



Designation: D7426 – 24

Standard Test Method for Assignment of the DSC Procedure for Determining T_g of a Polymer or an Elastomeric Compound¹

This standard is issued under the fixed designation D7426; 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 assignment of the glass transition temperatures (T_g) of materials using differential scanning calorimetry.

1.2 This test method is applicable to amorphous materials, including thermosets or semicrystalline materials containing amorphous regions, that are stable and do not undergo decomposition or sublimation in the glass transition region.

1.3 The normal operating temperature range is from -120 to 500°C . The temperature range may be extended, depending upon the instrumentation used.

1.4 Computer or electronic-based instruments, techniques, or data treatment equivalent to this test method may also 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 standard to determine the necessary equivalency prior to use.

1.5 ISO 11357–2 is equivalent to this test method.

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

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 *ISO Standard:*³

ISO 11357–2 Differential Scanning Calorimetry (DSC)-Part 2 Determination of Glass Transition Temperature

3. Terminology

3.1 *Definitions:*

3.1.1 The following terms are applicable to this test method and can be found in Terminology **E473** and Terminology **E1142**: *differential scanning calorimetry (DSC)*, *differential thermal analysis (DTA)*, *glass transition*, *glass transition temperature (T_g)*, and *specific heat capacity*.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 There are commonly used transition points associated with the glass transition region. (See **Fig. 1**.)

3.2.2 *extrapolated end temperature (T_e)*, $^\circ\text{C}$, n —the point of intersection of the tangent drawn at the point of greatest slope on the transition curve with the extrapolated baseline following the transition.

3.2.3 *extrapolated onset temperature (T_p)*, $^\circ\text{C}$, n —the point of intersection of the tangent drawn at the point of greatest slope on the transition curve with the extrapolated baseline prior to the transition.

3.2.4 *inflection temperature (T_i)*, $^\circ\text{C}$, n —the point on the thermal curve corresponding to the peak of the first derivative

¹ This test method is under the jurisdiction of ASTM Committee **D11** on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee **D11.10** on Physical Testing.

Current edition approved Aug. 1, 2024. Published August 2024. Originally approved in 2008. Last previous edition approved in 2013 as D7426 – 08 (2013) which was withdrawn July 2022 and reinstated in August 2024. DOI: 10.1520/D7426-24.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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>.