



Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head¹

This standard is issued under the fixed designation D 4716; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers the procedure for determining the flow rate per unit width within the manufactured plane of geosynthetics under varying normal compressive stresses and a constant head. The test is intended primarily as an index test but can be used also as a performance test when the hydraulic gradients and specimen contact surfaces are selected by the user to model anticipated field conditions.

1.2 This test method is limited to geosynthetics that allow continuous in-plane flow paths to occur parallel to the intended direction of flow.

1.3 The values stated in SI units are to be regarded as the standard. The values stated in parentheses are provided 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D 4354 Practice for Sampling of Geosynthetics for Testing
- D 4439 Terminology for Geosynthetics
- D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity
- D 6574 Test Method for Determining the In-Plane Hydraulic Transmissivity of a Geosynthetic by Radial Flow

3. Terminology

3.1 Definitions:

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.03 on Hydraulic Properties.

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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.

3.1.1 *geocomposite, n*—a product fabricated from any combination of geosynthetics with geotechnical materials or other synthetics which is used in a geotechnical application.

(D 4439)

3.1.2 *geonet, n*—a geosynthetic consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for planar drainage of liquids or gases.

(D 4439)

3.1.3 *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.

(D 4439)

3.1.4 *geotechnics, n*—the application of scientific methods and engineering principals to the acquisition, interpretation, and use of knowledge of material of the earth's crust to the solution of engineering problems.

3.1.4.1 *Discussion*—Geotechnics embraces the fields of soil mechanics, rock mechanics, and many of the engineering aspects of geology, geophysics, hydrology, and related sciences.

(D 4439)

3.1.5 *geotextile, n*—a permeable geosynthetic comprised solely of textiles.

(D 4439)

3.1.6 *gravity flow, n*—flow in a direction parallel to the plane of a geosynthetic driven predominantly by a difference in elevation between the inlet and outflow points of a specimen.

3.1.6.1 *Discussion*—The pressure at the outflow is considered to be atmospheric.

(D 4439)

3.1.7 *head (static), n*—the height above a standard datum of the surface of a column of water (or other liquid) that can be supported by a static pressure at a given point. The static head is the sum of the elevation head and the pressure head.

(D 5092)

3.1.8 *hydraulic gradient, i, n*—the loss of hydraulic head per unit distance of flow, dh/dL .

(D 4439)

3.1.9 *hydraulic transmissivity, θ ($L^2 T^{-1}$), n*—for a geosynthetic, the volumetric flow rate per unit width of specimen per unit gradient in a direction parallel to the plane of the specimen.

3.1.9.1 *Discussion*—“transmissivity” is technically applicable only to saturated, laminar hydraulic flow conditions (see Appendix X1).

(D 4439)