

Mercury in the Workplace

Metallic mercury (also known as elemental mercury or Hg) is a potent neurotoxin that can cause health damage in very small amounts. It is liquid at room temperature and readily evaporates into the air. Workers can be exposed to mercury if they breathe mercury vapor or have skin contact with it. They can also be exposed if instruments or equipment containing mercury break and release mercury-containing dust, liquid, or vapor. Cal/OSHA requires employers to protect their employees from mercury exposure on the job. This fact sheet is about **metallic mercury**.

Is there mercury at your workplace?

There could be if you work at a...

- Fluorescent bulb recycler
- Hardware store, landfill, or waste facility where fluorescent light bulbs are handled or recycled
- Lighting equipment manufacturer
- Dentist office
- Health care facility
- Laboratory
- Facility with mercury-containing instruments or equipment
- Drinking water or wastewater treatment plant

Instruments and equipment that contain mercury can break and release mercury.

Some examples include:

- Fluorescent light bulbs
- Switches in thermostats
- Pressure gauges at water treatment plants
- Blood pressure gauges and other medical instruments
- Equipment used in plumbing, heating, and air conditioning
- For more information about products that contain mercury, see [Northeast Waste Management Officials' Association mercury fact sheets](#)



Thermostat tilt switch
Photo: Medvedev



Photo: Christian Taube

Note: See Page 6 for a list of links used in this fact sheet with corresponding web addresses (URLs).



Pressure gauges at a waste water treatment plant

Photo: Dana Point Times/Andrea Papagianis

FACT SHEET
ANALYSIS

HAZARD EVALUATION SYSTEM & INFORMATION SERVICE

California Department of Public Health, Occupational Health Branch
850 Marina Bay Parkway, Building P, 3rd Floor, Richmond, CA 94804
510-620-5757 • CA Relay Service: 711 • www.cdph.ca.gov/programs/ohb

Mercury can cause health problems

How are workers exposed to mercury?

The main way people are exposed to metallic mercury is by breathing its vapors. This can happen if mercury-containing dust or vapor is released during a work process, such as crushing fluorescent lightbulbs. Mercury-containing liquid, dust, or vapor can also be released if an instrument or piece of machinery that has mercury in it breaks.

Overview of Health Effects

When you breathe in mercury vapors, most of the mercury enters your bloodstream directly from your lungs, and then rapidly goes to other parts of your body. Mercury can also be absorbed through your skin. Health effects depend on the intensity and duration of exposure. Brief exposures to very high levels of mercury vapors can affect the lungs and result in death. Other symptoms with acute exposure include vomiting and diarrhea. Your brain and kidneys are most likely to be affected with long-term lower dose exposure. This fact sheet will focus on these chronic low dose health effects.



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Nervous System

Mercury poisoning most commonly affects the nervous system (the brain and spinal cord). Early

symptoms may include loss of appetite, fatigue, and insomnia. These can be easily mistaken for other health problems. Symptoms with ongoing exposure include tremor, anxiety, and memory loss. Some of these symptoms have been seen in people who were exposed to mercury for years at air levels just above the legal limits. Severe mercury poisoning can permanently damage the nervous system.

Reproductive Health

Exposure to mercury can harm the physical and mental development of a baby before it's born. It can decrease a woman's fertility and increase her chances of having a miscarriage, stillborn child, or a child with birth defects. Women can pass mercury to their baby through breast milk. Because of these concerns, it is very important that women who are pregnant, planning to become pregnant, or breast feeding not be exposed to mercury. Mercury may also adversely affect reproductive function in men.

Kidney Damage

Mercury accumulates in and damages the kidneys. People with kidney damage often have no obvious symptoms until the damage is severe. Special urine tests are used to detect kidney damage. See "Are you being exposed to mercury on the job?" on page 4 for information on how to get a test. In most cases, kidney damage is reversible and kidney function will gradually recover once exposure is stopped.

Cancer

Metallic mercury has not been found to cause cancer in adults. However, organic mercury compounds can possibly cause cancer in humans.



Organic mercury is a different form of mercury that can also cause serious health effects. Mercury in fish is a common dietary source. Workers can be exposed to organic mercury when working with pesticides, in laboratories, or other industries. For information on organic mercury compounds in fish, see [Mercury in Fish - California Environmental Protection Agency \(EPA\)](#) [California Department of Public Health](#)

For information on organic mercury at work, see [OSHA chemical information: Organic Mercury](#)

Mercury exposure from breaks and spills: Protecting workers

A number of workplaces use equipment or handle items that contain mercury. This mercury can be released if these products or equipment get broken. Here are some things employers and workers can do to prevent mercury exposure and protect worker health.



www.thinkoutsidethebin.com

Recycling at hardware stores or landfills

Burned-out fluorescent bulbs can break during handling or packaging and release mercury.

What you can do:

- ▶ Handle bulbs carefully to avoid breaking them.
- ▶ Wear personal protective equipment when handling fluorescent lights. This includes respirators with cartridges for mercury vapors, eye protection, and gloves.
- ▶ Never store used bulbs outside or on top of recycling bins unless they are packaged in an air-tight, tear-resistant bag.
- ▶ Use shipping containers that do not allow mercury vapors to escape. Double-boxed recycling containers with zippered foil-plastic bags are very effective at preventing mercury releases.

Workplaces where mercury-containing equipment is used

Instruments and equipment parts such as switches, gauges, thermostats, regulators, and thermometers are used in a wide range of industries. These include water treatment plants, auto repair, plumbing, heating, and air conditioning. You can also find them in medical settings and laboratories.

What you can do:

- ▶ Use equipment that does not contain mercury if alternatives are available.
- ▶ Handle instruments and equipment that contain mercury very carefully.
- ▶ Inspect mercury-containing devices regularly to make sure they are well-maintained and in good condition.
- ▶ Repair or replace instruments or equipment that need attention.

If a break or spill occurs...

- ▶ Cleaning up a mercury spill must be done **very** carefully. **Plan ahead** by designating employees that will be responsible and training them on how to do it safely. See [Small Mercury Spill and Fluorescent Bulb Cleanup Guidance for Businesses](#) (Colorado Department of Public Health) and [Managing Small Mercury Spills](#) (Health & Environment Alliance and Health Care Without Harm Europe) for information that can be used to train workers.
- ▶ Buy a "mercury spill kit." Make sure everyone knows where it is and how to use it. Spill kits can be very inexpensive (less than \$100) and can be bought from a safety equipment supplier.
- ▶ Do not clean up a mercury release or spill if you have not been properly trained.
- ▶ Never use a broom, compressed air, or a vacuum cleaner (unless it is a mercury spill vacuum cleaner) to clean up mercury, as that will break it up or spread it into the air.
- ▶ Do not dispose of mercury down the drain.
- ▶ Verify the mercury has been cleaned up by using a mercury meter or hiring an environmental consultant.

Are you being exposed to mercury on the job?

There are two ways to find out if workers are being exposed to harmful levels of mercury. The best way for a worker to know is to have a test that measures how much mercury is present in her or his urine or blood and have a doctor check body systems that are affected by mercury. This is called “medical monitoring.” Employers in workplaces where mercury is commonly used or found, such as fluorescent bulb recycling, should also measure how much mercury there is in the air workers breathe. This is called “air monitoring.”

Medical Monitoring

Employers should provide medical monitoring periodically to employees who handle mercury-containing materials to make sure they are not getting sick from exposure to mercury at work. A medical monitoring program should be designed to detect health effects as soon as possible.

The amount of mercury in your body can be estimated by measuring mercury in urine or blood.

- **Urine tests** are the best way to measure long-term exposures.
- **Blood tests** are better for evaluating a single high exposure (like cleaning up a spill), if the test is done right after the worker is exposed.

Medical monitoring for mercury also includes physical examinations. Medical monitoring of workers should be conducted by a physician trained in occupational medicine. See [Testing for Kidney Disease](#) for more information.

Note: The average urine mercury level for a person who does not work with mercury is less than 2 micrograms mercury per gram of creatinine.

Air Monitoring

Cal/OSHA has set legal limits on the amount of mercury that can be in the air workers breathe. These are called exposure limits. There are two kinds of exposure limits:

- The **Permissible Exposure Limit** or PEL is the maximum amount of mercury permitted in the air a worker breathes averaged over an 8-hour day. The PEL for metallic mercury is 25 $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter of air).
- The **Ceiling Limit** is the level that should never be exceeded at any time. The Ceiling Limit for mercury is 100 $\mu\text{g}/\text{m}^3$.

Employers must maintain airborne mercury below these limits. They must measure the amount of mercury in the air whenever workers may be exposed above these limits.

Note: Studies have shown that workers who were exposed to mercury for long periods of time, even at the legal limit (PEL), have had neurological health effects. Maintaining exposures below the PEL is recommended to protect worker health.

Dental Field

Amalgam fillings are made of an alloy containing about 50% mercury. Dentists, hygienists, and assistants can be exposed to mercury when they handle or place amalgam fillings in patients. They can also be exposed when they grind or repair existing amalgam fillings. Studies have shown that these activities can result in release of mercury in air at levels that could be a health concern. Mercury can also stay in carpets and continue to get into the air if it is not properly removed.

Fluorescent Bulb Recycling

Fluorescent tubes and compact fluorescent lamps (CFLs) contain mercury vapor. Some also contain a small amount of liquid mercury or powder with mercury in it. When the bulbs are broken and crushed, mercury is released into the air. Mercury can build up in the indoor air, exposing workers to unsafe levels.

For more information, see the OSHA fact sheet [Protecting Workers from Mercury while Crushing and Recycling Fluorescent Light Bulbs](#)

RESOURCES

MERCURY-SPECIFIC RESOURCES AND INFORMATION

- US Environmental Protection Agency (USEPA)
www.epa.gov/mercury
- National Institute for Occupational Safety and Health (NIOSH) www.cdc.gov/niosh/topics/mercury/
- New Jersey Department of Health – Controlling Metallic Mercury Exposure in the Workplace: A Guide for Employers
www.nj.gov/health/surv/documents/mercemp.pdf

WHERE TO GET HELP

- Hazard Evaluation System and Information Service. (HESIS)
www.cdph.ca.gov/programs/hesis/
HESIS answers questions about chemicals and other workplace hazards.
(510) 620-5817 • (866) 282-5516 (toll free in California)
Free publications on workplace health and safety topics.
(510) 620-5717 • (866) 627-1586 (toll free in California)
www.cdph.ca.gov/programs/hesis/Pages/Publications.aspx
- Cal/OSHA - California Division of Occupational Safety and Health sets and enforces workplace health and safety regulations (laws).
Talk to your employer if you think there is a health and safety problem at your job. If your employer does not fix the problem, you can call Cal/OSHA and ask for an inspection. Cal/OSHA will not tell your employer who made the call. Find a Cal/OSHA office near you:
www.dir.ca.gov/dosh/DistrictOffices.htm
(510) 286-7000
- Cal/OSHA Consultation Service provides free assistance to employers to help them improve health and safety and comply with Cal/OSHA regulations.
800-963-9424 • InfoCons@dir.ca.gov
www.dir.ca.gov/dosh/consultation_offices.html
- To find a doctor who specializes in work-related injury and illness:
Search for “occupational medicine providers, your city name, CA” in www.googlemaps.com or another browser.

CAL/OSHA STANDARDS REGULATIONS THAT HELP PROTECT WORKERS

- Control of Hazardous Substances, Airborne Contaminants
(Title 8 CCR 5155) - sets limits on how much of a contaminant can be in the air workers breathe.
- Hazard Communication
(Title 8 CCR 5194) - requires employers to tell workers about hazardous substances they are working with and train them to work safely.
- Injury and Illness Prevention Program (IIPP, Title 8 CCR 3203) - requires employers to develop and implement an effective, written IIPP for reporting, identifying, and correcting workplace hazards in a timely manner and training workers on any hazards they might face on the job.
- Respiratory Protection
(Title 8 CCR 5144) - requires employers to provide respirators when necessary to protect workers from airborne hazards, to make sure respirators fit properly, and to train workers on how to care for them and use them.
- Access to Medical and Exposure Records
(Title 8 CCR 3204) - gives workers the right to see and copy their own medical records and any records related to measuring toxic substances they may have been exposed to on the job. These records are important in determining whether an employee's health has been affected by her or his work.

[Search official text of all Cal/OSHA standards](#)

This factsheet is an information alert from HESIS.

To obtain a copy of this document in an alternate format, please call (510) 620-5757 (CA Relay Service: 711). Please allow at least ten (10) working days to coordinate alternate format services.



Links used in this fact sheet with corresponding web addresses (URLs)

Page 1

- Northeast Waste Management Officials' Association mercury factsheets
<http://www.newmoa.org/prevention/mercury/imerc/FactSheets/index.cfm>

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For information on organic mercury compounds in fish, see

- Mercury in Fish - California Environmental Protection Agency (EPA)
<http://oehha.ca.gov/media/downloads/fish/fact-sheet/hgfactsnontechnical.pdf>
- California Department of Public Health
http://www.ehib.org/ehib/www.ehib.org/papers/Mercury_in_Fish_FINAL.pdf

For information on organic mercury at work, see:

- OSHA chemical information - Organic Mercury
http://www.osha.gov/dts/chemiclsampling/data/CH_250500.html

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Information that can be used to train workers

- Small Mercury Spill and Fluorescent Bulb Cleanup Guidance for Businesses (Colorado Department of Public Health)
https://www.colorado.gov/pacific/sites/default/files/HM_hg-cleanup-biz.pdf
- Managing Small Mercury Spills (Health & Environment Alliance and Health Care Without Harm Europe)
http://www.env-health.org/IMG/pdf/Managing_Small_Spills_B-2.pdf

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- Testing for Kidney Disease
<http://www.worker-health.org/liverkidneyscreen.html>
- Protecting Workers from Mercury while Crushing and Recycling Fluorescent Light Bulbs
https://www.osha.gov/Publications/mercuryexposure_fluorescentbulbs_factsheet.pdf

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Mercury-specific resources and information

- US Environmental Protection Agency (USEPA)
<http://www.epa.gov/mercury>
- National Institute for Occupational Safety and Health (NIOSH)
<http://www.cdc.gov/niosh/topics/mercury/>
- New Jersey Department of Health Controlling Metallic Mercury Exposure in the Workplace: A Guide for Employers
<http://www.nj.gov/health/surv/documents/mercemp.pdf>

Hazard Evaluation System and Information Service (HESIS)

<http://www.cdph.ca.gov/programs/hesis>

- Free publications on workplace health and safety topics
<http://www.cdph.ca.gov/programs/hesis/Pages/Publications.aspx>
- Cal/OSHA - California Division of Occupational Safety and Health
<http://www.dir.ca.gov/dosh/DistrictOffices.htm>
- Cal/OSHA Consultation Service
http://www.dir.ca.gov/dosh/consultation_offices.html
- Search official text of all Cal/OSHA standards
<http://www.dir.ca.gov/title8/index/T8index.asp>

