



# Standard Test Method for Vertical Strip Drains Using a Large Scale Consolidation Test<sup>1</sup>

This standard is issued under the fixed designation D7498/D7498M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Units information and designation were corrected and editorial changes were made throughout in February 2014

## 1. Scope

1.1 This test method is a performance test, which measures the effectiveness of vertical strip drains on the time rates of consolidation of compressible soils from construction project sites.

1.1.1 It is expected that the design agency will be responsible for performing this test. It is not intended to be a manufacturer performed test.

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

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the 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:*<sup>2</sup>

[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 related to geosynthetics, see Terminology [D4439](#).

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto: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 *vertical strip drains, 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 for determining the effectiveness of vertical strip drains used under specified soil conditions to enhance the time rate of consolidation of compressible soils.

4.2 A specimen of the vertical strip drain is inserted in the test chamber and compressible soil from the project site is remolded around the vertical strip drain, such that the drain is in a similar position as it would be on the project site.

4.3 The top of the soil is sealed with a wax seal, such that drainage only occurs through the vertical strip drain. The vertical strip drain protrudes up through the seal.

4.4 A sand drainage blanket is placed on top of the wax seal, such that the vertical strip drain drains into the sand blanket.

4.5 A rubber cup seal provides the means of applying incremental loads in a similar manner to a standard soils consolidation test.

4.6 A similar setup is used, only with a 50 mm [2 in.] sand drain in place of the vertical strip drain.

4.7 The Coefficients of Consolidation are determined from the test results for both the vertical strip drain and the sand drain. Time rates of consolidation are then compared.

4.8 Persons performing this test shall have knowledge in the consolidation testing of soils.

## 5. Significance and Use

5.1 As this is a time intensive test, it should not be considered as an acceptance test for commercial shipments of prefabricated vertical strip drains.

5.2 Prior to the development of vertical strip drains, when it was desired to increase the rate of consolidation of a compressible soil on a construction project, large diameter sand drains were installed. Vertical strip drains can be installed in areas

where it is desired to increase the rate of soils consolidation in place of these large diameter sand drains.

5.3 This test method can be used to compare the performance of vertical strip drains to that of sand drains.

**6. Apparatus**

6.1 The apparatus for this test method is a specialty piece of equipment that must be capable of safely handling loads up to 206.8 kPa [30 psi] using compressed air.

6.1.1 As this is a time intensive test, it is recommended to have three test apparatus setups. This will allow simultaneous testing of three vertical strip drain specimens.

6.1.2 *Test Chamber*—A 254.0-mm [10-in.] diameter by 558.6-mm [22-in.] high by 12.7-mm [0.5-in.] wall thickness PVC pipe. (Fig. 1)

6.1.2.1 *Drainage Ports*—Six 3.18-mm [0.125-in.] drainage ports are located 152.4-mm [6-in.] from the top, and equally spaced around the perimeter of the cylinder.

6.1.2.2 On the outside of the cylinder, at 180° to one another, two 19.05-mm [0.75-in.] thick acrylic hooks are located 25.4 mm [1 in.] from the bottom of the test chamber for the purpose of fastening the test chamber to the base plate.

6.1.3 *Base Plate*:

6.1.3.1 A 361.95-mm [14.25-in.] diameter PVC flat plate, 38.1 mm [1.5 in.] thick.

6.1.3.2 The base plate has a 12.7-mm [0.5-in.] wide by 6.35-mm [0.25-in.] deep concentric groove, having an inside diameter of 254.0 mm [10 in.], located on the top side of the base plate.

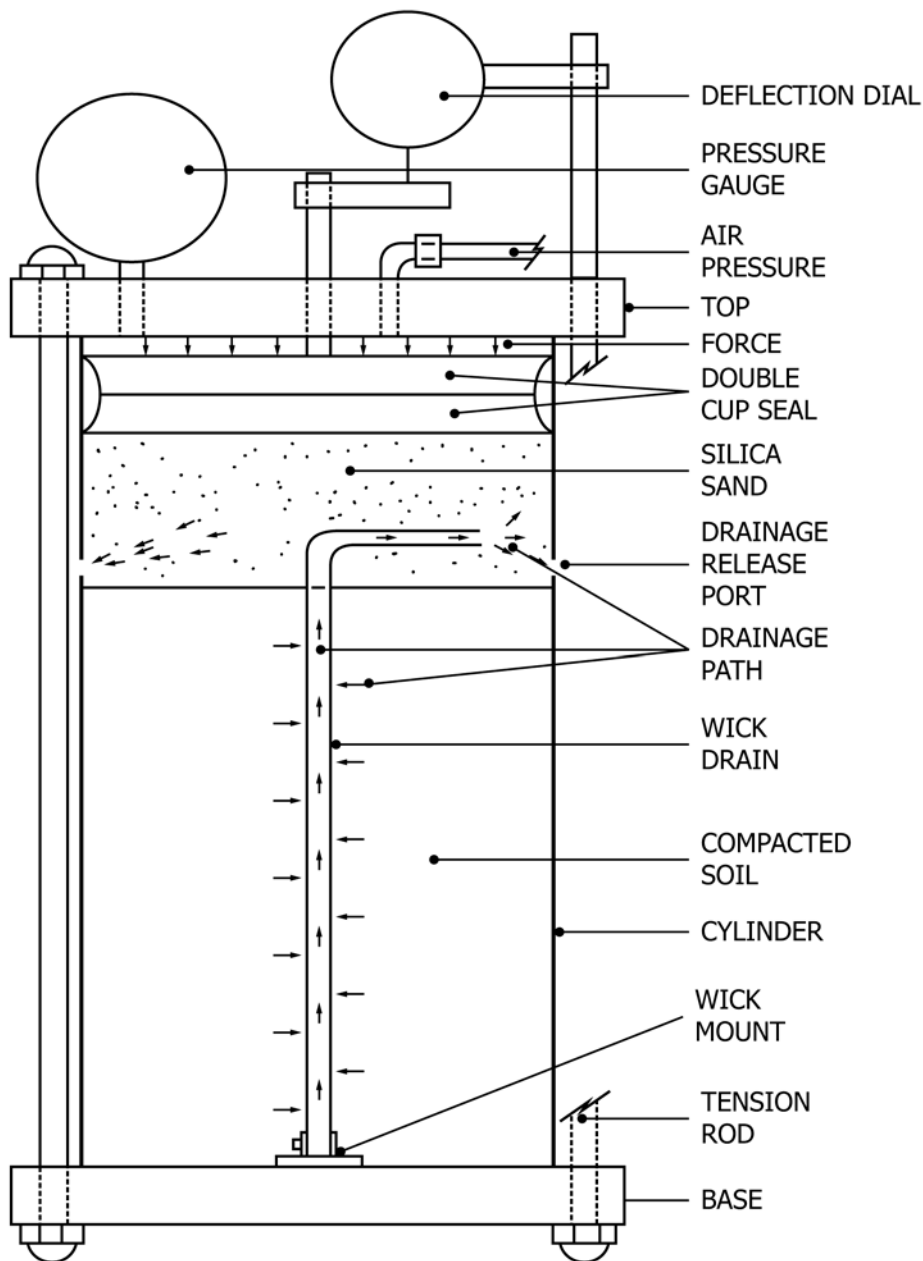


FIG. 1 Large Scale Consolidator