Designation: D2638 – 10 (Reapproved 2015)ε1

Standard Test Method for Real Density of Calcined Petroleum Coke by Helium Pycnometer[1]

This standard is issued under the fixed designation D2638; 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.

ε[1] NOTE—Editorial changes were made throughout in December 2015.

1. Scope

1.1 This test method covers the determination of the real density (RD) of calcined petroleum coke. Real density, by definition is obtained when the particle size of the specimen is smaller than 75 µm (U.S. No. 200 Sieve).

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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]

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

D2013 Practice for Preparing Coal Samples for Analysis

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

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4292 Test Method for Determination of Vibrated Bulk Density of Calcined Petroleum Coke

D4930 Test Method for Dust Control Material on Calcined Petroleum Coke

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 *Definitions:*

3.1.1 *calcined petroleum coke, n*—petroleum coke that has been thermally treated to drive off the volatile matter and to develop crystalline structure.

3.1.2 *petroleum coke, n*—a solid, carbonaceous residue produced by thermal decomposition of heavy petroleum fractions or cracked stocks, or both.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *bulk density, n*—the mass of the particles divided by the volume they occupy which includes the space between the particles. Refer to Test Method D4292 for bulk density procedures.

3.2.2 *dedusting material, n*—See Test Method D4930.

3.2.3 *real density, n*—(RD) (also be referred to as true specific gravity). The mass divided by the volume occupied by the material excluding pores and voids. It is required, therefore, that voids in the coke be eliminated and that pores in the material be filled by the fluid being displaced. This requirement is met for the purposes of this test method by reducing the coke particles to a size smaller than 75 µm.

3.2.3.1 *Discussion*—The density of particles larger than 75 µm up to the largest that can be put into the helium pycnometer can also be determined, but must be designated as particle density (PD). The precision data obtained for RD may not be applicable to PD.

4. Summary of Test Method

4.1 A representative sample of calcined petroleum coke is dried and ground to pass a 75 µm (200-mesh) screen. The mass of the sample is determined directly and the volume derived by the volume of helium displaced when the sample is introduced

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.05 on Properties of Fuels, Petroleum Coke and Carbon Material.

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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.