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Standard Test Method for Testing Vertical Strip Drains in the Crimped Condition[1]

This standard is issued under the fixed designation D6918; 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 is a performance ~~test, which~~test that measures the effect ~~crimping;~~crimping has on the ability of vertical strip drains to transmit water parallel to the plane of the drain.

1.2 This test method is applicable to all vertical strip drains.

~~1.3The values stated in SI units are to be regarded as the standard.~~

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 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]

D4354 ~~Practice for Sampling of Geosynthetics for Testing~~ Practice for Sampling of Geosynthetics for Testing

D4439 Terminology for Geosynthetics

3. Terminology

3.1 *Definitions:*

~~3.1.1*geocomposite*, *n*—a product composed of two or more materials, at least one of which is a geosynthetic.~~

~~3.1.2*geosynthetics*, *n*—a planar product manufactured from polymeric materials used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.~~

~~3.1.3*geotextile*, *n*—a permeable geosynthetic comprised solely of textiles.~~

~~3.1.3.1*Discussion*—Geotextiles perform several functions in geotechnical engineering applications, including: separation, filtration, drainage, reinforcement, and protection.~~

~~3.1.4~~

3.1.1 For general geosynthetics terms used in this standard, refer to Terminology D4439.

3.2 *Definitions:* Definitions of Terms Specific to This Standard:

3.2.1 *vertical strip drain*, *n*—a geocomposite consisting of a geotextile cover and drainage core installed vertically into soil to provide drainage for accelerated consolidation of soils.

4. Summary of Test Method

4.1 This test method ~~describes procedures~~ presents two methods for determining the effect of a crimp forming in the vertical strip drain due the consolidation of soils around it in the field.

4.1.1 A vertical strip drain is sealed in a ~~cover of heat shrink plastic~~ waterproof membrane to prevent any water from escaping out through the geotextile during the test.

4.1.2 The sealed vertical strip drain is placed in the appropriate crimping device ~~(See Fig. 1)~~ and water is allowed to pass through it under a constant head of water.

~~4.1.3A90°~~4.1.3 A crimp is placed on the specimen, and water allowed to pass through it under a constant head in the crimped condition.

4.1.4 The flow rate of water along the plane of the uncrimped vertical strip drain is compared to the flow rate in the crimped condition.

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[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.

5. Significance and Use

5.1 This test method is considered satisfactory for the acceptance of commercial shipments of vertical strip drains.

5.1.1 In case of dispute arising from differences in reported test results when using this test method for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if there is any statistical bias between their laboratories. Competent statistical assistance is recommended for the investigation of bias. As a minimum, the two parties should take a group of test specimens that as homogenous as possible, and that are from a lot of material of the type in question. The test specimens should be randomly assigned in numbers to each laboratory for testing. The average results from the two laboratories should be compared using Student's t-test for unpaired data and an acceptable probability level chosen by the two parties before the start of testing. If a bias is found, either its cause must be found and corrected, or the purchaser and the supplier must agree to interpret future test results in light of the known bias.

5.2 Vertical strip drains are installed in areas where it is desired to increase the rate of soil consolidation. It has been shown that as the soil around the vertical strip drain consolidates, a crimp may form in the vertical strip drain due to the movement of the drain in the area of soil consolidation.

5.3 This test method can be used to evaluate if there is any reduction in flow rate of water through the drain due to the crimping, and what effect, if any, this crimping may have on the rate of consolidation of the soil.

6. Apparatus

6.1 Method A:

6.1.1 The test device must be capable of maintaining a constant head of water on the vertical strip drain being tested. The apparatus consists of a water chamber assembly, a specimen holder, and a crimping wedge, all of which are attached to a holding stand. See Fig. 1 and Fig. 2.

~~6.2~~

6.1.2 *Container*, for collecting the water as it flows through the vertical strip drain.

~~6.3~~

6.1.3 *Stopwatch or Electronic Timing Device*, connected to the collection container, for timing the flow of water through the vertical strip drain.

~~6.4~~

6.1.4 *Blow Dryer*, used for applying heat to the heat shrink-wrap that is placed around the test specimen prior to testing.

6.2 Method B:

6.2.1 *Discharge Capacity Tester*—The discharge capacity tester may be pressured by earth pressure when the vertical strip drains are mounted vertically within the ground to serve as discharging interstitial water. The apparatus in use for the principle illustrated in the following Fig. 3 is used for monitoring the variation of the discharge capacity of the vertical strip drains in the event of the earth pressure.

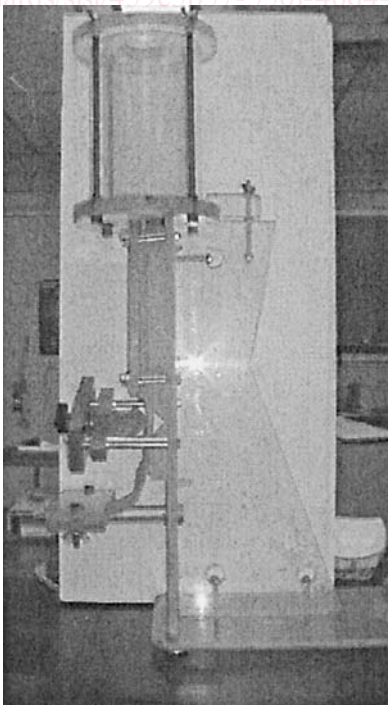

FIG. 1 Complete Crimp Test Apparatus for Method A

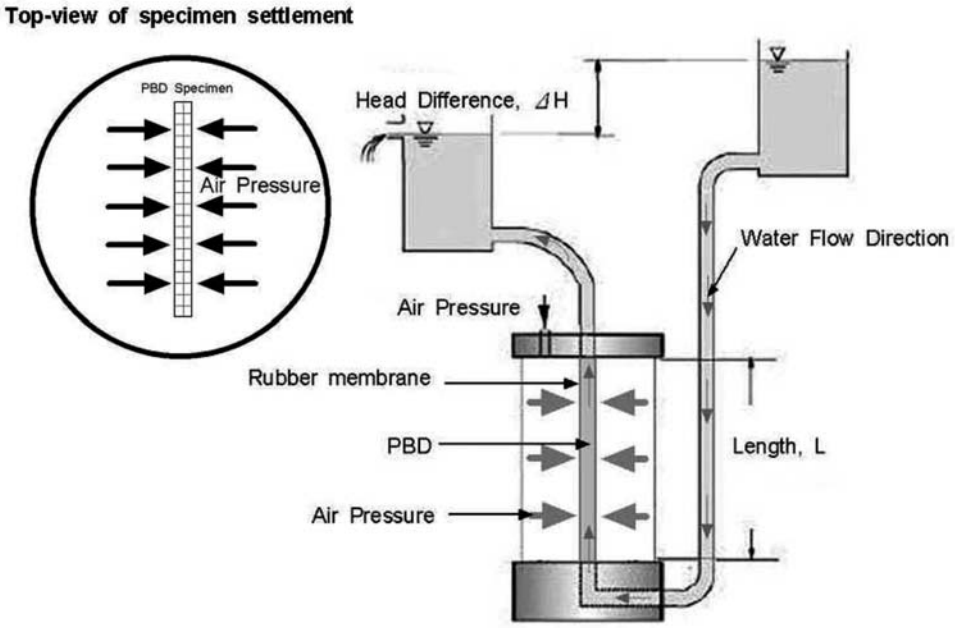

FIG. 2 Test Device for Method B

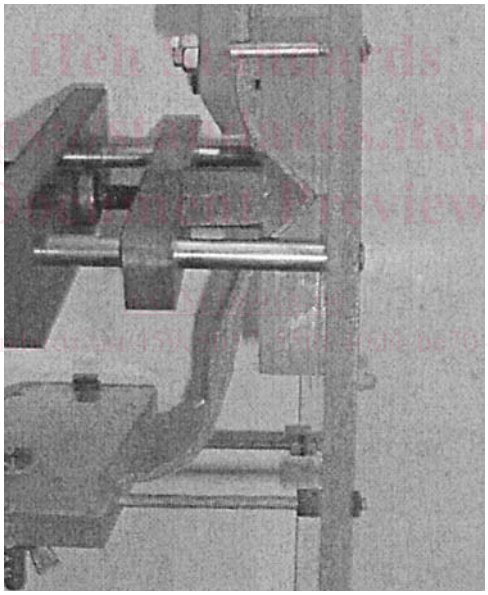

FIG. 3 Crimping Wedge for Method A

6.2.2 The discharge capacity tester is mainly comprised of a sample mounting portion, a pressure controller, water supply, and a flow-rate measurement portion.

6.2.3 The sample mounting portion must maintain all vertically mounted vertical strip drains. The length of the vertical strip drain exposed to external pressure must be (300 ± 10) mm.

6.2.4 The mounted sample is covered by a cylinder, and air pressure or hydraulic pressure must be applied to the internal component of the cylinder in order to model the pressure arising from the earth mass.

6.2.5 The pressure controller should be provided for controlling the pressure applied to the mounted sample.

6.2.6 The water supply for adjusting height is required.

6.2.7 The flow-rate measurement portion measures the amount of water passing through the mounted sample.

6.2.8 *Rubber Membrane*—a cylinder-shaped rubber membrane, of a thickness of 0.35mm, and formed with synthesized rubber latex

6.2.9 *Stopwatch*—See Section 6.3.

6.2.10 *Thermometer*—a thermometer with an accuracy level to 0.2

6.2.11 *Flowmeter*—an instrument capable of measuring the amount of water with an accuracy level of 10, or a gauge revised