

Mercury in Heating, Ventilation and Air Conditioning Laboratories in Voc-Tech Schools

Items that contain mercury:

- mercury thermostats with the silver liquid
- U-tubes (or vacuum gauges) with the silver liquid
- mercury switches
- mercury relays
- mercury thermostat probes

These devices are commonly used in heating, ventilation and air conditioning (HVAC) applications. Students entering the HVAC field will come in contact with devices that contain mercury. Because of this, teachers may decide to keep some mercury devices for instructional or demonstration purposes. If so, it is important that a mercury spill kit is located in the laboratory and that at least two staff people are trained in its use.

Once they are working in the HVAC profession, students will come in contact with devices that contain mercury

Mercury Thermostats and Non-Mercury Alternatives

Mercury tilt switches have been used in thermostats for more than 40 years. They provide accurate and reliable temperature control, require little or no maintenance, and do not require a power source. However, each switch contains approximately three grams of mercury.

To determine whether a thermostat contains mercury, carefully remove the front plate and look for small glass ampules that contain silver liquid. Because the mercury in thermostats is completely enclosed, it does not pose an immediate threat to health or to the environment unless the glass breaks or the product is disposed of in the regular trash.

Non-mercury thermostats, including air-controlled, reed switch, vapor-filled diaphragm, snap-switch and programmable electronic, are readily available from wholesale and retail heating and plumbing supply stores.

Mercury U-Tubes and Non-Mercury Alternatives

Vacuum gauges with a visible silver liquid contain mercury. Liquid mercury in the gauges responds to air pressure in a precise way that can be read on a calibrated scale.

Non-mercury alternatives are available. Electronic (digital) gauges and aneroid (e.g., Bourdon tube, diaphragm, piston or capsule) pressure gauges are available and effective in most applications.

Other Mercury-Containing Devices and Non-Mercury Alternatives

- mercury switches
- mercury relays
- mercury thermostat probes

Mercury switches are found in a variety of items, including hot water heaters, bilge and sump pumps. If a mechanical switch is not visible in these items, a mercury switch is probably being used.

Mercury thermostat probes, also known as flame sensors or gas safety valves, may be found in gas-fired appliances that have pilot lights, such as ranges, ovens, clothes dryers, water heaters, furnaces, or space heaters. The mercury is inside a tube and expands or contracts to open and shut the valve.

Because the mercury in these switches, relays and probes is completely enclosed, it does not pose an immediate threat to health or to the environment unless the glass breaks or the product is disposed of in the regular trash.

When purchasing any of these items, be sure that the new item has a non-mercury switch, relay or thermostat probe. Alternatives to mercury switches include hard-contact switches, solid-state switches, electro-optical switches, inductive sensors, capacitive sensors, photoelectric sensors, and ultrasonic sensors. Alternatives to mercury thermostat probes include electric flame sensors and electronic ignition. Most new float switches are made without mercury. Non-mercury float control switches include magnetic dry reed switches, optic sensors, and mechanical switches.

Storing Unwanted Items

To safely remove an unwanted mercury thermostat, use a screwdriver and a pair of wire cutters to remove the entire thermostat from the wall. **DO NOT** attempt to remove the switches themselves or dismantle the thermostat in any way.

When disposing of unwanted mercury vacuum gauges, thermostats or switches, save the mercury devices in two sealed, non-breakable containers (e.g., two zip-locked plastic bags, one inside the other) in a safe place. Label the containers “Universal Waste - Mercury-Containing Devices” and indicate the date that they were stored.

Unwanted mercury devices are classified as universal wastes (a category of hazardous wastes) and should NOT be disposed of in the regular trash. Arrange for proper disposal of the universal wastes. For more information, see the fact sheet “Establishing Hazardous and Universal Waste Collection Areas.”

For thermostats only, a consortium of thermostat manufacturers formed the Thermostat Recycling Corporation (TRC) to collect and recycle used thermostats. Thermostats are collected at participating Heating, Ventilation and Air Conditioning Supply Wholesalers. There may be a participating wholesaler in your area. For a list of participating wholesalers, see <http://www.nema.org/government/environment/>.

When disposing of a large item that you know contains a mercury switch, relay, or thermostat probe, alert your white goods hauler to the presence of mercury in the device. Alternately, if you have been trained and are confident that you can safely remove the switch, relay or thermostat probe yourself without disturbing the mercury, do so and, until you arrange for proper disposal, store the mercury-containing component as described previously.





How to Handle a Mercury Spill or Leak

If a mercury leak or spill occurs and it is less than two tablespoons, you may be able to clean it up yourself. (Most thermostats contain less than this amount.) First ventilate the room to the outdoors and keep people and animals out of the area. Remove all jewelry from hands and wrists. Wear rubber gloves to avoid mercury contact with the skin.

If you have a mercury spill kit, follow the instructions that come with it. Otherwise, follow these instructions:

- Use an eyedropper or two pieces of stiff paper to scoop the mercury into an unbreakable container.
- Place all contaminated cleaning materials and the gloves in two sealed, non-breakable containers (e.g., two zip-locked plastic bags, one inside the other).
- Remove any contaminated carpeting and store with contaminated cleaning materials.
- Label the containers “Hazardous Waste - Mercury-Containing Devices” and indicate the date that they were stored.
- Replace the item with a non-mercury alternative.
- Dispose of all contaminated materials as hazardous waste. (See the fact sheet “Establishing Hazardous and Universal Waste Collection Areas.”)

If the spill is greater than two tablespoons, you need to get professional spill response assistance. First, close off the area immediately. Call the Massachusetts DEP’s Spill Response Center at 888-304-1133, or your local fire department. To minimize volatilization, turn down the temperature to below 65 degrees Fahrenheit. Open windows and ventilate the area. Surround and contain the spill as much as possible. For a release to the environment of one pound (approximately two tablespoons) or more, reporting to the Spill Response Center is required.

NEVER use a vacuum cleaner or broom to clean up a mercury spill as this causes mercury to vaporize into the air, causing greater potential for health risks. **NEVER** pour mercury down the drain. Mercury is heavier than water and may get trapped in the plumbing system and continue to vaporize into the room, causing potential health risks.



Additional Information

For additional information on facility systems, equipment and supplies that may contain mercury, see the website of the National Institutes of Health at <http://www.nih.gov/od/ors/ds/nomercury/systems.htm> or the website of the Burlington, Mass. Board of Health at <http://www.208.58.133.9/health/Mercury.htm>

