



Standard Test Method for Determining Specific Heat Capacity by Differential Scanning Calorimetry¹

This standard is issued under the fixed designation E1269; 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 test method covers the determination of specific heat capacity by differential scanning calorimetry.

1.2 This test method is generally applicable to thermally stable solids and liquids.

1.3 The normal operating range of the test is from -100 to 600 °C. The temperature range can be extended, depending upon the instrumentation and specimen holders used.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 Computer or electronic-based instrumentation, techniques, or data treatment equivalent to this test method may be used.

NOTE 1—Users of this test method are expressly advised that all such instruments or techniques may not be equivalent. It is the responsibility of the user of this test method to determine equivalency prior to use.

1.6 This method is similar to ISO 11357–4, but contains additional methodology not found in that method. Additionally, ISO 11357–4 contains practices not found in this standard. This method is similar to Japanese Industrial Standard K 7123, but contains additional methodology not found in that method.

1.7 *This standard does not purport to address all of the safety concerns, 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.* Specific precautionary statements are given in Section 9.

2. Referenced Documents

2.1 ASTM Standards:²

¹ This test method 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.

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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.

E473 Terminology Relating to Thermal Analysis and Rheology

E967 Test Method for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers

E968 Practice for Heat Flow Calibration of Differential Scanning Calorimeters

E1142 Terminology Relating to Thermophysical Properties

2.2 ISO Standard:

ISO 11357–4 Plastics: Differential Scanning Calorimetry (DSC)- Determination of Specific Heat Capacity³

2.3 Japanese Industrial Standard:

K 7123 Testing Methods for Specific Heat Capacity of Plastics³

3. Terminology

3.1 *Definitions*—Technical terms used in this test method are described in Terminologies E473 and E1142.

4. Summary of Test Method

4.1 This test method consists of heating the test material at a controlled rate in a controlled atmosphere through the region of interest. The difference in heat flow into the test material and a reference material or blank due to energy changes in the material is continually monitored and recorded.

5. Significance and Use

5.1 Differential scanning calorimetric measurements provide a rapid, simple method for determining specific heat capacities of materials.

5.2 Specific heat capacities are important for reactor and cooling system design purposes, quality control, and research and development.

6. Interferences

6.1 Since milligram quantities of specimen are used, it is essential that specimens are homogeneous and representative.

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