



Designation: D4792/D4792M – 13

# Standard Test Method for Potential Expansion of Aggregates from Hydration Reactions<sup>1</sup>

This standard is issued under the fixed designation D4792/D4792M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the determination of potential volume expansion of dense graded compacted aggregates that contain components susceptible to hydration and consequent volume increase, such as the free calcium and magnesium oxides that occur in some industrial by-products.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

NOTE 1—Sieve size is identified by its standard designation in Specification E11. The alternative designation given in parentheses is for information only and does not represent a different standard sieve size.

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.*

1.4 *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:*<sup>2</sup>

[C702 Practice for Reducing Samples of Aggregate to Testing Size](#)

[D75 Practice for Sampling Aggregates](#)

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.51 on Aggregate Tests.

Current edition approved June 1, 2013. Published June 2013. Originally approved in 1988. Last previous edition approved in 2006 as D4792 – 00 (2006). DOI: 10.1520/D4792\_D4792M-13.

<sup>2</sup> 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.

[D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort \(12,400 ft-lbf/ft<sup>3</sup> \(600 kN-m/m<sup>3</sup>\)\)](#)

[D1883 Test Method for California Bearing Ratio \(CBR\) of Laboratory-Compacted Soils](#)

[D2940 Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports](#)

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

## 3. Summary of Test Method

3.1 This test method consists of measuring the volume expansion of compacted specimens following the general procedures of Test Method D1883. Compaction is based on maximum density determination using Test Methods D698. To accelerate the hydration reaction, specimens are stored in water at  $70 \pm 3^\circ\text{C}$  [ $158 \pm 5^\circ\text{F}$ ] for a minimum of 7 days.

## 4. Significance and Use

4.1 This test method provides a procedure for determining the compliance of steel slags and other materials with specifications, such as Specification D2940, that limit permissible expansion of base and subbase aggregates containing components subject to hydration.

4.2 This test method can also be used to evaluate the effectiveness of aging or other treatments for reducing the expansive potential of such materials.

4.3 Test results have not been correlated with field performance, and values obtained do not necessarily indicate expansion that may occur in service conditions.

## 5. Apparatus

5.1 *Molds, Spacer Disks, Expansion Measuring Apparatus, Stainless Steel Weights, and Dial Gages* conforming to the requirements of Test Method D1883.

5.2 *Mixing Bowl, Straight-Edge, Scale, Filter Paper, Dishes*, etc. as required in Test Methods D698 and D1883.

5.3 *Water Storage Facility*—A water bath controlled at  $70 \pm 3^\circ\text{C}$  [ $158 \pm 5^\circ\text{F}$ ] or suitable tanks or buckets for submersion of the test specimens in an oven controlled so as to maintain that water temperature.