



Standard Test Methods for One-Dimensional Expansion, Shrinkage, and Uplift Pressure of Soil-Lime Mixtures¹

This standard is issued under the fixed designation D3877; 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 provide procedures for conducting expansion, shrinkage, and uplift pressure tests on compacted soil-lime mixtures and can be used to determine the lime content required to achieve desired control of volume changes caused by increases or decreases of moisture.

1.2 The tests can be used to determine (a) the magnitude of volume changes under varying load conditions, (b) the rate of volume change, and (c) the magnitude of pressure change as moisture changes of the soil-lime mixture take place. The permeability of soil-lime mixture can also, if desired, be determined at the various load conditions.

NOTE 1—Changes in field conditions can have major effects on the expansion and shrinkage characteristics of expansive soils. Therefore, to the greatest extent possible, initial and anticipated future field conditions should be duplicated, particularly with respect to moisture and density.

1.3 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice [D6026](#), [D3740](#)

1.3.1 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.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

¹ These test methods are under the jurisdiction of ASTM Committee [D18](#) on Soil and Rock and are the direct responsibility of Subcommittee [D18.15](#) on Stabilization With Admixtures.

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2. Referenced Documents

2.1 *ASTM Standards:*²

- [C51](#) Terminology Relating to Lime and Limestone (as used by the Industry)
- [D427](#) Test Method for Shrinkage Factors of Soils by the Mercury Method (Withdrawn 2008)³
- [D653](#) Terminology Relating to Soil, Rock, and Contained Fluids
- [D698](#) Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))
- [D854](#) Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
- [D1452](#) Practice for Soil Exploration and Sampling by Auger Borings
- [D1557](#) Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- [D2216](#) Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- [D2435](#) Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- [D3551](#) Practice for Laboratory Preparation of Soil-Lime Mixtures Using Mechanical Mixer
- [D3740](#) Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- [D4943](#) Test Method for Shrinkage Factors of Soils by the Wax Method
- [D6026](#) Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 *Definitions:*

- 3.1.1 Refer to Terminology [C51](#) for terms relating to lime.
- 3.1.2 Refer to Terminology [D653](#) for terms relating to soil.

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 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