



Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete¹

This standard is issued under the fixed designation C 157/C 157M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of the length changes that are produced by causes other than externally applied forces and temperature changes in hardened hydraulic-cement mortar and concrete specimens made in the laboratory and exposed to controlled conditions of temperature and moisture.

1.2 The values stated in either inch-pound or SI units are to be regarded separately as standard. An exception is with regard to sieve sizes and nominal size of aggregate, in which the SI values are the standard as stated in Specification E 11. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other, without combining values in any way.

1.3 *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:

- C 125 Terminology Relating to Concrete and Concrete Aggregates²
- C 143/C 143M Test Method for Slump of Hydraulic Cement Concrete²
- C 172 Practice for Sampling Freshly Mixed Concrete²
- C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory²
- C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency³
- C 490 Practice for Use of Apparatus for the Determination

of Length Change of Hardened Cement Paste, Mortar, and Concrete^{3,2}

C 511 Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes^{3,2}

C 596 Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement³

C 1437 Test Method for Determining Flow of Hydraulic Cement Mortar³

E 11 Specification for Wire Cloth and Sieves for Testing Purposes⁴

E 337 Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)⁵

3. Terminology

3.1 *Definitions*—The terms used in this test method are defined in Terminology C 125.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *length change, n*—an increase or decrease in the length of a test specimen that has been caused to change by any factor other than externally applied forces and temperature changes.

4. Significance and Use

4.1 Measurement of length change permits assessment of the potential for volumetric expansion or contraction of mortar or concrete due to various causes other than applied force or temperature change. This test method is particularly useful for comparative evaluation of this potential in different hydraulic-cement mortar or concrete mixtures.

4.2 This test method provides useful information for experimental purposes or for products that require testing under nonstandard mixing, placing, handling, or curing conditions, such as high product workability or different demolding times. Standard conditions are described in 5.4.1.

4.3 If conditions for mixing, curing, sampling, and storage other than specified in this test method are required, they shall

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.68 on Methods of Testing for Volume Changes of Concrete and Concrete Aggregates.

Current edition approved June 10, 2003. Published September 2003. Originally approved in 1940. Last previous edition approved in 1999 as C 157/C 157M – 99.

² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 11.03.