

IMERC Fact Sheet

Mercury Use in Thermostats

Latest Update: January 2010

“Mercury Use in Thermostats” summarizes the use of mercury in thermostats found in residences, businesses, and industrial settings, including thermostats sold as stand-alone units and as components within heating and cooling equipment. This Fact Sheet covers all types of thermostats that contain mercury in the individual devices; the total amount of mercury in all of the devices that were sold as new in the U.S. in 2001, 2004, and 2007; companies that have phased-out the products’ manufacture and sale; and non-mercury alternative devices.

The information in this Fact Sheet is based on data submitted to the state members of the Interstate Mercury Education and Reduction Clearinghouse (IMERC)¹ including Connecticut, Louisiana, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. The data is available online through the IMERC Mercury-Added Products Database.²

A number of important caveats must be considered when reviewing the data summarized in this Fact Sheet:

- This Fact Sheet does not include mercury thermostats used in cooking ranges; those thermostats are covered in the fact sheet entitled, *Mercury Use in Gas & Electric Cooking Ranges & Other Cooking Equipment*.³
- The information may not represent the entire universe of mercury-containing thermostats sold in the U.S. The IMERC-member states continuously receive new information from mercury-added product manufacturers, and the data presented in this Fact Sheet may underestimate the total amount of mercury sold in this product category.
- The information summarizes mercury use in thermostats sold nationwide since 2001. It does not include mercury thermostats sold prior to January 1, 2001 or exported outside of the U.S.
- Reported data includes only mercury that is used in the product, and does not include mercury emitted during mining, manufacturing, or other points in the products’ life cycle.

Mercury Components in Thermostats

Mercury thermostats use mercury switches to sense and control room temperature through communication with heating, ventilating, and air conditioning (HVAC) equipment.

¹ IMERC: <http://www.newmoa.org/prevention/mercury/imerc/about.cfm>

² Mercury-Added Products Database: <http://www.newmoa.org/prevention/mercury/imerc/notification/index.cfm>

³ Mercury Use in Gas and & Electric Cooking Ranges and Other Cooking Equipment Fact Sheet: http://www.newmoa.org/prevention/mercury/imerc/FactSheets/factsheet_ranges.cfm

Mercury thermostats contain bimetal coils that contract and expand with room temperature. When the coil contracts or expands, it activates the mercury switch, which opens or closes a circuit to make the furnace, heat pump, or air conditioner turn on or off. A mercury thermostat may contain one or more switches, depending on how many heating and cooling systems it activates.



Mercury Thermostat
Source: NEWMOA



Mercury Switch inside Thermostat
Source: Wikipedia



Mercury Thermostat
Source: NEWMOA

According to the Thermostat Recycling Corporation (TRC), mercury thermostats contain an average of 1.4 mercury switches (i.e., components), with a minimum of 2.8 grams of elemental mercury per switch. Therefore, the total amount of mercury used in a thermostat is approximately four grams. Industrial-sized thermostats may have multiple switches and thus have reported higher amounts of mercury. Some examples of industrial thermostats reported by manufacturers include a low-voltage multi-stage wall thermostat and a heat pump thermostat.

Mercury Use in Thermostats

Table 1 presents the total amount of mercury contained in mercury thermostats sold in the U.S. in years 2001, 2004, and 2007. This total includes thermostats used in residences, businesses, and industrial settings, including thermostats sold as stand-alone units and as components within heating and cooling equipment. More detailed information on the 2001 and 2004 data can be found in the report, *Trends in Mercury Use in Products: Summary of the IMERC Mercury-added Products Database*, June 2008.⁴ The 2007 data is taken from a NEWMOA presentation, *Trends in Mercury Use in Products: Analysis of the IMERC Mercury-added Products Database*, November 17, 2009.⁵

⁴ Trends in Mercury Use in Products: Summary of the IMERC Mercury-Added Products Database: www.newmoa.org/prevention/mercury/imerc/pubs/reports.cfm

⁵ Trends in Mercury Use in Products: Analysis of the IMERC Mercury-added Products Database: www.newmoa.org/prevention/mercury/conferences/sciandpolicy/presentations/Wienert_Session3B.pdf

Table 1: Total Mercury Sold in Thermostats in the U.S. (pounds)			
Product	Total Mercury 2001	Total Mercury 2004	Total Mercury 2007
Thermostats	29,253 (14.6 tons)	28,901 (14.5 tons)	7,727 (3.9 tons)

[Note: 453.6 grams = 1 pound; All numbers are rounded to the nearest whole number.]

As shown in Table 1, the total amount of mercury in thermostats sold in the U.S. during calendar years 2001 and 2004 was 14.6 tons and 14.5 tons, respectively. This represents a decrease of 0.1 tons, or approximately 1 percent over the three-year period. In 2007, the total amount of mercury in thermostats sold in the U.S. was 3.9 tons, a decrease of over 10 tons than the previous reporting period in 2004. Mercury use in thermostats has decreased approximately 73 percent since 2001.

Since 2001, many states have passed legislation restricting the sale of mercury-added thermostats. As more state laws go into effect, mercury use in this product category will likely continue to decline. Another reason for the significant decrease could be that non-mercury programmable thermostats are rapidly increasing in popularity. These electronic thermostats are set to heat and cool based on a pre-programmed schedule, which helps conserve energy.

Phase-Outs & Product Bans on the Sale of Mercury Thermostats

The following IMERC-member states currently have restrictions on the sale and/or distribution of mercury-containing thermostats: California, Connecticut, Illinois, Louisiana, Maine, Massachusetts, Minnesota, New Hampshire, Rhode Island, Vermont, and Washington. Additional states that restrict the sale or use/installation of mercury thermostats include: Iowa, Michigan, Montana, Ohio, Oregon, and Pennsylvania.⁶ In response to these mercury product bans and phase-outs, many companies have ceased manufacturing mercury thermostats and/or stopped selling these products in these states.

The National Electrical Manufacturer’s Association (NEMA) is a trade association that represents the major U.S. thermostat manufacturers, including: General Electric, Honeywell, and White-Rodgers. In October 2009, NEMA reported to the IMERC-member states that all three companies – General Electric, Honeywell, and White-Rogers – have stopped manufacturing mercury-added thermostats.

The following is a list of additional companies and thermostat products that have reportedly been eliminated from the U.S. market since 2001:

⁶ State Mercury-Added Product Ban Guidance: www.newmoa.org/prevention/mercury/imerc/productban.cfm
 State Mercury-Added Product Phase-Out Guidance:
www.newmoa.org/prevention/mercury/imerc/phaseoutinfo.cfm

Marvair reported to IMERC-member states that they discontinued their line of air conditioning units with mercury thermostats in December 2003.

Coachmen Recreational Vehicles reported to IMERC-member states that they phased-out mercury thermostats in their recreational vehicles in April 2004.

Sunline reported to IMERC-member states that they have not had any mercury-added products, including mercury thermostats, in their recreational vehicles since July 2004.

Princo Instruments, Inc. reported to the IMERC-member states that they phased-out the manufacture and sale of all products containing mercury, including their mercury-added thermostats as of January 22, 2007.

PSG Controls, Inc. reported to IMERC-member states in 2008 that they do not sell mercury thermostats in any of the IMERC states, as of their respective product ban dates. They do, however, continue to sell mercury thermostats to states without such bans.

Non-Mercury Alternatives

There are non-mercury alternatives that may be suitable for replacing mercury thermostats. These include electromechanical (i.e., air-controlled, reed switch, vapor-filled diaphragm, snap-switch) and electronic programmable thermostats (i.e., digital). Many factors should be considered when switching to a non-mercury thermostat, including the relative costs, availability, and product effectiveness.

Many of the non-mercury alternatives are readily available from wholesale and retail heating and plumbing supply stores at a generally comparable price as mercury thermostats. Programmable thermostats are more expensive than traditional mercury thermostats, but can save energy and money, by enabling users to automatically adjust the temperature or turn off the heat or air conditioning depending on the time of day.

Collection and Recycling Programs for Mercury Thermostats

The Thermostat Recycling Corporation's (TRC) thermostat collection program is an industry-sponsored private corporation, originally established by thermostat manufacturers General Electric, Honeywell, and White-Rodgers. TRC facilitates the collection of all brands of used, wall-mounted mercury-switch thermostats so that the mercury can be separated and recycled. For more information on the TRC program, visit: www.thermostat-recycle.org/.

Collection through the TRC program takes place through Heating, Ventilation, and Air Conditioning (HVAC) wholesale outlets, HVAC contractors, and more recently through local household hazardous waste facilities throughout the U.S. Participation is voluntary, and the companies and agencies collecting the thermostats pay a one-time fee of \$25.00 to obtain a

collection bin to store and ultimately transport the thermostats for recycling. The elemental mercury from the thermostats collected through this program is reclaimed.

In addition to the TRC program, some states, including Iowa, Maine, New Hampshire, Oregon, and Vermont have legislation requiring thermostat manufacturers to establish collection programs for recycling out-of-service mercury thermostats. Maine and Vermont also require these manufacturers to pay a financial incentive to persons recycling mercury thermostats. This is a fairly new initiative in both states, but preliminary collection results show that the incentive is playing a key role in increasing mercury thermostat recycling rates.

Many other states, including California, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New York, Rhode Island, and Vermont have laws restricting or fully prohibiting the disposal of mercury-added thermostats in household trash. As a result, these states are actively working to improve mercury thermostat collection and recycling – either by promoting the TRC’s mercury thermostat collection and recycling program; or through other local, state, or regional mercury thermostat collection programs.

For more information on the state programs and legislation pertaining to the collection of mercury thermostats, go to:

www.newmoa.org/prevention/mercury/ThermostatRecyclingReport2008.pdf.