



Designation: D167 – 12a

Standard Test Method for Apparent and True Specific Gravity and Porosity of Lump Coke¹

This standard is issued under the fixed designation D167; 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 apparent specific gravity (Sections 2 to 9) and true specific gravity (Sections 10 to 13) of lump coke larger than 25-mm (1-in.) size and calculating porosity (Section 14) from the specific gravity data.

1.2 The values given in SI units shall be regarded as the standard. Inch-pound units shall be accepted on an equivalent basis.

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:*²

D121 Terminology of Coal and Coke

D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis

3. Terminology

3.1 For definitions of terms used in this test method, refer to D121 Terminology of Coal and Coke.

4. Significance and Use

4.1 Apparent and true specific gravity, as determined by this test method, are influenced by the type of coals carbonized and the operating and preparational conditions of that carbonization, that is, charge bulk density, heating rate, and pulverization level. In turn, these properties directly influence the performance in processes using coke.

¹ 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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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.

APPARENT SPECIFIC GRAVITY

5. Apparatus

5.1 The apparatus for the determination of the apparent specific gravity of coke shall consist of the following:

5.1.1 *An Elliptical or Rectangular Cross-Sectioned Container*, approximately 560 mm (22 in.) in length, 280 mm (11 in.) in width, and a minimum of 330 mm (13 in.) in height, provided with a spout consisting of a short 13-mm ($\frac{1}{2}$ -in.) nipple extending horizontally from the container about 270 mm ($10\frac{1}{2}$ in.) above the bottom.

5.1.2 *Wire Cage or Basket*, of about 13-mm ($\frac{1}{2}$ -in.) square-mesh screen wire cloth provided with a cover and two long handles, suitable for holding the entire sample of coke and so made as to fit inside the container below the spout.

5.1.3 *Bucket or Other Vessel*, 11-L (3-gal), suitable for receiving the displaced water.

5.1.4 *Pan*, about 380 mm (15 in.) square and 76 mm (3 in.) in height or the equivalent for containing the coke during the determination of its weight.

5.1.5 *Balance*, sensitive to 0.05 kg (0.1 lb).

6. Sampling at Source

6.1 When the porosity test is desired on run-of-oven coke, the sample shall be collected from the coke wharf.

6.1.1 *By-Product Coke*—About 23 kg (50 lb) of representative pieces of coke shall be selected from the coke wharf for each test. This is best accomplished by dividing the coke on the wharf into approximately equal areas and selecting an equal number of pieces from each area. Each piece of coke selected shall be approximately equal in length to one half of the width of the coke ovens, and shall show a “cauliflower” end produced at the walls of the ovens, and an “inner” end produced at the center of the ovens.

7. Sampling at Delivery

7.1 If the porosity test is desired on coke for furnace or cupola use, the sample shall be representative of the material in question and collected at the place of delivery.

7.1.1 *By-Product*—The sample is best collected as the coke is delivered from the railroad cars into the bins. This can be accomplished by securing a representative sample of 4.5 to 6.8