



Designation: D5335 – 24

Standard Test Method for Linear Coefficient of Thermal Expansion of Rock Using Bonded Electric Resistance Strain Gauges¹

This standard is issued under the fixed designation D5335; 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 covers the laboratory determination of the linear (one-dimensional) coefficient of thermal expansion of rock using bonded electric resistance strain gauges. This test method is intended for evaluation of intact rock cores. Discontinuities in the rock mass, such as joints, inclusions, voids, veins, bedding, and the like can influence the thermal expansion of the rock, and judgment should be used when selecting the specimen to be analyzed in this test method.

1.2 This test method is applicable for unconfined stress states over the temperature range from 20 to 260°C, within the restrictions noted in 6.1.

1.3 The test specimens may be either saturated, dry or unsaturated. If saturated or unsaturated specimens are used, then the test temperature shall be at least 10°C less than the boiling point of the saturating fluid in order to reduce the effects of evaporation of the fluid. Refer to 6.3 and 8.4.

1.4 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.5 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.5.1 The procedure used to specify how data are collected/recorded or calculated in this 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 analytical methods for engineering design.

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
- D2113 Practice for Rock Core Drilling and Sampling of Rock for Site Exploration (Withdrawn 2023)³
- D2216 Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data
- E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves
- E83 Practice for Verification and Classification of Extensometer Systems
- E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process
- E228 Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer
- E289 Test Method for Linear Thermal Expansion of Rigid Solids with Interferometry

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.12 on Rock Mechanics.

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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