



Designation: D5101 – 23

Standard Test Method for Measuring the Filtration Compatibility of Soil-Geotextile Systems¹

This standard is issued under the fixed designation D5101; 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 performance tests applicable for determining the compatibility of geotextiles with various types of water-saturated soils under unidirectional flow conditions.

1.2 Two evaluation methods may be used to investigate soil-geotextile filtration behavior, depending on the soil type:

1.2.1 For soils with a plasticity index lower than 5, the systems compatibility shall be evaluated per this standard.

1.2.2 For soils with a plasticity index of 5 or more, it is recommended to use Test Method **D5567** ('HCR,' Hydraulic Conductivity Ratio) instead of this test method.

1.2.3 If the plasticity index of the soil is close to 5, the involved parties shall agree on the selection of the appropriate method prior to conducting the test. This task may require comparison of the permeability of the soil-geotextile system to the detection limits of the HCR and Gradient Ratio Test (GRT) test apparatus being used.

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

1.4 *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.*

1.5 *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 **D35.03** on Permeability and Filtration.

Current edition approved Nov. 1, 2023. Published November 2023. Originally approved in 1990. Last previous edition approved in 2017 as D5101 – 12 (2017). DOI: 10.1520/D5101-23.

2. Referenced Documents

2.1 *ASTM Standards:*²

D123 Terminology Relating to Textiles

D422 Test Method for Particle-Size Analysis of Soils (Withdrawn 2016)³

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

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

D4439 Terminology for Geosynthetics

D5567 Test Method for Hydraulic Conductivity Ratio (HCR) Testing of Soil/Geotextile Systems

3. Terminology

3.1 *Definitions:*

3.1.1 *clogging, n—in geotextiles*, the tendency for a given geotextile to lose permeability due to soil particles that have either become embedded in the fabric openings or have built up on the geotextile surface to form a layer with lower permeability than that of the bulk soil specimen.

3.1.2 *gradient ratio, n—in geotextiles*, ratio of the hydraulic gradient across a soil-geotextile interface to the hydraulic gradient through the soil alone.

3.1.3 *hydraulic gradient, i, s (D)*—the loss of hydraulic head per unit distance of flow, dH/dL.

3.1.4 *piping, n*—the tendency of the geotextile to let a quantity of soil pass through its plane that may potentially lead to stability concerns in the soil or internal clogging of the geotextile.

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.