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Standard Test Method for Carbon Black, Pelleted—Pellet Attrition¹

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1. Scope

1.1 This test method covers the determination of pellet attrition of pelleted carbon black.

1.2 The values stated in SI units are to be regarded as the standard. The values 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 1508 Test Method for Carbon Black, Pelleted—Fines Content²
- D 1511 Test Method for Carbon Black—Pellet Size Distribution²
- 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. Summary of Test Method

3.1 A test sample of carbon black is placed on a 125- μ m sieve and shaken in a mechanical sieve shaker for 5 min to remove the fines (see Test Method D 1508). The same test sample is shaken for an additional 15 min to determine the amount of pellet breakdown or attrition created during this additional shake interval. The attrition is expressed in percent.

4. Significance and Use

4.1 The attrition of carbon black gives some indication as to the amount of fines that may be expected to be created by pellet breakdown in conveying and handling or in a bulk shipment while in transit.

5. Apparatus

5.1 Mechanical Sieve Shaker.⁴

5.2 Sieves, six 125 μ m (U.S. Standard No. 120), having a 200 mm (8 in.) diameter and 25 mm (1 in.) height, or equivalent, conforming to Specification E 11.

5.3 Sieve Separator Receivers, five.

5.4 Sieve Cover.

5.5 Bottom Receiver Pan.

5.6 Riffle Sample Splitter.

5.7 Small Scoop or Large Spoon.

5.8 Balance, 0.1-g sensitivity.

6. Sampling

6.1 Samples shall be taken in accordance with Practices D 1799 and D 1900.

6.2 Practice D 5817 shall be used for reduction and blending of samples.

7. Procedure

7.1 Stack the sieves in the following order from bottom to top: Bottom receiver, 125- μ m sieve, separator receiver, 125- μ m sieve, and four additional separator receivers and sieves, alternately placed and with the cover placed on the top sieve.

7.2 Weigh 25.0 g of test sample, being careful to dip approximately 25 g of material from the sample pan of the riffle sample splitter.

NOTE 1—It is not good practice to weigh-out the sample by pouring it directly out of the splitter container since the fines and small pellets will tend to remain in the container while the large pellets pour out first.

7.3 Transfer each test sample to an individual 125- μ m sieve.

NOTE 2—Six different test samples may be tested when all six sets of sieves are used.

7.4 Complete the assembly with the cover and transfer to the shaker. Tighten the stack in the shaker to eliminate any looseness.

7.5 Start the shaker and allow to shake for 5 min with the hammer operating.

7.6 Remove the sieve assembly and discard the black retained on each receiver.

NOTE 3—If the 5 min fines in Test Method D 1508 is to be determined in addition to the attrition, weigh the carbon black retained on each receiver to the nearest 0.1 g and then discard this portion.

7.7 Reassemble the sieves and transfer the stack back to the shaker and shake for an additional 15 min.

¹ This test method is under the jurisdiction of ASTM Committee D-24 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 A Ro-Tap sieve shaker is satisfactory for this purpose. For a description of this apparatus refer to Test Method D 1511.