



Designation: D7499/D7499M – 09 (Reapproved 2023)

Standard Test Method for Measuring Geosynthetic-Soil Resilient Interface Shear Stiffness¹

This standard is issued under the fixed designation D7499/D7499M; 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 details how cyclic loading is applied to geosynthetics embedded in soil to determine the apparent stiffness of the soil–geosynthetic interface.

1.2 Resilient interface shear stiffness describes the shear stiffness between a geosynthetic and its surrounding soil under conditions of small cyclic loads.

1.3 This test method is intended to provide properties for design. The test method was developed for mechanistic empirical pavement design methods requiring input of the resilient interface shear stiffness. The use of this parameter from this test method for other applications involving cyclic loading should be evaluated on a case-by-case basis. It can also be used to compare different geosynthetics, soil types, etc., and thereby be used as a research and development test procedure.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the 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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

Current edition approved Feb. 1, 2023. Published February 2023. Originally approved in 2009. Last previous edition approved in 2014 as D7499/D7499M – 09 (2014). DOI: 10.1520/D7499_D7499M-09R23.

2. Referenced Documents

2.1 *ASTM Standards:*²

D123 Terminology Relating to Textiles

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3080/D3080M Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions (Withdrawn 2020)³

D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

D4439 Terminology for Geosynthetics

3. Terminology

3.1 For definitions of other terms used in this test method refer to Terminologies D123, D653, and D4439.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *apertures, n*—the open spaces in geogrids which enable soil interlocking to occur.

3.2.2 *atmosphere for testing geosynthetics, n*—air maintained at a relative humidity of $60 \pm 10\%$ and a temperature of $21 \pm 2^\circ\text{C}$ [$70 \pm 4^\circ\text{F}$].

3.2.3 *cross-machine direction, n*—the direction in the plane of the geosynthetic perpendicular to the direction of manufacture.

3.2.4 *failure, n*—an arbitrary point at which a material ceases to be functionally capable of its intended use.

3.2.5 *geosynthetic, n*—a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

3.2.6 *geosynthetic-soil resilient interface shear stiffness, n*—a parameter that describes the apparent stiffness of the interface between the soil and the geosynthetic determined by

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.

³ The last approved version of this historical standard is referenced on www.astm.org.