



Standard Test Method for Rubber Additives—Wet Sieve Analysis of Powdered Rubber Chemicals¹

This standard is issued under the fixed designation D 5461; 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 describes a procedure for the qualitative evaluation of aggregate size and aggregate size distribution of powdered rubber accelerators and other compounding materials which are insoluble in water.

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 problems, 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. Terminology

2.1 Definitions:

2.1.1 *aggregate*—a cluster of individual particles making up the mass of the material.

2.1.2 *aggregate size distribution*—the distribution of aggregates obtained by passing wetted rubber chemicals through stacked sieves of known mesh which are arranged in order of decreasing size.

3. Summary of Test Method

3.1 A sample of powdered rubber chemical is wetted with a dilute aqueous solution of soap and defoamer. The sample is transported by water flow through stacked sieves arranged in order of decreasing mesh size. The material retained on the face of each sieve is dried in an oven. The dry mass of retained material is obtained for each sieve. The percent retained material is calculated on the basis of original sample mass. Individual masses and percentages are summed to evaluate the aggregate size distribution for the sample.

4. Significance and Use

4.1 This test method is used to evaluate the suitability of powdered rubber chemicals, particularly accelerators, for use in rubber compounds that require very small particle clusters to

achieve a uniform cross-linked network. This test method is intended to be used to ensure that no excessively large particles are present that would result in network “flaws” and to determine that the powdered product follows a typical pattern of size distribution.

4.2 In view of the inherent variability in this type of method, it is recommended that the results be used only in a semi-quantitative sense; that is, comparisons within a laboratory or relative comparisons of samples against reference samples, or both.

5. Apparatus

5.1 *Standard Sieves*, stainless steel, 200 mm (approximately 8 in.) diameter containing selected stainless steel wire cloths with openings in the range of 45 to 250 μm . (This corresponds to 325 to 60 mesh sieves.)

NOTE 1—If the 200 mm diameter sieves are not available, the smaller 76 mm diameter sieves can be used. In this case, the sample mass should be reduced from 50 to 10 g.

5.2 *Analytical Balance*, 150 g capacity, 1.0 mg sensitivity.

5.3 *Convection Oven*, controlled at $70 \pm 2^\circ\text{C}$. For low melting materials, the oven temperature should be set 10°C below the melting point.

5.4 *Aluminum Weighing Dishes*, disposable, 55 to 60 mm diameter, approximately 1 g mass.

5.5 *No. 6 Stiff Bristle Artist Brush*, having 10 to 45 mm long bristles.

6. Reagents and Materials

6.1 *Detergent*, sodium alkylbenzenesulfonate (SABS), 40 % active or equivalent.

6.2 *Silicone Defoamer*,² water soluble.

6.3 *Soap Solution*, prepared by adding 100 g of SABS and 200 cm^3 silicone defoamer to 20 dm^3 water.

7. Procedure

7.1 Place the soap solution in a suitable carboy on a shelf or stand over a sink and discharge the solution from the bottom of the container through 6 mm (0.25 in.) rubber tubing connected to a bottom outlet. A pinch-clamp serves as a control valve.

¹ This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.11 on Chemical Analysis.

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² Dow-Corning FG-10 silicone defoamer, available from Dow-Corning, Midland, MI, or equivalent has been found suitable for this purpose.