



Designation: D2014/D2014M – 19

## Standard Test Method for Expansion or Contraction of Coal by the Sole-Heated Oven<sup>1</sup>

This standard is issued under the fixed designation D2014/D2014M; 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 a large-scale laboratory test for obtaining information on the expansion or contraction of coal or coal blends during carbonization under specified conditions. This test method is applicable in the examination of coals or coal blends intended for use in the manufacture of coke.

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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

**D2234/D2234M** Practice for Collection of a Gross Sample of Coal

**D3302** Test Method for Total Moisture in Coal

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.15 on Metallurgical Properties of Coal and Coke.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

### 3. Summary of Test Method

3.1 During the test, a measured thickness of coal about 102 mm [4 in.] is heated from the bottom surface while a force corresponding to 15.17 kPa [2.20 psi] is applied to the top surface through a piston. At the end of the test, the thickness of the coke is measured by observing the final position of the piston.

### 4. Significance and Use

4.1 The values determined in this test method indicate to what extent a given coal or coal blend will expand or contract during the carbonization process when evaluated in terms of pertinent experience with other coals and coal blends and processing conditions used in commercial-type coke ovens.

### 5. Apparatus

5.1 *Test Oven Assembly*, consisting of the following: either a single-chamber oven having approximately 280 mm [11 in.] width, 610 mm [24 in.] length, and 280 mm [11 in.] depth, or a double-chambered oven with two chambers each having approximately 280 mm [11 in.] width, length, and depth; a heating system to heat the charge(s) unidirectionally through the sole according to a controlled program; piston(s) arranged so that a constant load may be applied to the top surface of the charge; and suitable instrumentation so that appropriate temperatures and the position of the piston(s) may be measured. The auxiliary equipment includes apparatus facilitating the charging of the oven in a standard manner. The vertical partition of the double-chambered oven may be of 51 mm [2 in.] firebrick tile or equivalent.

#### 5.1.1 Carbonization Chamber:

5.1.1.1 The sole shall be of silicon carbide tile, about 40 mm [1.5 in.] thick, 305 mm [12 in.] wide, and extending approximately 75 mm [3 in.] beyond the carbonization chamber at the front and back. Side, front, and back walls should be 40 mm [1.5 in.] firebrick tile or equivalent. It is appropriate to key the sole to the side and back tiles. The top edges of sidewalls shall be held in an adjustable steel framework so that the walls may be made and maintained precisely perpendicular to the sole. Hole(s) 6.35 mm [0.25 in.] in diameter shall be provided