime.
6. Wear chemical resistant gloves if possible. If you have only latex gloves, wear at least 2 pairs.
7. Use small pieces of stiff paper or cardboard to gather the mercury into a small pile.
8. Use an syringes to suck up the mercury beads, and put the mercury in a glass container half filled with water. Seal and mark the container.
9. Label the bag “mercury waste” and put the bag in the glass container with the water in it.
10. Seal and mark the container. Put it inside another plastic bag.
11. Dispose of it as toxic waste.



**Standard:** No any public health and occupational safety standard, guidelines and policy exist for mercury in Nepal.

**Global Movements:** global movement of Mercury free health care facilities; city, hospital, national and union level adoption of ban on mercury and mercury based measuring equipments and practices, Regional storage facilities development and ultimately moving towards legally binding international treaty on mercury by 2013.

“ Say No to Mercury, Adopt Safer Alternative and Stay Healthy ”

### More Information:



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Environmental Development(CEPHED)

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