



Environmental Management Consulting, Inc.

MERCURY

What is Mercury?

Mercury (Hg) is a heavy, silvery-white metal that has toxic effects on the human body and is harmful to the environment. It is in a liquid state at room temperature and will evaporate at room temperature. This vapor is odorless and invisible to the naked eye.

What are the Health Effects?

Mercury is toxic to the human body. Breathing in vapors, ingesting the liquid or absorbing it through the skin are the primary routes of exposure. Women and children are most vulnerable to mercury poisoning. This poisoning can cause brain and nerve damage, impaired coordination, blurred vision and memory loss.

Where can Mercury be found in Buildings?

Mercury can be found in thermometers, barometers, thermostats, pressure switches and gauges, as well as fluorescent and other types of light bulbs. Occasionally, mercury also can be found in gymnasium floors.

It also has been used in hospital and dental environments and may be found in sink traps and collection basins.

How does this affect me in Construction?

Care must be taken during demolition and renovation projects. Suspect devices and materials should be carefully inventoried, removed in an intact manner and stored for proper shipment and recycling.

What if I encounter a Mercury Spill?

Relatively small spills on hard surfaces that are contained to a specific area can be cleaned up using a commercially available mercury spill clean-up kit.

Larger spills, spills where the mercury is difficult to see (carpeted areas, inside cabinets, in debris piles, etc.) and spills that spread should only be cleaned up by properly trained professionals. All spills must be reported.

Securing Safer Futures...

W 7748 Cty Hwy V, Lake Mills, WI 53551  920.648.6343 Fax: 920.648-4370  www.emc-wi.com

Responding to Mercury Spills: Small Spill Response

Before cleaning any mercury spills, be sure to read and follow the precautions found in the general mercury spill fact sheet on the web at <http://dhfs.wisconsin.gov/eh/HlthHaz/fs/MercSpill.htm>.

CONTAIN THE SPILL

Mercury will bead up and spread readily. If the further spread of mercury beads is possible, place a barrier such as kitty litter, sand, towels etc. around the spill site. If powdered sulfur or amalgamating agent is available, use it to contain the spill. Pay close attention to floor openings such as air vents and drains. Place barriers or tape around the site to prevent traffic through it. Be sure to keep children and pets away.

Note: If the mercury was vacuumed, exposed to heat or entered the ventilation system, refer to large spill guidance on the web at <http://dhfs.wisconsin.gov/eh/HlthHaz/fs/HGlgspills.htm>. Higher mercury vapor levels may exist and could require additional protective equipment and professional expertise.

EVACUATE THE SPILL AREA

Before people leave the spill area, be sure they had not come into contact with mercury. Avoid traffic going through the spill area. Those who may have come into contact with mercury should be directed to a nearby location away from the spill and asked to stay there until contamination can be assessed and clean up completed. Once immediately outside of the spill area, contaminated (direct contact with mercury) shoes and clothes should be removed and double-bagged. Otherwise, mercury could be tracked around the building or home.

TURN OFF VENTILATING OR AIR CONDITIONING SYSTEMS

If feasible, turn off heating, ventilation or air conditioning systems for the parts of the building affected by the spill and seal the ventilation openings (both vents and returns).

CLOSE INTERIOR DOORS TO THE ROOM

Close doors leading directly to the spill site and open exterior doors and windows of the room where the spill occurred. When not occupied, seal the door with plastic and tape.

OPEN WINDOWS AND EXHAUST ROOM AIR TO THE OUTDOORS

Place a fan in an exterior room window blowing air outside.

ASSEMBLE CLEAN UP SUPPLIES

Many clean up supplies are available from hardware stores. Mercury spill kits are also available from suppliers (See the resource links below). The following are some common household articles that could be used to construct an in-home mercury cleanup kit:

- eye dropper- to pick up the mercury
- plastic container with lid- to hold the mercury
- plastic sheeting- to provide a clean surface on which equipment can be stored
- powdered zinc or sulfur*- to bind with the mercury
- rubber squeegee- to help recover the mercury and spill powder
- tape; wide, duct, or masking – to seal doors and vents and to help pick up mercury beads
- tray or box- to hold mercury storage container
- plastic bags with zipper seal – to store mercury-contaminated debris and equipment
- plastic dust pan- to help recover mercury and spill powder
- rubber gloves- to protect hands from mercury contact
- syringe without needle- to pick up mercury
- trash bags- for containing mercury waste
- playing cards or index cards- for collecting mercury beads
- zinc and sulfur will bind with mercury reducing the amount of vapor. Sulfur will turn brown on contact with mercury.

DRESS APPROPRIATELY

Wear gloves (rubber), clothes and shoes that can be discarded if they become contaminated. Wear safety goggles if available. Place Tyvek booties, or use plastic bags as booties over shoes, to prevent your shoes from being contaminated and allowing you to simply remove the bags from your shoes upon leaving the room.

PICK UP ALL VISIBLE MERCURY DROPLETS

Inspect the spill area with a bright light to help illuminate any hidden droplets. Clean up any beads of mercury by using a squeegee or index card and plastic dustpan. With the card, gently push the mercury droplets away from any carpet, fabric, or porous surfaces and toward other droplets to combine them into larger droplets. Slide droplets onto a sheet of rigid paper like an index card. Never use a broom on a mercury spill because it will only scatter the mercury droplets, making them harder to find and pick up.

GENTLY PLACE MERCURY INTO AN UNBREAKABLE PLASTIC CONTAINER

Use a plastic jar or double-bagged ziplock baggie, to deposit the mercury into (avoid using glass because it can easily break). If necessary, suction off the droplets using an eyedropper or syringe. Adhesive tape strips may also be used to clean up any tiny remaining mercury droplets. Place the plastic container inside a plastic bag to provide additional safety. Tighten each lid securely so that liquid and vapors will be contained.

CONSIDER REMOVAL AND DISPOSAL OF CONTAMINATED CARPETING OR OTHER SOFT ITEMS

Consider removal of carpet and other soft items that received direct mercury contact. It takes very little mercury in air to create unhealthy levels of vapor. Further, vacuuming any surface with mercury will make more vapor. Factors that affect the severity of risk from mercury in carpet or soft-surfaced items include the amount of mercury spilled, how much was recovered, the type of room and whether young children or pregnant women frequent the room. Local health departments and spill response contractors may be able to monitor for the presence of mercury vapor on contaminated items. However, private testing may be costly. The value of the item should be weighed against such cost and the piece of mind offered by the testing and/or removal of the contaminated item. When removing contaminated items, double wrap them in plastic trash bags and contact your local health department or Wisconsin Department of Natural Resources below for proper disposal. (Do not expose to heat or incinerate).

SPRINKLE POWDERED SULFUR OR ZINC ON THE SPILL SITE

Powdered sulfur or zinc will bind to any remaining mercury. These materials are supplied in commercially available mercury spill kits (See spill kit sources under “Resources” on the web at <http://dhfs.wisconsin.gov/eh/HlthHaz/fs/hgresources.htm>). Sulfur can often be purchased separately from garden supply stores. Apply over hard to reach areas such as cracks and crevices to minimize the release of mercury vapors. In instances where furniture or carpet has been exposed to mercury, seek advice from your local health department, the Department of Health and Family Services or a spill response contractor. Once used to collect mercury, the powder must be disposed properly. Vapor suppressing solutions are also available. See under “Resources” on the web. (The use of powders on carpets is not recommended, as later vacuuming will produce more mercury vapor).

CHECK CAREFULLY FOR MISSED MERCURY

A very bright flashlight may be used to better illuminate mercury beads in the spill area. Sprinkling powdered sulfur over the spill area may also help identify missed mercury, as the powder will turn brown on contact with mercury. Collect the powder as was done with mercury beads. Special precautions should be taken if mercury was spilled in a high traffic area or a confined area where children or infants play. Young children playing on the floor are particularly at risk to mercury’s effects on the central nervous system. Call the Department of Health and

Family Services, Bureau of Environmental Health at 608-266-1120 or your local health department to see if additional testing or other measures may be needed.

SET ASIDE EVERYTHING YOU THINK MIGHT BE CONTAMINATED WITH MERCURY

Package materials securely and label as "Mercury-Contaminated." Specific labeling and disposal requirements may differ depending on whether the spill occurred at a household or at a regulated business. Clothing or personal belongings that may be contaminated can be tested following the guidance under "Large Spills" on the web to see if they can be safely returned for use. Contact the disposal references listed under "Resources" on the web for assistance.

MONITOR SPILL ZONE FOR MERCURY VAPORS

Even if the impacted area appears clean, there may still be microscopic beads or hidden residual quantities of mercury present that emit vapors. For larger-sized spills, it may be necessary to professionally test mercury vapor levels in the immediate area. If mercury is detected, re-clean the impacted area using previously mentioned procedures and repeat testing until levels fall to within safe parameters. If mercury vapor levels remain high even after repeated cleaning, a more aggressive action is probably needed. Guidance for acceptable levels for re-occupancy is offered below. Contact the Department of Health and Family Services, Bureau of Environmental Health at 608-266-1120 or the contractors under "Resources" (on the web at <http://dhfs.wisconsin.gov/eh/HlthHaz/fs/hgresources.htm>) for assistance.

CONTINUE VENTILATION

Ventilate as much as possible to completely air out the room or spill zone with outside air.

AIRBORNE EXPOSURE LEVELS

Units of measure are very important in evaluating mercury spills. Airborne levels are reported in weight per cubic meter of air (m^3). Weight can be expressed as milligrams (abbreviated as mg, a thousandth of a gram), microgram (abbreviated as ug, a millionth of a gram) or nanograms (abbreviated as ng, a billionth of a gram).

Reference Concentrations for Airborne Mercury Exposure

Agency	Exposure Value (micrograms per cubic meter)	Comments
NIOSH	10,000 ug/m ³	Immediately Dangerous to Life or Health (IDLH) value allowable for a maximum of 30 minutes in emergency situations only
Occupational Safety and Health Administration (OSHA)	100 ug/m ³	Enforceable workplace standard, assuming 8 hours/day, 40 hours/week
National Institute of Occupational Safety and Health (NIOSH)	50 ug/m ³	Workplace recommendation
Agency for Toxic Substances and Disease Registry (ATSDR)	10 ug/m ³	Level at which residents are advised to not occupy the affected area. Also a screening level for bagged clothes
ATSDR	3 ug/m ³	Target cleanup level for commercial environments
ATSDR	1 ug/m ³	Target cleanup level for residential environments
ATSDR	.200 ug/m ³	Chronic level of exposure at which adverse effects would not be expected. Assumes exposure time of 24 hours/day for 30 years
NA	0.01 ug/m ³	Typical background level

INVENTORY ALL REMAINING MERCURY-CONTAINING DEVICES AND REPLACE THEM WITH MERCURY FREE ALTERNATIVES

The best way to address a mercury spill is to prevent it from ever happening in the first place. For assistance with reducing mercury use contact the Wisconsin Department of Natural Resources at 608-267-7639.

MEDICAL TESTING

If significant exposure is believed to have occurred, you should discuss with your family doctor whether urine mercury tests should be conducted for the people who use the area the most. Results should not be above 20 micrograms per liter of urine (20ug/L).

For more information

For health related information, contact the Wisconsin Division of Public Health, Bureau of Environmental Health, 1 West Wilson St, Box 2659, Madison, WI 53701-2659, (608) 266-1120 or online at <http://dhfs.wisconsin.gov/eh>.



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Responding to Mercury Spills: Large Spill Response

Cleaning Up Large Mercury Spills

If one pound or more (more than one fluid ounce or two tablespoons) has been spilled and gets into the environment, i.e., outdoors, sewer, groundwater or surface water, or that threatens public health, it must be reported immediately. Call the Wisconsin Department of Natural Resources Spill Response hotline at 800-943-0003.

Before cleaning any mercury spills, be sure to read and follow the precautions (<http://dhfs.wisconsin.gov/eh/HlthHaz/fs/MercSpill.htm>) found in the general mercury spill fact sheet on the web.

EVACUATE THE SPILL AREA

Before people leave the spill site, be sure they had not come in contact with or stepped in the mercury. When directing people out of the area, be sure to avoid traffic going through the spill site. Those who may have come into contact with mercury should be directed to the nearest safe location and asked to stay there until contamination can be assessed and clean up completed.

Once immediately outside of the spill area, contaminated (direct contact with mercury) shoes and clothes should be removed, double-bagged and sealed. Not doing so can result in mercury being tracked around the building or home, making the situation worse.

SEEK PROFESSIONAL ASSISTANCE FOR CLEAN UP

Call either the local fire department or a contractor listed under “Resources” on the web (<http://dhfs.wisconsin.gov/eh/HlthHaz/fs/hgresources.htm>). Spills of this size require specialized equipment and demanding control measures. It is also likely larger spills will release dangerous levels of vapors into air and specialized protective equipment, such as self contained breathing apparatus, will be necessary for responders.

TEST CLOTHING/PERSONAL BELONGINGS

Clothing and personal belongings that were contaminated or suspected of being contaminated can be placed in a plastic bag, which should then be sealed and allowed to sit for about an hour. Test the headspace of the air in the bag with a mercury vapor analyzer capable of reliably detecting concentrations less than 0.1 ug/m^3 . If the level in the headspace in the bag is less than 10 ug/m^3 , the clothes and belongings can be returned to the owners. Other procedural guidance for decontamination can be found at the Ohio EPA website:

http://www.epa.state.oh.us/opp/mercury_pbt/mercury.pdf. It should be noted that the cost to clean and monitor clothes and belongings could exceed the value of those items. Clean up cost should be weighed against item value to prevent unnecessary expense.

CONTINUE VENTILATION

Ventilate as much as possible to completely air out the room or spill zone with outside air.

MONITOR

Air in the spill area should be tested using NIOSH Method 6009 (<http://www.cdc.gov/niosh/nmam/>) or similar method with comparable limit of detection. Levels should be below 1 ug/m³ for residential environments and 3 ug/m³ for commercial environments.

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