Designation: C958 – 92 (Reapproved2007)

Standard Test Method for Particle Size Distribution of Alumina or Quartz by X-Ray Monitoring of Gravity Sedimentation[1]

This standard is issued under the fixed designation C958; 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 distribution of alumina or quartz powders in the range from 0.5 to 50 μm and having a median particle diameter from 2.5 to 10 μm using a sedimentation method. This test method is one of several found valuable for the measurement of particle size. Instruments used for this test method employ a constant intensity X-ray beam that is passed through a sedimenting dispersion of particles.

1.2 The values stated in SI units are to be regarded as the standard. The values 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.* For specific hazard statements, see Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C242 Terminology of Ceramic Whitewares and Related Products

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

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

3. Terminology

3.1 For definitions of terms used in this test method, refer to Terminology C242.

4. Summary of Test Method

4.1 An aqueous homogeneous dispersion of the specimen is permitted to settle in a cell. The decrease in particle concentration over a programmed settling distance is monitored by an X-ray beam passing through the sedimenting dispersion to a detector. The specimen concentration at any given sedimentation distance is inversely proportional to the X-ray flux and the equivalent diameter (spherical) is calculated from Stokes' law.

NOTE 1—Refer to Terminology C242. Most equipment manufacturers refer to this as the equivalent spherical diameter.

5. Apparatus

5.1 *X-Ray Sedimentation Apparatus.*

5.2 *Ultrasonic Probe or Bath*—An ultrasonic probe approximately 13-mm (½-in.) in diameter and approximately 50 to 100 W or an ultrasonic bath of approximately 0.3 W/cm^2 (2 W/in.^{2}).

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[3] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Distilled or Deionized Water* .

6.3 *Dispersing Liquid*—Dissolve 1.0 g/L of reagent grade sodium hexametaphosphate in distilled or deionized water. Discard any remaining solution after six weeks from date of preparation.

7. Hazards

7.1 Precautions applying to the use of low-intensity X-rays should be observed.

[1] This test method is under the jurisdiction of ASTM Committee C21 on Ceramic Whitewares and Related Productsand is the direct responsibility of Subcommittee C21.04 on Raw Materials.

Current edition approved May 1, 2007. Published June 2007. Originally approved in 1992. Last previous edition approved in 2000 as C958–92(2000) DOI: 10.1520/C0958-92R07.

[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.

[3] *Reagent Chemicals, American Chemical Society Specifications,* American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals,* BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary,* U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.