



Standard Test Method for Pore Size Characteristics of Geotextiles by Capillary Flow Test¹

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1. Scope

1.1 This test method covers the determination of the pore size distribution of geotextile filters with pore sizes ranging from 1 to 1000 μm .

NOTE 1—The accuracy of this procedure has been verified up to a maximum pore size of 500 μm . Above this value accuracy has been found to be equipment dependent and should be verified by the user through checks on materials with known opening sizes.

1.2 The test method measures the entire pore size distribution in terms of a surface analysis of specified pore sizes in a geotextile, defined in terms of the limiting diameters.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard may involve hazardous materials, operations, and equipment. 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

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

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

D4439 Terminology for Geosynthetics

3. Terminology

3.1 *Definitions*—For definitions of other terms used in this test method, refer to Terminologies D4439 and D1129.

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 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.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *bubble point pore size (O_{98})*, n —the largest effective pore diameter detected by the sudden increase of flow rate at the beginning of the wet test.

3.2.2 *pore constriction (O)*, n —diameter of a circle having the same area as the smallest section of a given pore.

3.2.3 *pore size (O_i)*, n —capillary equivalent pore diameter for which the percent of total pore diameters i in a given geotextile based on the surface occupied by the pores are smaller than or equal to that diameter.

3.2.4 *pore size distribution (PSD)*, n —percent cumulative distribution of the complete range of pore sizes with in a given geotextile based on the surface occupied by the pores.

3.2.5 *wetting fluid*, n —fluid used to wet the geotextile test specimen for the capillary porometry portion of the test method, that is, the “wet” test. The verb “wet” is intended to mean to completely saturate the geotextile specimen with the wetting fluid thoroughly such that the entire thickness of the specimen contains fluid with no entrained air bubbles.

4. Summary of Test Method

4.1 Geotextile filters have discrete pores from one side to the other of the geotextile. The bubble point test is based on the principle that a wetting fluid is held in these continuous pores by capillary attraction and surface tension, and the minimum pressure required to force fluid from these pores is a function of pore diameter.

4.2 A fluid-wet geotextile will pass air when the applied air pressure exceeds the capillary attraction of the fluid in the pore constriction. Smaller pore constrictions will exhibit similar behavior at higher pressures. The relationship between pore size and pressure has been established for the wetting fluid.

4.3 By comparing the gas flow rates of both a wet and dry test at the same pressures, the percentage of the flow passing through the filter pores larger than or equal to the specified size may be calculated from the pressure-size relationship. By increasing pressure in small steps, it is possible to determine the flow contribution of very small pore size increments by difference.