



Standard Test Method for Inspection and Verification of Thermometers¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers visual and dimensional inspection and test for scale accuracy to be used in the verification of liquid-in-glass thermometers as specified in Specifications [E1](#) and [E2251](#). However, these procedures may be applied to other liquid-in-glass thermometers.²

NOTE 1—The use of NIST SP250-23² is recommended.

1.2 **Warning**—Mercury has been designated by EPA and many state agencies as a hazardous material that can cause central nervous system, kidney and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website: <http://www.epa.gov/mercury/faq.htm> - for additional information. Users should be aware that selling mercury and/or mercury containing products into your state may be prohibited by state law.-

1.3 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:³

[E1](#) Specification for ASTM Liquid-in-Glass Thermometers
[E344](#) Terminology Relating to Thermometry and Hydrometry

¹ This test method is under the jurisdiction of ASTM Committee [E20](#) on Temperature Measurement and is the direct responsibility of Subcommittee [E20.05](#) on Liquid-in-Glass Thermometers and Hydrometers.

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² "Liquid-in-Glass Thermometer Calibration Service," NIST Special Publication 250-23, 1988, Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[E2251](#) Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids

3. Terminology

3.1 Definitions:

3.1.1 The definitions given in Terminology [E344](#) apply. Some that are considered essential to this standard are given below.

3.1.2 *calibration, n*—of a thermometer or thermometric system, the set of operations that establish, under specified conditions, the relationship between the values of a thermometric quantity indicated by a thermometer or thermometric system and the corresponding values of temperature realized by standards.

3.1.2.1 *Discussion*—(1) The result of a calibration permits either the assignment of values of temperature to indicated values of thermometric quantity or determination of corrections with respect to indications. (2) A calibration may also determine other metrological properties such as the effect of influence quantities. (3) The result of a calibration may be communicated in a document such as a calibration certificate or a calibration report. (4) The term *calibration* has also been used to refer to the result of the operations, to representations of the result, and to the actual relationship between values of the thermometric quantity and temperature.

3.1.3 *complete-immersion thermometer, n*— a liquid-in-glass thermometer, not specified in ASTM documents, designed to indicate temperature correctly when the entire thermometer is exposed to the temperature being measured.

3.1.4 *partial-immersion thermometer, n*— a liquid-in-glass thermometer designed to indicate temperature correctly when the bulb and a specified part of the stem are exposed to the temperature being measured.

3.1.5 *total-immersion thermometer, n*—a liquid-in-glass thermometer designed to indicate temperature correctly when just that portion of the thermometer containing the liquid is exposed to the temperature being measured.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *reference point, n*—a temperature at which a thermometer is checked for changes in the bulb volume.

3.2.2 *verification, n*—the process of testing a thermometer for compliance with specifications.