Designation: D5158 – 98 (Reapproved 2013)

Standard Test Method for Determination of Particle Size of Powdered Activated Carbon by Air Jet Sieving[1]

This standard is issued under the fixed designation D5158; 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 the particle size of powdered activated carbons using an air-jet sieve device. For purposes of this test method, powdered activated carbon is defined as activated carbon in particle sizes predominantly smaller than 80 mesh.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

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]

D2652 Terminology Relating to Activated Carbon

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E300 Practice for Sampling Industrial Chemicals

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

3. Terminology

3.1 *Definitions*— Terms relating to this test method are defined in Terminology D2652.

4. Summary of Test Method

4.1 A weighed sample of as-received powdered activated carbon is placed in a test sieve that is inserted in the sieve holder of the air-jet sieve assembly. Air is passed through the sieve from a slowly-rotating nozzle to fluidize the sample for a given period of time. Exit air flow removes undersized particles downward through the test sieve to a collection canister. The amount of carbon retained on the test sieve is weighed and the percent passing the test sieve is computed by difference. For a particle size distribution, the test must be repeated using sieves with different openings.

5. Significance and Use

5.1 The particle size of powdered activated carbon is sometimes used to evaluate filter cake filtration rates and the filter penetration in filtering applications. The selection and handling of powdered activated carbon, and operation of processes using powdered activated carbon, requires the knowledge of the particle size.

NOTE 1—Relative humidity (RH) can affect the repeatability and accuracy of this test. Activated carbon not at equilibrium with the RH of the ambient air may lose or gain weight accordingly, dependent upon whether or not the carbon picks up or loses moisture.

6. Apparatus

6.1 *Air-Jet Sieve Assembly.*

6.2 *Wire Cloth Sieves,* bronze or stainless steel (stainless steel sieves preferred), 200 and 325 mesh, in accordance with Specification E11. The sieves shall be 203 mm (8 in.) in diameter.

6.3 *Brush,* soft bristle.

6.4 *Balance,* with a sensitivity of 1.0 mg.

6.5 *Ultrasonic Bath,* capable of cleaning 203-mm (8-in.) diameter sieves.

7. Sampling

7.1 Activated carbon is not strictly a chemically and physically homogeneous material. To enable performing meaningful tests within the stated tolerances of the ASTM test methods, it is essential that sampling be performed to obtain as representative a sample as possible. When a small amount of sample represents tons of material, the collection, mixing, and preparation of samples is extremely important. The practice described in Practice E300 is suitable to ensure that sampling and

[1] This test method is under the jurisdiction of ASTM Committee D28 on Activated Carbon and is the direct responsibility of Subcommittee D28.02 on Liquid Phase Evaluation.

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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.