

IMERC Fact Sheet

Mercury Use in Thermostats

This Fact Sheet 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. It includes the total amount of mercury in all products that were sold in the U.S. in 2001, 2004, 2007, and 2010.

The information in the Fact Sheet is based on data submitted to the state members of the [Interstate Mercury Education and Reduction Clearinghouse \(IMERC\)](#) 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](#).

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.

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.

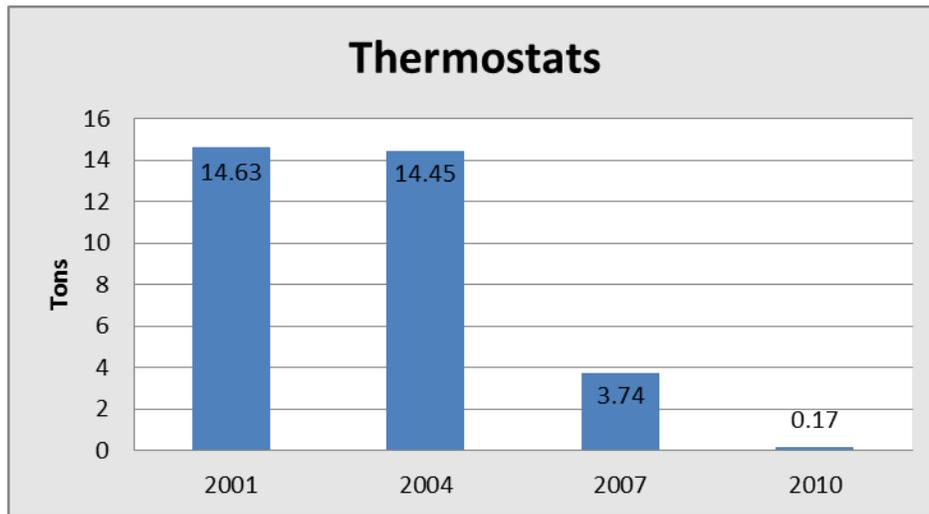
Mercury Use in Thermostats

Table 1 presents the total amount of mercury sold in thermostats in 2001, 2004, 2007, and 2010.¹ Eight thermostat manufacturers have submitted Mercury-added Product Notification Forms to IMERC-member states.² 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.

Table 1: Total Mercury Sold in Thermostats (pounds)			
2001	2004	2007	2010
29,253 (14.6 tons)	28,901 (14.5 tons)	7,485 (3.7 tons)	330 (0.17 tons)

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

The amount of mercury in thermostats sold in the U.S. during calendar year 2001 was 14.6 tons compared to only 0.17 tons in 2010. Mercury use in thermostats has decreased almost 99 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

¹ 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.

(www.newmoa.org/prevention/mercury/imerc/pubs/reports.cfm)

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.

(www.newmoa.org/prevention/mercury/conferences/sciandpolicy/presentations/Wienert_Session3B.pdf)

² The National Electric Manufacturers Association (NEMA) reports on behalf of the three major thermostat manufacturers in the U.S. – General Electric, Honeywell, and White-Rodgers. These companies reported that they phased-out the manufacture and sale of mercury-added thermostats in October 2009.

continue to decline. Another reason for the significant decrease could be the growing popularity of non-mercury programmable thermostats. 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, Michigan, Minnesota, New Hampshire, New York, Rhode Island, Vermont, and Washington. Additional states that restrict the sale or use/installation of mercury thermostats include: Iowa, Maryland, Montana, Ohio, Oregon, Pennsylvania, and Wisconsin.

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. As of the 2010 reporting period, following companies have reportedly phased-out the sale and distribution of mercury-containing thermostats in the U.S. market:

- General Electric
- Honeywell
- Invensys Climate Controls
- Princo Instruments, Inc.
- TPI Corp.
- White-Rodgers

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 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. The participating companies and agencies 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.

Some states, including Illinois, Iowa, Maine, New Hampshire, New York, Oregon, and Vermont have enacted legislation requiring thermostat manufacturers to establish collection programs for recycling out-of-service mercury thermostats. Maine and Vermont require these manufacturers to pay a financial incentive to persons collecting mercury thermostats for recycling. New York (as of July 1, 2014) may also require manufacturers to pay a financial incentive if collection goals are not met. This is a fairly new initiative in these 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.

Data Caveats

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

- The information may not represent the entire universe of 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 products 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.