



Standard Practice for Calibration of Temperature Scale for Thermogravimetry¹

This standard is issued under the fixed designation E1582; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice describes the temperature calibration of thermogravimetric analyzers over the temperature range from 25 to 1500°C and is applicable to commercial and custom-built apparatus. This calibration may be accomplished by the use of either melting point standards or magnetic transition standards.

1.2 The mass change curve in thermogravimetry results from a number of influences, some of which are characteristic of the specimen holder assembly and atmosphere rather than the specimen. The variations from instrument to instrument occur in the point of measurement of the temperature, the nature of the material, its size and packing, the geometry and composition of the specimen container, the geometry and design of the furnace, and the accuracy and sensitivity of the temperature sensor and displaying scales. These all contribute to differences in measured temperatures, which may exceed 20°C. In addition, some sample holder assemblies will show variations of measured temperature with sample size or heating/cooling rate, or both. Since it is neither practical nor advisable to standardize sample holders or thermobalance geometries, instruments may be calibrated by measurement of the deviation of a melting or magnetic (Curie Point) transition temperature from the standard reference temperature. This deviation can be applied as a correction term to subsequent measurements.

1.3 This practice assumes that the indicated temperature of the instrument is linear over the range defined by a two-point calibration and that this linearity has been verified. These two calibration temperatures should be as close to the experimental measurements to be made as possible.

1.4 This practice describes two procedures for temperature calibration of thermogravimetric analyzers using any type balance. Procedure A uses melting point standards for calibration. Procedure B uses magnetic transition standards for calibration.

NOTE 1—Since all electronic data treatments are not equivalent, the user

shall verify equivalency prior to use.

1.5 The data generated by these procedures can be used to correct the temperature scale of the instrument by either a positive or negative amount using either a two-point temperature calibration procedure or a multi-point temperature calibration with best line fit for the generated data.

NOTE 2—A single-point calibration may be used where this is the only procedure possible or practical. The use of a single-point procedure is not recommended.

1.6 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 This practice is related to ISO 11358 but provides information and methods not found in ISO 11358.

1.8 *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:²

[E473 Terminology Relating to Thermal Analysis and Rheology](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[E967 Test Method for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers](#)

[E1142 Terminology Relating to Thermophysical Properties](#)

2.2 Other Standards:

[ISO 11358 Plastics — Part 4: Thermogravimetry \(TG\) of Polymers — General Principles](#)³

3. Terminology

3.1 *Definitions*—Technical terms used in this document are defined in Terminologies [E473](#) and [E1142](#).

¹ This practice is under the jurisdiction of ASTM Committee [E37](#) on Thermal Measurements and is the direct responsibility of Subcommittee [E37.01](#) on Calorimetry and Mass Loss.

Current edition approved May 1, 2014. Published June 2014. Originally approved in 1993. Last previous edition approved in 2010 as E1582 – 10. DOI: 10.1520/E1582-14.

² 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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.