



Designation: D8378/D8378M – 21

Standard Test Method for Potential Expansion of Steel Slag from Hydration Reactions by Autoclave¹

This standard is issued under the fixed designation D8378/D8378M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers the determination of potential volume expansion of steel slags that contain components susceptible to hydration and consequent volume increase, such as the free calcium and magnesium oxides.

1.1.1 This method is based upon the Cement Autoclave procedure, Test Method C151/C151M, and the California Bearing Ratio procedure, Test Method D1883. This is an aggressive test that can detect both calcium and magnesium expansion potentials. The procedure is also a rapid method typically completed within 24 h.

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 nonconformance 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, health, and environmental 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.*

¹ 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.

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2. Referenced Documents

2.1 ASTM Standards:²

C29/C29M Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate

C151/C151M Test Method for Autoclave Expansion of Hydraulic Cement

C702/C702M Practice for Reducing Samples of Aggregate to Testing Size

C1005 Specification for Reference Masses and Devices for Determining Mass and Volume for Use in Physical Testing of Hydraulic Cements

D75/D75M Practice for Sampling Aggregates

D1883 Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils

D4792/D4792M Test Method for Potential Expansion of Aggregates from Hydration Reactions

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

2.2 Other Standard:³

Indiana Test Method ITM 219 Acceptance Procedures of Steel Furnace Slag for Deleterious Materials

3. Summary of Test Method

3.1 This test method consists of measuring the volume expansion of compacted specimens following the autoclave procedures of Test Method C151/C151M. The method utilizes a mold similar to the one used in Test Method D1883, with the exception of it being proportionally smaller in order to fit in the autoclave. This method is severe due to the high temperatures and pressure. This method detects periclase (MgO) hydration reactions that may not appear during some water bath procedures, such as Test Method D4792/D4792M. As a result,

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 Available from Indiana Department of Transportation, https://www.in.gov/indot/div/mt/itm/pubs/219_testing.pdf.