



Standard Test Method for Rubber Compounding Materials—Determination of Particle Size Distribution of Recycled Vulcanizate Particulate Rubber¹

This standard is issued under the fixed designation D 5644; 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 recycled vulcanizate particulate rubber products.

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 1566 Terminology Relating to Rubber²

D 5603 Classification for Rubber Compounding Materials—Recycled Vulcanizate Particulate Rubber²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes³

E 105 Practice for Probability Sampling of Materials³

3. Terminology

3.1 Definitions:

3.1.1 *parent compound, n*—original compound used in the product.

3.1.2 *recycled vulcanizate particulate rubber, n*—recyclable vulcanizate rubber that has been processed to give particulates or other forms of different shapes, sizes, and size distributions.

3.1.2.1 *Discussion*—The words “vulcanizate” and “vulcanized” are interchangeable. Additional terminology associated with this classification can be found in Terminology D 1566.

4. Significance and Use

4.1 The particulate size distribution of vulcanizate particulate rubber is used for the purpose of assigning a product mesh size designation.

4.2 The product designation for mesh size is based on the size designation screen which allows a range for the upper limit

retained of maximum 5 % for up to 850 μm (20 mesh) particles and maximum 10 % for finer than 850 μm. No rubber particles shall be retained on the top (zero) screen (see 6.3, 6.4, and Note 1).

5. Apparatus

5.1 *Mechanical Sieve Shaker*⁴—This is a mechanically operated sieve shaker that imparts a uniform rotary and tapping motion to a stack of 200-mm (8-in.) sieves in accordance with 5.2. The sieve shaker should be adjusted to accommodate a stack of sieves, receiver pan, and cover plate. The bottom stops should be adjusted to give a clearance of 1.5 mm (0.06 in.) between the bottom plate and the screens so that the screens will be free to rotate. The sieve shaker machine shall be powered with an electric motor operating 28.75 to 29.17 Hz (1725 to 1750 rpm). This will produce 2.33 to 2.60 Hz and 280 to 320 rotary motions/min. The cover plate shall be fitted with a cork stopper that shall extend from 3.00 to 9.00 mm (0.118 to 0.354 in.) above the metal recess. At no time shall a rubber, wood, or other material other than cork be permitted.

5.2 *Standard Sieves*, stainless steel or brass, 200 mm (7.9 in.) in diameter conforming to Specification E 11. The sieve set should include a lid and a bottom pan.

5.3 *Balance*, with a sensitivity of 0.1 g.

5.4 *Brush*.

5.4.1 A Tyler Model 1778-SB soft brass wire brush for cleaning sieves 100 mesh and coarser.

5.4.2 A nylon bristle brush for cleaning sieves finer than 100 mesh.

5.5 *Jar*, capacity of 500 cm³ (1 pint) with large opening.

5.6 *Rubber Balls*,⁵ with a diameter from 25 mm (1 in.) to 50 mm (2 in.). Enough balls are needed to have two balls per sieve.

5.7 *Talcum Powders*, usually some mixture of magnesium silicate, silica, magnesium oxide, magnesium—aluminum silicate with at least 90 % of the particles being less than 40 μm (approximately 400 mesh) in size.

¹ This test method is under the jurisdiction of ASTM Committee D-11 on Rubber and is the direct responsibility of Subcommittee D11.26 on Recycled Rubber.

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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 Sieve Shaker meets the specified conditions and has been found satisfactory for this purpose, and is available from many scientific laboratory suppliers.

⁵ Available from various sieve manufacturing suppliers.