



Standard Test Methods for Laboratory Miniature Vane Shear Test for Saturated Fine-Grained Clayey Soil¹

This standard is issued under the fixed designation D4648/D4648M; 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 These test methods cover the miniature vane test in very soft to stiff saturated fine-grained clayey soils ($\phi = 0$). Knowledge of the nature of the soil in which each vane test is to be made is necessary for assessment of the applicability and interpretation of the test results.

NOTE 1—It is recommended that the miniature vane test be conducted in fine-grained, predominately clay soils with an undrained shear strength less than 1.0 tsf [100 kPa]. Vane failure conditions in higher strength clay and predominantly silty soils may deviate from the assumed cylindrical failure surface, thereby causing error in the measured strength.

1.2 These test methods include the use of both conventional calibrated torque spring units (Method A) and electrical torque transducer units (Method B) with a motorized miniature vane shear device.

1.3 Laboratory vane is an ideal tool to investigate strength anisotropy in the vertical and horizontal directions, if suitable samples (specimens) are available.

1.4 All measured and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.5 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.

1.5.1 The gravitational system of inch-pound units is used when dealing with inch-pound units. In this system, the pound (lbf) represents a unit of force (weight), while the unit for mass is slugs. The rationalized slug unit is not given, unless dynamic ($F = ma$) calculations are involved.

1.6 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:²

- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- D1587 Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes
- D2216 Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)
- D2573 Test Method for Field Vane Shear Test in Saturated Fine-Grained Soils
- D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- D4220 Practices for Preserving and Transporting Soil Samples
- D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 Definitions:

3.1.1 For common definitions of terms in this standard, refer to Terminology D653.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *torque*—the product of the magnitude of a force and the perpendicular distance of the line of action of the force from a specified axis of rotation.

3.2.2 *torque spring*—an elastic spring that can be calibrated to provide a measure of torque that is proportional to the rotation (about a central longitudinal axis) of one end of the spring relative to a fixed condition at the opposite end of the spring.

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.05 on Strength and Compressibility of Soils.

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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.