



Designation: D7750 – 23

# Standard Test Method for Cure Behavior of Thermosetting Resins by Dynamic Mechanical Procedures using an Encapsulated Specimen Rheometer<sup>1</sup>

This standard is issued under the fixed designation D7750; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This method covers the use of dynamic mechanical instrumentation for determination and reporting of the thermal advancement of cure behavior of thermosetting resin on an inert filler or fiber in a laboratory. It may also be used for determining the cure properties of resins without fillers or fibers. These encapsulated specimens are deformed in torsional shear using dynamic mechanical methods.

1.2 This method is intended to provide means for determining the cure behavior of thermosetting resins on fibers over a range of temperatures from room temperature to 250 °C by forced-constant amplitude techniques (in accordance with Practice [D4065](#)). Plots of complex modulus, complex viscosity, and damping ratio or tan delta as a function of time or temperature, or both, quantify the thermal advancement or cure characteristics of a resin or a resin on filler or fiber.

1.3 Test data obtained by this method is relevant and appropriate for optimizing cure cycles.

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

1.4.1 *Exception*—The Fahrenheit temperature measurement in [10.1](#) is provided for information only and is not considered standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *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 Recom-*

*mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D3878 Terminology for Composite Materials

D4000 Classification System for Specifying Plastic Materials

D4065 Practice for Plastics: Dynamic Mechanical Properties: Determination and Report of Procedures

D4092 Terminology for Plastics: Dynamic Mechanical Properties

D4473 Test Method for Plastics: Dynamic Mechanical Properties: Cure Behavior

D6507 Practice for Fiber Reinforcement Orientation Codes for Composite Materials

D7028 Test Method for Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA)

E380 Practice for Use of the International System of Units (SI) (the Modernized Metric System) (Withdrawn 1997)<sup>3</sup>

## 3. Terminology

3.1 *Definitions*: For most definitions applicable to this method refer to Terminology [D4092](#).

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *Encapsulated Sample Parallel Plate Rheometer*—Dynamic Mechanical Analyzer apparatus that holds the specimen under pressure within a confined cavity. The apparatus is designed to contain the resin within the specimen throughout the progress of the cure.

## 4. Summary of Test Method

4.1 A small circular specimen is assembled from uncured thermoset resin materials that correspond to a representation of

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D30](#) on Composite Materials and is the direct responsibility of Subcommittee [D30.03](#) on Constituent/Precursor Properties.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).