



Designation: D6992 – 16 (Reapproved 2023)

Standard Test Method for Accelerated Tensile Creep and Creep-Rupture of Geosynthetic Materials Based on Time-Temperature Superposition Using the Stepped Isothermal Method¹

This standard is issued under the fixed designation D6992; 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 accelerated testing for tensile creep, and tensile creep-rupture properties using the Stepped Isothermal Method (SIM).

1.2 The test method is focused on geosynthetic reinforcement materials such as yarns, ribs of geogrids, or narrow geotextile specimens.

1.3 The SIM tests are laterally unconfined tests based on time-temperature superposition procedures.

1.4 Tensile tests are to be completed before SIM tests and the results are used to determine the stress levels for subsequent SIM tests defined in terms of the percentage of Ultimate Tensile Strength (T_{ULT}). Additionally, the tensile test can be designed to provide estimates of the initial elastic strain distributions appropriate for the SIM results.

1.5 Ramp and Hold (R+H) tests may be completed in conjunction with SIM tests. They are designed to provide additional estimates of the initial elastic and initial rapid creep strain levels appropriate for the SIM results.

1.6 This method can be used to establish the sustained load creep and creep-rupture characteristics of a geosynthetic. Results of this method are to be used to augment results of Test Method D5262 and may not be used as the sole basis for determination of long-term creep and creep-rupture behavior of geosynthetic material.

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

1.8 *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.

1.9 *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

D2990 Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

D4439 Terminology for Geosynthetics

D4595 Test Method for Tensile Properties of Geotextiles by the Wide-Width Method

D5262 Test Method for Determining the Unconfined Tension Creep and Creep Rupture Behavior of Planar Geosynthetics Used for Reinforcement Purposes

3. Terminology

3.1 For definitions related to geosynthetics, see Terminology D4439.

3.2 For definitions related to creep, see Test Methods D2990 and D5262.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *creep modulus*—in SIM analysis, the load divided by the percent strain at any given point in time.

3.3.2 *dwell time*—time during which conditions (particular load) are held constant between temperature steps.

3.3.3 *mean test temperature*—the arithmetic average of all temperature readings of the atmosphere surrounding the test specimen for a particular temperature step, starting at a time not later than established temperature ramp time, and finishing at a time just prior to the subsequent temperature reset.

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.02 on Endurance Properties.

Current edition approved Sept. 1, 2023. Published September 2023. Originally approved in 2003. Last previous edition approved in 2016 as D6992 – 16. DOI: 10.1520/D6992-16R23.

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.