Designation: D3532/D3532M – 19

Standard Test Method for Gel Time of Carbon Fiber-Epoxy Prepreg[1]

This standard is issued under the fixed designation D3532/D3532M; 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.

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

1. Scope

1.1 This test method covers the determination of gel time of carbon fiber-epoxy tape and sheet. The test method is suitable for the measurement of gel time of resin systems having either high or low viscosity.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.2.1 Within the text, inch-pound units are shown in brackets.

1.3 *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.*

1.4 *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]

D3531/D3531M Test Method for Resin Flow of Carbon Fiber-Epoxy Prepreg

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

D7750 Test Method for Cure Behavior of Thermosetting Resins by Dynamic Mechanical Procedures using an Encapsulated Specimen Rheometer

3. Summary of Test Method

3.1 A specimen of prepreg material approximately 5 mm [0.25 in.] square is placed between microscope coverglasses on a hot plate preheated to either of two test temperatures, 120 or 175 °C [250 or 350 °F]. Pressure is applied to the specimen through the coverglass with a wood pick to manipulate the resin. The time from the application of heat until the resin ceases to flow by contact with the pick is noted and reported as the gel time.

4. Significance and Use

4.1 This test method can be used to obtain the gel time of resin squeezed from prepreg tape or sheet material. This test is a useful measure for material acceptance.

4.2 The gel time will vary with the test temperature. The temperatures specified in this test method are two of many temperatures often used in processing epoxy prepreg material. If other test temperatures are used, this is to be clearly noted as indicated in 10.1.2.

4.3 Gel time is not recommended as a measure of out time (unacceptable degree of cross-linking). Use Resin Flow Test Method D3531/D3531M, Dynamic Viscosity Test Method D4473, or Dynamic Mechanical Procedures Test Method D7750.

5. Interferences

5.1 The test is a subjective measure of when a gel point is reached. The visual evidence of gel may vary between materials, reinforcements, and, in some cases, between resin material batches. If the definition of gel in this method is not sufficiently standard for a given material, interested parties shall agree on a further definition of gelation.

6. Apparatus

6.1 *Cutting Knife.*

6.2 *Hot Plate,* of either of the following types:

6.2.1 *Class A Hot Plate,* capable of maintaining temperatures of either 120 °C [250 °F] or 175 °C [350 °F] and the means of measuring its surface temperature to an accuracy of ±1 °C [±2 °F].

[1] 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.

Current edition approved Sept. 1, 2019. Published September 2019. Originally approved in 1976. Last previous edition approved in 2012 as D3532/D3532M – 12. DOI: 10.1520/D3532_D3532M-19.

[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.