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Standard Guide for Selection of Test Methods for Prefabricated Vertical Drains (PVD)¹

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1. Scope

1.1 This guide provides recommendations for the selection of appropriate test methods for prefabricated vertical geocomposite drains (sometimes referred to as wick drains) used in geotechnical engineering applications to provide consistency in data reporting.

1.2 This guide includes test methods for all types of prefabricated geocomposite drains manufactured in a plant and consisting of a polymeric core structure with a synthetic fabric (geotextile) jacket for filtration.

1.3 This guide is intended to aid all personnel involved in the selection, manufacture, installation, or evaluation of prefabricated vertical drains.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

[D4491/D4491M Test Methods for Water Permeability of Geotextiles by Permittivity](#)

[D4533/D4533M Test Method for Trapezoid Tearing Strength of Geotextiles](#)

[D4632/D4632M Test Method for Grab Breaking Load and Elongation of Geotextiles](#)

[D4716/D4716M Test Method for Determining the \(In-plane\) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head](#)

[D4751 Test Methods for Determining Apparent Opening Size of a Geotextile](#)

[D4884/D4884M Test Method for Strength of Sewn or Bonded Seams of Geotextiles](#)

[D5101 Test Method for Measuring the Filtration Compatibility of Soil-Geotextile Systems](#)

[D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics](#)

[D5322 Practice for Laboratory Immersion Procedures for Evaluating the Chemical Resistance of Geosynthetics to Liquids](#)

[D5493 Test Method for Permittivity of Geotextiles Under Load](#)

[D5567 Test Method for Hydraulic Conductivity Ratio \(HCR\) Testing of Soil/Geotextile Systems](#)

[D5819 Guide for Selecting Test Methods for Experimental Evaluation of Geosynthetic Durability](#)

[D6241 Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe](#)

[D6364 Test Method for Determining Short-Term Compression Behavior of Geosynthetics](#)

[D6389 Practice for Tests to Evaluate the Chemical Resistance of Geotextiles to Liquids](#)

[D6918 Test Method for Testing Vertical Strip Drains in the Crimped Condition](#)

[D7498/D7498M Test Method for Vertical Strip Drains Using a Large Scale Consolidation Test](#)

¹ This guide 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. 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 *geosynthetic, n*—a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a manmade project, structure, or system.

3.1.3 *geotechnical engineering, n*—the engineering application of geotechnics.

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 *geotextiles, n*—any permeable textile material used in foundation, soil, rock, earth, or any other geotechnical engineering related material, as an integral part of a manmade project, structure, or system.

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

3.1.6.1 *Discussion*—Also known as band drain, wick drain, or prefabricated vertical drain (PVD).

4. Significance and Use

4.1 To properly evaluate prefabricated vertical drains, tests must be performed according to specific test methods and procedures. Failure to follow this practice can result in data not representative of the product’s characteristics and performance.

5. Test Methods

5.1 Recommended test methods for prefabricated vertical drains have been grouped into two categories and are listed in tables as follows:

5.1.1 Prefabricated Vertical Drains Index Properties:

Characteristic	ASTM Standard
PVD (Geocomposite)	
Grab	Test Method D4632/D4632M
Thickness	Test Method D5199
Discharge Capacity (Transmissivity)	Test Method D4716/D4716M
Compression	Test Method D6364
Seam Strength	Test Method D4884/D4884M
Geotextile (Filter)	
Permittivity	Test Method D4491/D4491M
Permeability	Test Method D4491/D4491M
Apparent Opening Size	Test Method D4751
Static Puncture	Test Method D6241
Trap Tear	Test Method D4533/D4533M

5.1.2 Prefabricated Vertical Drains Performance Properties:

Characteristic	ASTM Standard
PVD (Geocomposite)	
Discharge Capacity (Transmissivity)	Test Method D4716/D4716M
Chemical Resistance	Practice D5322 / Practice D6389
Durability	Guide D5819
Crimp Test	Test Method D6918
Large Scale Consolidation	Test Method D7498/D7498M
Geotextile (Filter)	
Permittivity Under Load	Test Method D5493
Clogging Potential by Gradient Ratio	Test Method D5101
Hydraulic Conductivity Ratio	Test Method D5567

6. Keywords

6.1 geocomposite; geosynthetic; geotextile; permittivity; prefabricated vertical drain; transmissivity

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