



Standard Test Methods for One-Dimensional Swell or Settlement Potential of Cohesive Soils¹

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1. Scope *

1.1 These test methods cover three alternative laboratory methods for determining the magnitude of swell or settlement of relatively undisturbed or compacted cohesive soil.

NOTE 1—Refer to Section 5 to determine the best method for a particular application.

1.2 The test methods can be used to determine (a) the magnitude of swell or settlement under known vertical (axial) pressure, or (b) the magnitude of vertical pressure needed to maintain no volume change of laterally constrained, axially loaded specimens.

1.3 The values stated in SI units are to be regarded as the standard. The values stated in inch-pound units are approximate.

1.4 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D 6026.

1.4.1 The method used to specify how data are collected, calculated, or recorded in this standard is not directly related to the accuracy to which the data can be applied in design or other uses, or both. How one applies the results obtained using this standard is beyond its scope.

1.5 *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:

D 422 Test Method for Particle-Size Analysis of Soils²

D 653 Terminology Relating to Soil, Rock, and Contained Fluids²

¹ These test methods are under the jurisdiction of ASTM Committee D18 on Soil and Rock and are the direct responsibility of Subcommittee D18.05 on Structural Properties of Soils.

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² Annual Book of ASTM Standards, Vol. 04.08.

D 698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12.400 ft-lbf/ft³ (600 kN-m/m³))²

D 854 Test Method for Specific Gravity of Soils²

D 1557 Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56.000 ft-lbf/ft³ (2.700 kN-m/m³))²

D 1587 Practice for Thin-Walled Tube Sampling of Soils²

D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock²

D 2435 Test Method for One-Dimensional Consolidation Properties of Soils²

D 3550 Practice for Ring-Lined Barrel Sampling of Soils²

D 3740 Practice for Minimum Requirements for Agencies Engaged In the Testing and/or Inspection of Soil and Rock as Used In Engineering Design and Construction²

D 3877 Test Methods for One-Dimensional Expansion, Shrinkage, and Uplift Pressure of Soil-Lime Mixtures²

D 4220 Practices for Preserving and Transporting Soil Samples²

D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils²

D 6026 Practice for Using Significant Digits in Geotechnical Data²

3. Terminology

3.1 *Definitions*—Refer to Terminology D 653 for standard definitions of terms.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *heave (L)*—increase in vertical height, Δh , of a column of in situ soil of height h following absorption of water.

3.2.2 *percent heave or settlement, %*—increase or decrease in the ratio of the change in vertical height, Δh , to the original height of a column of in situ soil; $h \times 100$ or $\Delta h/h \times 100$.

3.2.3 *settlement, L*—decrease in vertical height, Δh , of a column of in situ soil of height h .

3.2.4 *swell, L*—increase in elevation or dilation of soil column following absorption of water.

3.2.5 *free swell, %*—percent heave, $\Delta h/h \times 100$, following absorption of water at the seating pressure σ_{se} .

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

