

Mercury thermometers face final phase out

February 25 2011, By Peter Gwynne



A thermometer filled with mercury. Credit: Andres Rueda

The mercury thermometer, long a fixture in household medicine cabinets and industrial settings, is going the way of the horse and buggy. The reason: Mercury released into the environment from a broken thermometer is highly poisonous.

Pure [mercury](#) and its compounds can cause neurological problems and other ailments in people exposed to them. So government and state agencies have mounted campaigns to end the use of thermometers that contain the liquid metal.

Federal and state authorities have lobbied since 2002 for bans on medical mercury thermometers. It's already almost impossible to buy one for home use. Now, the [Environmental Protection Agency](#), the National Institute of Standards and Technology, and environmental and industry groups are targeting industrial users of mercury thermometers.

NIST will close down its calibration service for mercury thermometers at the end of this month. The 110 year service has ensured the accuracy of instruments used to monitor temperatures in chemical, pharmaceutical, and petroleum facilities.

"We've been working with the EPA and state agencies to help phase out the whole process of using mercury thermometers," said Gregory Strouse, leader of NIST's temperature and humidity group. "Anything you can do to prevent mercury getting into the environment is a good thing."

Mercury from thermometers reaches the environment in two main ways: improper disposal of broken thermometers and coal-fueled power plants.

According to the EPA, coal-burning power plants account for about half of the emissions of mercury in the U.S. Mercury vapor can also waft into the air from broken thermometers. And liquid mercury from those same breakages can end up in landfills, where microorganisms convert it into a highly toxic form called methylmercury. This often seeps into rivers and then the ocean where it accumulates in sea life that absorbs it from the polluted waters.

Tossing unused or broken mercury thermometers in the trash can contribute to this cycle.

"If you drop a mercury thermometer, contact your local or state recycling center," Strouse advised. "If you have an intact mercury thermometer in the house, we suggest that you put it in a soda bottle and cap it for transport to a disposal site."

Mercury can have significant effects on human health. Its vapor can cause mood swings, insomnia, and memory loss, and high vapor levels can damage organs.

Hat makers in the 19th century had a reputation for strange behavior. It stemmed from their exposure to the mercury solution used to cure animal pelts. The Mad Hatter in "Alice in Wonderland" illustrated the danger.

More dangerous today are the concentrated mercury levels in the fish we consume. Small amounts of the compound methylmercury can damage our nervous systems and can affect the brain development of infants and young children.

Cleaning up a spill of mercury requires care and a lot of money. It can cost from \$5,000 to \$50,000 to clean an industrial spill.

Mercury can be recycled safely. NIST recently sent the mercury from more than 8,000 industrial thermometers to facilities that use it to produce compact fluorescent lights. The one-sixtieth of an ounce of mercury in a typical thermometer is enough to make 125 light bulbs. That form of recycling has two environmental advantages.

"Most of the mercury is bound to the inside of the glass during the life cycle of the bulb, a process that makes it much less environmentally harmful," Strouse said. "And compact fluorescents use less electricity, which reduces the amount of coal burned. That reduces the amount of mercury released by a factor of four."

Meanwhile, NIST is working on alternative options for industrial users in clinical and industrial temperature measurement. And digital electronic thermometers and glass alcohol thermometers measure temperatures just as well as mercury instruments for household use.

"Change always brings confusion and apprehension, but in every case there is an alternative thermometer to suit the measurement need," said NIST researcher Dawn Cross.

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