



REPLACING MERCURY CONTAINING PRODUCTS AND MERCURY THERMOMETERS IN ASTM STANDARDS

Abstract

At the request of several States, ASTM International has issued a directive to all technical committees to review their standards that reference mercury containing instruments or mercury methods and determine the technical and economic feasibility of replacing them or substituting with non-mercury instruments or methods. A number of States have banned the sale of mercury containing instruments, including ASTM mercury thermometers, making it difficult for users in those States to comply with ASTM standards. In most cases, the instruments in question are the mercury-in-glass thermometers specified in ASTM E1. These thermometers have long been the gold standard temperature measurement devices in many ASTM standards. In this presentation we will review the ASTM directive, including how to communicate the technical committees' resolutions to ASTM; technical issues in replacing mercury containing devices with other devices, especially the thermometers found in ASTM E1; legal issues involved with this project, including which States have bans and how the bans differ from State to State.



ASTM INITIATIVE

ASTM Involvement

In January 2006, state environmental agencies became aware of Federal and State rules and regulations that require the use of ASTM standards. Many of these standards require the use of mercury in glass (ASTM E1) thermometers.

States began to lobby ASTM to remove requirement of mercury in their standards

ASTM Search

In response to the requests, ASTM searched through their standards for references to ASTM E1, mercury, mercury-in-glass thermometers and liquid-in-glass thermometers.

ASTM E1 is the most referenced standard within ASTM- it is referenced in over 900 standards.

ASTM E20 Mercury Project Task Group

Consists of seven members of ASTM Committee E20 to help provide technical guidance to the committees affect by this review.

We have technical experts in liquid-in-glass thermometry, resistance thermometry, thermocouples, radiation thermometry, thermistors and in calibration and construction.

Guidance document developed for distribution to Subcommittee Chairmen and is available today.

ASTM Committee E20 Temperature Measurement

ASTM Subcommittee E20.05 Liquid-in-Glass Thermometers & Hydrometers

Liquid-in-Glass Thermometers	Hydrometers & Thermohydrometers
ASTM E1 "Standard Specification for ASTM Liquid-in-Glass Thermometers"	ASTM E100 "Standard Specification for ASTM Hydrometers"
ASTM E77 "Standard Test Method for Inspection and Verification of Thermometers"	ASTM E126 "Standard Test Method for Inspection, Calibration and Verification of Hydrometers"
ASTM E2251 "Standard Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids"	NEW "Standard Specification for ASTM Thermohydrometers using Non-Mercury Liquids"
	NEW "Standard Specification for Electronic Thermohydrometers (densitometers) using the Digital Buoyancy Method"
	NEW "Standard Test Method for Calibration and Verification of Electronic Thermohydrometers (Densitometers)"



ASTM Committee E20 Temperature Measurement Other Standards of Interest

Resistance Thermometry

E644- Standard Test Methods for Testing Industrial Resistance Thermometers.

E1137- Standard Specification for Industrial Platinum Resistance Thermometers

Thermocouples

E220- Standard Test Method for Calibration of Thermocouples by Comparison Techniques

E230- Specification for Temperature- Electromotive Force (EMF) Tables for Standardized Thermocouples

Fundamentals

E563- Standard Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature



SUMMARY STATE BANS ON MERCURY-IN-GLASS THERMOMETER

as of June 15, 2007

✓ **CALIFORNIA** Effective July 1, 2006

A person shall not sell, offer to sell, or distribute for promotional purposes, any of the following new or re-furbished mercury-added products....

Barometer... flow meter... **hydrometer**... hygrometer... psychrometer... manometer... pyrometer... **thermometer**.

This does not apply to the sale of a mercury-added product if the use of the product is required under federal law or **federal contract specification** or if the only mercury-added component in the product is a button cell battery.

California Codes Health and Safety Code 25214.8.3.

✗ **CONNECTICUT** Effective July 1, 2004 (add'l req. July 1, 2006)

... no person shall offer for sale or distribute for promotional purposes any mercury-added product if the mercury content of the product exceeds 100 mg in the case of fabricated mercury-added products or 50 ppm in the case of formulated mercury added products

Manufacturer may apply for an exemption.

Connecticut Chapter 446m Mercury Reduction and Education Sec 221-617.

✓ **INDIANA** Effective July 1, 2003

A person may sell or provide a mercury commodity to another person in this state (other than for collecting for recycling) only if: (1) the person selling or providing the mercury commodity **provides an MSDS**... (2) person selling or providing the mercury commodity requires that the purchaser or recipient will (a) use the mercury only for medical purposes, in dental amalgam, dispose-caps, for training, **for research or for manufacturing purposes** (b) understands that mercury is toxic, (c) will store and use properly.. (d) will not intentionally place... in solid waste for disposal or in a wastewater disposal system.

Indiana IC 13-20-17.5-5



✗ MAINE Effective July 1, 2006

A person shall not sell or offer to sell or distribute the following mercury-added products:

Barometer... flow meter... hydrometer... hygrometer or psychrometer... manometer... pyrometer... thermometer...

This section does not apply to the sale of the above products if the use of the product is a federal requirement or if the only mercury-added component in the product is a button cell battery. Manufacturer may apply for an exemption.

Maine Title 38, Chapter 16-B, Section 1661-C-6

✗ MASSACHUSETTS Effective May 1, 2007

Manufacturers of products to which mercury has been intentionally added and that are sold in the state must establish a system of collecting them at the end of their useful lives, and for recycling their mercury contents. The plan must be approved and certified by the department.

Unless the mercury-added product is required under federal law.

Massachusetts Chapter 190 of the Acts of 2006, Section 6J

✓ MICHIGAN Effective January 1, 2003

(Ban includes) all mercury thermometers sold or offered for promotion...

...except those (1) required by state or federal statute, regulation, or administrative rule, (2) **used for pharmaceutical research purposes.**

Enforcement shall be done by dept of environmental quality. A person who violates this part is guilty of a misdemeanor punishable by imprisonment of not more than 60 days or a fine of not more than \$1,000.00, or both, plus the costs of prosecution.

Michigan Act 451 of 1994,

Sections 324.17201 & 324.17202



✓ **MINNESOTA** Effective January 1, 2002

Includes all mercury thermometers manufactured after June 1, 2002,

Except those (1) **used for food research and development or processing**, (2) are a component of an animal agriculture climate control system or industrial measurement system, until a system is replaced or a non-mercury component is available, (3) **used for calibration of other thermometers**, apparatus or equipment unless a nonmercury calibration standard is approved by NIST and (4) electronic thermometers with button cell batteries.

Minnesota Chapter 47- H.F. No 274

✗ **NEBRASKA** Effective May 20, 2003

No liquid mercury thermometer containing elemental mercury shall be sold, given away, or otherwise distributed in this state.

No exceptions in statute.

Nebraska Chapter 28, Section 28-1349 & 28-1350
(Laws of 2003, LB 17 Section 3 & 4)

✗ **NEW YORK** Effective January 1, 2007

(Bans) all mercury-added manometers and hydrometers,

except those used to replace a product that is a component in a larger product in use prior to January 1, 2007, or the resale of a manometer or hydrometer manufactured before December 31, 2006.

New York Title 21, Section 27-2107,6



✓ **NEW YORK** Effective January 1, 2008

Cannot sell, offer for sale, or distribute mercury-added thermometers if **a non-mercury alternative is available**. Commission will review this by February 2008 and rule if non-mercury alternatives are available.

Excludes mercury-added thermometers that are a component of a larger product in use prior to January 1, 2008 or resale manufactured before January 1, 2008; excludes if the use is a federal requirement.

New York Title 21, Section 27-2107,8

✓ **RHODE ISLAND** Effective January 1, 2006- revise 1/1/07 & 1/1/08

No mercury added product shall be offered for final sale or use or distributed **for promotional purposes in the state** if the mercury content of product exceeds 1 gram for fabricated products and 250 ppm for formulated products.

Excludes are lighting for entertainment industry and fluorescent lamps and HID lamps. Manufacturers may apply for exemption.

Rhode Island Title 23, Health & Safety,

Mercury Reduction & Education Act.

Chapter 23-24.9-7

✗ **VERMONT** Effective January 1, 2007

Restricts the sale of thermometers that contain elemental mercury

Excludes if it is for a Federal requirement.

Also ... barometers... flow meters... hygrometers & psychrometers... manometers... hydrometers.

Excludes Hygrometers, psychrometers & manometers if replacing into larger device in place before 1/1/07. Exemptions may be granted.

Vermont Chapter 164, Section 7105



✓ **WASHINGTON** Effective January 1, 2006

(Ban) includes all mercury thermometers...

except those (1) electronic thermometers with a button cell battery containing mercury (2) **used for food research and development** or processing including meat, dairy products, and pet food processing, (3) are a component of an animal agriculture climate control system or **industrial measurement system**, until a system is replaced or a non-mercury component is available, (3) **used for calibration of other thermometers**, apparatus or equipment unless a nonmercury calibration standard is approved by NIST and (4) electronic thermometers with button cell batteries.

Washington Chapter 70.95M.050