



Standard Test Method for Evaluation of Hydraulic Properties of Geosynthetic Clay Liners Permeated with Potentially Incompatible Liquids¹

This standard is issued under the fixed designation D 6766; 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 both flux and hydraulic conductivity (also referred to as *coefficient of permeability*) of geosynthetic clay liner (GCL) specimens permeated with chemical solutions and leachates utilizing a flexible wall permeameter.

1.2 This test method may be utilized with GCL specimens that have a hydraulic conductivity less than or equal to 1×10^{-5} m/s (1×10^{-3} cm/s).

1.3 This test method is applicable to GCL products having geotextile backing(s). It may not be applicable to GCL products with geomembrane backing(s).

1.4 This test method provides measurements of flux and hydraulic conductivity under a prescribed set of conditions, as an index test, that can be used for manufacturing quality control. The flux and hydraulic conductivity values determined using this test method under the prescribed set of conditions is not considered to be representative of the in-service conditions of GCLs. However, the test method allows the requester to establish a set of test conditions; thus, the test method also may be used to check performance or conformance, or both.

1.5 The values stated in SI units are to be regarded as the standard, unless other units are specifically given. By tradition in U.S. practice, hydraulic conductivity is reported in centimeters per second, although the common SI units for hydraulic conductivity are meters per second.

1.6 *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 653 Terminology Relating to Soil, Rock, and Contained Fluids²

D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock²

D 4354 Practice for Sampling of Geosynthetics for Testing³

D 4439 Terminology for Geosynthetics³

D 4753 Specification for Evaluating, Selecting and Specifying Balances and Scales for Use in Soil and Rock Testing²

D 4767 Test Method for Consolidated-Undrained Triaxial Compression²

D 5084 Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter²

D 5887 Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter⁴

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens⁴

3. Terminology

3.1 Definitions:

3.1.1 *flux, n*—the rate of discharge of liquid under laminar flow conditions through a unit cross-sectional area of a GCL specimen at a standard temperature condition ($22 \pm 3^\circ\text{C}$).

3.1.2 *geosynthetic clay liner (GCL), n*—a factory-manufactured geosynthetic hydraulic barrier consisting of clay supported by geotextiles, geomembranes, or a combination thereof, that are held together by needling, stitching, chemical adhesives or other methods.

3.1.3 *hydraulic conductivity, k, n*—the rate of discharge of liquid under laminar flow conditions through a unit cross-sectional area of a GCL specimen under a unit hydraulic gradient and standard temperature conditions ($22 \pm 3^\circ\text{C}$).

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 more

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.04 on Hydraulic Properties.

Current edition approved Feb 10, 2002. Published March 2002.

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

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

⁴ *Annual Book of ASTM Standards*, Vol 04.02.