



Standard Test Method for True Specific Gravity of Refractory Materials by Water Immersion¹

This standard is issued under the fixed designation C 135; 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.

1. Scope

1.1 This test method covers the determination of true specific gravity of refractory materials under prescribed conditions. It is not applicable to materials attacked by water.

1.2 *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 604 Test Method for True Specific Gravity of Refractory Materials by Gas-Comparison Pycnometer²

D 153 Test Methods for Specific Gravity of Pigments³

E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴

3. Significance and Use

3.1 The true specific gravity of a material is the ratio of its true density, determined at a specific temperature, to the true density of water, determined at a specific temperature. Thus, the true specific gravity of a material is a primary property which is related to chemical and mineralogical composition.

3.2 For refractory raw materials and products the true specific gravity is a useful value for: classification, detecting differences in chemical composition between supposedly like samples, indicating mineralogical phases or phase changes, calculating total porosity when the bulk density is known, and for any other test method which requires this value for the calculation of results.

3.3 This test method is a primary standard method which is suitable for use in specifications, quality control, and research and development. It can also serve as a referee test method in purchasing contracts or agreements.

¹ This test method is under the jurisdiction of the ASTM Committee C-8 on Refractories and is the direct responsibility of Subcommittee C08.03 on Physical Tests and Properties.

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² *Annual Book of ASTM Standards*, Vol 15.01.

³ *Annual Book of ASTM Standards*, Vol 06.03.

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

3.4 Fundamental assumptions inherent in this test method are the following:

3.4.1 The sample is representative of the material in general,

3.4.2 The total sample has been reduced to the particle size specified,

3.4.3 No impurity has been introduced during processing of the sample,

3.4.4 The sample itself is not magnetic and all magnetic material introduced during processing of the sample has been removed,

3.4.5 The material is not hydratable or reactive with water, and

3.4.6 The test method has been conducted in a meticulous manner.

3.4.7 Deviation from any of these assumptions negates the usefulness of the results.

3.5 In interpreting the results of this test method it must be recognized that the specified sample particle size does not guarantee that all closed pores have been eliminated. The amount of residual closed pores may vary between materials or even between samples of the same or like materials, and the specified sample particle size is not the same as that specified for Test Method C 604. The values generated by this test method may, therefore, be close approximations rather than accurate representations of true specific gravities. Thus, comparisons of results should only be judiciously made between like materials tested by this test method or with full recognition of potentially inherent differences between the materials being compared or the test method used.

4. Apparatus

4.1 *Analytical Balance*, accurate to 0.1 mg.

4.2 *Pycnometer Bottle*, 50-mL, with ground-joint fitted thermometer and capillary side tube with cap.

4.3 *Vacuum Source*, capable of 0.5 to 1.0 in. (13 to 25 mm) Hg, for use with alternative method (Note 1).

NOTE 1—A suitable alternative evacuation method is described in Test Method D 153.

5. Preparation of Sample

5.1 Extract two pieces of walnut size from different positions in a solid specimen in such a way as to exclude any part of the original exterior surface (skin surface). When an average