



Standard Test Method for Expansion Index of Soils¹

This standard is issued under the fixed designation D4829; 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 This test method allows for determination of expansion potential of soils when inundated with distilled water.²

1.2 This test method provides a simple yet sensitive method for evaluation of expansion potential of soils for practical engineering applications using an index parameter.

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 D6026.

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: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

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
D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
D3877 Test Methods for One-Dimensional Expansion, Shrinkage, and Uplift Pressure of Soil-Lime Mixtures
D4546 Test Methods for One-Dimensional Swell or Collapse of Soils
D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing
D6026 Practice for Using Significant Digits in Geotechnical Data
E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves
E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Terminology

3.1 For common definitions of other terms used in this Test Method, refer to Terminology D653.

3.2 Definitions:

3.2.1 *scarification*—scratching the surface of a compacted layer to facilitate bonding with the next layer to avoid potential separation between compacted layers.

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *expansion index (EI)*, n —1000 times the difference between final and initial height of the specimen divided by the initial height.

4. Summary of Test Method

4.1 A specimen is prepared by compacting a test soil into a metal ring at a degree of saturation of $50 \pm 2\%$. The specimen and the ring are then placed in a consolidometer. A vertical confining pressure of 6.9 kPa (1 lbf/in.²) is applied to the specimen and the specimen is then inundated with distilled water. The deformation of the specimen is recorded for 24 h or until the rate of deformation becomes less than 0.005 mm/h (0.0002 in./h), whichever occurs first. A minimum recording time of 3 h is required.

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 Refer to Anderson, J. N., and Lade, P. V., “The Expansion Index Test,” *Geotechnical Testing Journal*, Vol 4, No. 2, ASTM, 1981, pp. 58–67.

³ 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.