



Designation: D 1511 – 00

Standard Test Method for Carbon Black—Pellet Size Distribution¹

This standard is issued under the fixed designation D 1511; 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 pellet size distribution of carbon black.

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.*

2. Referenced Documents

2.1 ASTM Standards:

D 1799 Practice for Carbon Black—Sampling Packaged Shipments²

D 1900 Practice for Carbon Black—Sampling Bulk Shipments²

D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries²

D 5817 Practice for Carbon Black, Pelleted-Reduction and Blending of Gross Samples²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes³

3. Significance and Use

3.1 The variation in the size of the pellets may relate to the level of dispersion and to the ease of handling. Due to the many other variables that influence dispersion and handling, the significance of pellet size must be determined by the user.

4. Apparatus

4.1 Riffle Sample Splitter as specified in D 5817.

4.2 Balance with a sensitivity of 0.1 g.

4.3 *Sieves*—U.S. Standard Sieves or equivalent, conforming to Specifications E 11. Sieve Nos. 10, 18, 35, 60, and 120, having openings respectively of 2000, 1000, 500, 250, and 125 μm, shall be used. The sieves shall be 25 mm (1 in.) in height and 200 mm (8 in.) in diameter.

4.4 Bottom receiver pan and top sieve cover.

4.5 *Sieve Shaker*—Any equipment that will vibrate or shake a stack of sieves in a manner that will allow the pellets to separate into size fractions without excessive pellet breakage. The following three types of shakers have been found satisfactory for determining the pellet size distribution of pelleted carbon black.

4.5.1 *Mechanical Sieve Shaker*⁴—The Ro-Tap Siever imparts a uniform rotary and tapping motion to a stack of sieves as described in 4.3. The shaker machine shall be powered with an electric motor producing 181 to 183 rads/s (1725–1750 r/min). This will produce 140 to 160 raps/min and 280 to 320 rotary motions/min. The cover plate shall be fitted with a cork stopper that shall extend 3–9 mm ($\frac{1}{8}$ to $\frac{3}{8}$ in.) above the metal recess. Materials other than cork, such as rubber or wood, are unacceptable. The height of the RoTap hammer shall be set at 3.30 cm $\pm$ 0.15 cm (1–5/16 in $\pm$ 1/16 in).

4.5.2 *Vibratory Siever*⁵—The Retch/Brinkmann Vibratory Siever AS200 has variable timer and amplitude settings. When set at 3 minutes and 0.5 amplitude, the vibratory siever provides satisfactory results. The siever accommodates a stack of sieves as described in 4.3.

4.5.3 *Automatic Sieve Shaker*⁶—The Gradex 2000 automatically performs all of the required steps including the weighing of the sample and the individual fractions retained on each sieve. The equipment consists of a balance, autoseed system, electric motor that imparts a uniform rotary motion, pneumatically operated rods to provide the tapping action, and computer and software to record and perform analyses. Shake time of 1 minute provides satisfactory test results. The test sieves are described in 4.3.

NOTE 1—Top sieve cover is not needed for the Gradex 2000.

NOTE 2—The Gradex is supplied with one standard tapping rod. It is recommended that two additional tapping rods be installed to provide additional tapping action.

5. Sampling

5.1 Lot samples shall be taken in accordance with Practices D 1799 or D 1900.

¹ This test method is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.51 on Carbon Black Pellet Properties.

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² *Annual Book of ASTM Standards*, Vol 09.01.

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

⁴ The Ro-Tap Siever is available from WS Tyler, 8570 Tyler Blvd., Mentor, OH 44060, Ph. 1-800-321-6188.

⁵ The Retsch/Brinkmann Vibratory Siever AS200 is available from Brinkmann Instruments, Inc., One Cantiague Rd., Westbury, NY 11590, Ph. 1-800-645-3050.

⁶ The Gradex 2000 is available from Rotex, Inc., 1230 Knowlton Street, Cincinnati, OH 45223, Ph. 1-513-541-1236.