



Designation: D6467 – 21^{ε1}

Standard Test Method for Torsional Ring Shear Test to Determine Drained Residual Shear Strength of Fine-Grained Soils¹

This standard is issued under the fixed designation D6467; 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.

^{ε1} NOTE—The standard was editorially updated in January 2022.

1. Scope*

1.1 Fine-grained soils in this Test Method are restricted to soils containing no more than 15 % fine sand (100 % passing the 425 μm (No. 40) sieve and no more than 15 % retained on the 75 μm (No. 200) sieve).

1.2 This test method provides a procedure for performing a torsional ring shear test under a drained condition to determine the residual shear strength of fine-grained soils. This test method is performed by shearing a reconstituted, overconsolidated, presheared specimen at a controlled displacement rate until the constant drained shear resistance is established on a single shear surface determined by the configuration of the apparatus.

1.3 In this test, the specimen rotates in one direction until the constant or residual shear resistance is established. The amount of rotation is converted to displacement using the average radius of the specimen and multiplying it by numbers of degrees traveled and 0.0174.

1.4 An intact specimen or a specimen with a natural shear surface can be used for testing. However, obtaining a natural slip surface specimen, determining the direction of field shearing, and trimming and aligning the usually non-horizontal shear surface in the ring shear apparatus is difficult. As a result, this test method focuses on the use of a reconstituted specimen to determine the residual strength. An unlimited amount of continuous shear displacement can be achieved to obtain a residual strength condition in a ring shear device.

1.5 A shear stress-displacement relationship may be obtained from this test method. However, a shear stress-strain relationship or any associated quantity, such as modulus, cannot be determined from this test method because the height of the shear zone unknown, so an accurate or representative shear strain cannot be determined.

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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1.6 The selection of effective normal stresses and determination of the shear strength parameters for design analyses are the responsibility of the professional or office requesting the test. Generally, three or more effective normal stresses are applied to a test specimen in a multi-stage test or a new specimen can be used for each effective normal stress to determine the drained residual failure envelope.

1.7 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only and are not considered standard. The values given in parentheses are mathematical conversions to inch-pound units. Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.8 All measured and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026 unless superseded by this standard.

1.8.1 The procedures used to specify how data are collected/recorded or calculated in the standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analysis methods for engineering design.

1.9 *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.*

1.10 *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.*

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