Designation: D 5567 – 94 (Reapproved 2001)

Standard Test Method for Hydraulic Conductivity Ratio (HCR) Testing of Soil/Geotextile Systems[1]

This standard is issued under the fixed designation D 5567; 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 laboratory measurement of the hydraulic conductivity of water-saturated porous materials with a flexible-wall permeameter.

1.2 This test method may be used with undisturbed or compacted soil specimens that have a hydraulic conductivity less than or equal to 5×10^{-2} cm/s.

1.3 The filtration behavior of soils with hydraulic conductivities greater than 5×10^{-2} cm/s may be determined by the gradient ratio test (Test Method D 5101).

1.4 The values stated in SI units are to be regarded as the standard, although other units are provided for information and clarification purposes.

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

2. Referenced Documents

2.1 *ASTM Standards:*

D 422 Method for Particle-Size Analysis of Soils[2]

D 653 Terminology Relating to Soil, Rock, and Contained Fluids[2]

D 698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)[2]

D 854 Test Method for Specific Gravity of Soil Solids by Water Pycnometer[2]

D 1587 Method for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes[2]

D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass[2]

D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)[2]

D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D 4220 Practice for Preserving and Transporting Soil Samples[2]

D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils[2]

D 4354 Practice for Sampling of Geosynthetics for Testing[3]

D 4439 Terminology for Geotextiles[3]

D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity[3]

D 4647 Test Method for Identification and Classification of Dispersive Clay Soils by the Pinhole Test[2]

D 4751 Test Method for Determining the Apparent Opening Size of a Geotextile[3]

D 5084 Test Method for Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter[3]

D 5101 Test Method for Measuring the Soil Geotextile System Clogging Potential by the Gradient Ratio[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *filter*, *n*—a layer or combination of layers of previous materials designed and installed in such a manner as to provide drainage, yet prevent the movement of soil particles due to flowing water (Terminology D 653).

3.1.1.1 *Discussion*—A *geotextile filter* is the term used for a layer or combination of layers of pervious geosynthetic material(s) that are used in the capacity of a filter as defined above.

3.1.2 *geotextile*, *n*—any permeable textile material used with foundation, soil, rock, earth, or any other geotechnical engineering related material, as an integral part of a man-made product, structure, or system (Terminology D 4439).

3.1.3 *hydraulic conductivity (k)*, *n*—the rate of discharge of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard temperature conditions (20°C) (Test Method D 5084).

3.1.3.1 *Discussion*—The term *coefficient of permeability* is often used instead of *hydraulic conductivity*, but *hydraulic conductivity* is used exclusively in this test method. A complete discussion of the terminology associated with Darcy's law is given in the literature.[4]

3.1.4 *permeation*, *n*—the transmission of a fluid through a porous medium (NEW).

[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.

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[2] *Annual Book of ASTM Standards*, Vol 04.08.

[3] *Annual Book of ASTM Standards*, Vol 04.09.

[4] Olsen and Daniel, "Measurement of Hydraulic Conductivity of Fine-Grained Soils," *ASTM STP 746*, ASTM, Philadelphia, PA, 1981, pp. 18–64.

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