



Designation: D4648/D4648M – 24a

Standard Test Methods for Laboratory Miniature Vane Shear Test for Saturated Fine-Grained 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 saturated fine-grained, cohesive clay and silt soils for the estimation of undrained shear strength. 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. These test methods are not applicable to sandy soils or non-plastic silts, which may allow drainage during the test. These test methods are intended for soils which have an undrained shear strength less than 1.0 tsf [100 kPa].

NOTE 1—Vane failure conditions in higher strength clay and predominately 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 The values stated in either inch-pound units or SI units [presented in brackets] 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. Reporting of test results in units other than inch-pound shall not be regarded as nonconformance with this standard.

1.4.1 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.

1.5 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this test method.

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

1.7 *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

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D1587/D1587M Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes (Withdrawn 2024)³

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 Procedures)

D2573/D2573M 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/D4220M Practices for Preserving and Transporting Soil Samples (Withdrawn 2023)³

D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data

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 www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

*A Summary of Changes section appears at the end of this standard