Designation: D 4751 – 99a

Standard Test Method for Determining Apparent Opening Size of a Geotextile[1]

This standard is issued under the fixed designation D 4751; 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 the determination the apparent opening size (AOS) of a geotextile by sieving glass beads through a geotextile.

1.2 This test method shows the values in both SI units and inch-pound units. SI units is the technically correct name for the system of metric units known as the International System of Units. Inch-pound units is the technically correct name for the customary units used in the United States. The values in inch-pound units are provided for information only.

1.3 *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:*

C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates[2]

D 123 Terminology Relating to Textiles[3]

D 1776 Practice for Conditioning Textiles for Testing[3]

D 4238 Test Method for Electrostatic Propensity of Textiles[3]

D 4354 Practice for Sampling of Geosynthetics for Testing[4]

D 4439 Terminology for Geotextiles[4]

E 11 Specification for Wire-Cloth Sieves for Testing Purposes[5]

3. Terminology

3.1 *Definitions:*

3.1.1 *apparent opening size* (AOS), O_{95}, *n—for a geotextile*, a property that indicates the approximate largest particle that would effectively pass through the geotextile.

3.1.2 *atmosphere for testing geosynthetics*, *n*—air maintained at a relative humidity between 50 to 70 % and a temperature of 21 ± 2°C (70 ± 4°F).

3.1.3 *Discussion*—The laboratory conditions are very important to the AOS test. For example, excessive humidity (above 70 %) can cause beads to stick together; while too low a relative humidity (below 50 %) can result in an increase in static electricity.

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

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

3.1.6 *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 project, structure, or system.

3.1.7 For the definitions of the other terms relating to geotextiles, refer to Terminology D 4439.

3.2 For the definitions of the other terms relating to textiles, refer to Terminology D 123.

4. Summary of Test Method

4.1 A geotextile specimen is placed in a sieve frame, and sized glass beads are placed on the geotextile surface. The geotextile and frame are shaken laterally so that the jarring motion will induce the beads to pass through the test specimen. The procedure is repeated on the same specimen with various size glass beads until its apparent opening size has been determined.

5. Significance and Use

5.1 Using a geotextile as a medium to retain soil particles necessitates compatibility between it and the adjacent soil. This test method is used to indicate the apparent opening size in a geotextile, which reflects the approximate largest opening dimension available for soil to pass through.

5.2 Test Method D 4751 for the determination of opening size of geotextiles is acceptable for testing of commercial shipments of geotextiles. Current estimates of precision, between laboratories, are being established.

5.2.1 In case of a dispute arising from differences in reported test results when using Test Method D 4751 for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if

[1] This test method is under the jurisdiction of ASTM Committee D-35 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 04.02.

[3] *Annual Book of ASTM Standards*, Vol 07.01.

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

[5] *Annual Book of ASTM Standards*, Vol 14.02.

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