



Standard Test Method for Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders¹

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1. Scope

1.1 This test method covers the determination of the particle size distribution of nonplastic ceramic powders such as alumina, silica, feldspar, pyrophyllite, nepheline syenite, talc, titanates, and zircon using wire-cloth sieves.

1.2 Materials containing a large amount of fines, containing agglomerates, or that are nonfree-flowing, are wet-sieved to remove excessive fines or to disperse agglomerates before performing the test. This technique is not applicable to materials that are, to any degree, water soluble.

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:

C 322 Practice for Sampling Ceramic Whiteware Clays²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes³

3. Significance and Use

3.1 Sieve analyses are carried out to determine the particle size distribution of powders which, in turn, are used to qualify those materials as to their usefulness in the process under consideration. Since particle size analyses have only relative significance, the results should be considered only where they correlate with process characteristics. The parameter that is being measured in this test is the amount of material that will pass through a cloth having theoretically square openings. It must be remembered that all the holes are not square, nor uniform in size, and the question of whether a given particle will go through is a statistical one. Since each particle size analysis method measures a unique physical parameter, the results from one method may not agree with those from another. Particle size distributions play a role in such properties as bulk density, dustiness, and handling characteristics. Care

should be taken, however, when interpretations are made from one or two points (sieves) on the distribution curve.

4. Apparatus

4.1 *Balance*, having a sensitivity of 0.05 g.

4.2 *Sieves*, clean, unblinded, 205 mm (8 in.) in diameter, and conforming to Specification E 11. At all times they shall be certified by, or shall be calibrated with sieves certified by, the National Institute of Standards and Technology. For wet-sieving, use full-height 50-mm (2-in.) sieves; these sieves and pan may be used for dry-sieving also. Half-height 25-mm (1-in.) sieves and pan shall be used for dry-sieving only. The sieves to be used may range from 45 μm (No. 325) through 212 μm (No. 70).

4.3 *Drying Pans*, about 205 mm (8 in.) in diameter and 25 or 50 mm (1 or 2 in.) high.

4.4 *Dryer*—For drying, the use of an oven maintained automatically at 100 to 110°C is recommended.

4.5 *Mechanical Shaking Device*⁴—The shaking device shall be such as to produce a lateral and vertical motion of the sieve, accompanied by a jarring action so as to keep the sample moving continuously over the surface of the sieve.

4.6 In wet-sieving, the water should be slightly above room temperature (for example, a hot-cold mixer tap) and should be supplied by means of a fixed or hand-held spray.

5. Sampling

5.1 *Unit for Sampling*—Each carload shall be considered a unit for sampling.

5.2 *Gross Sample* (See Practice C 322)—In collecting the gross sample from a carload shipped in bags, select a number of bags equivalent to not less than 1 % of the total number of bags in the car. Bags taken for sampling shall be from locations evenly distributed, horizontally and vertically, throughout the car. The gross sample shall consist of equal increments of not less than 227 g (0.5 lbs) from each of the bags taken for sampling. In collecting the gross sample from a carload shipped in bulk, take equal increments of not less than 227 g each from points well distributed both horizontally and vertically.

5.3 *Test Sample*—Obtain the test sample, of not less than 110 g, by mixing the gross sample and then riffing or hand

¹ This method is under the jurisdiction of ASTM Committee C-21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.07 on Nonplastics.

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² *Annual Book of ASTM Standards*, Vol 15.02.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ The Tyler Ro-Tap mechanical shaking device, available from W.S. Tyler Co., Inc., Gastonia, NC 28053-9065 and major scientific supply houses, or equivalent, has been found satisfactory for this purpose.