



## Designation: D502 – 89 (Reapproved 2023)

# Standard Test Method for Particle Size of Soaps and Other Detergents<sup>1</sup>

This standard is issued under the fixed designation D502; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the determination of the particle size of soaps and other detergents by hand sieving and machine sieving methods.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D460 Test Methods for Sampling and Chemical Analysis of Soaps and Soap Products \(Withdrawn 2023\)](#)<sup>3</sup>

[D501 Test Methods of Sampling and Chemical Analysis of Alkaline Detergents](#)

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

## 3. Significance and Use

3.1 This test method assures that the particle size of soaps and detergents conforms to specifications having to do with

density and packaging, among others. It also offers a means of controlling the amount of potentially hazardous very low particle size material.

## 4. Sieves

4.1 The sieves shall conform to Specification [E11](#).

## 5. Sampling

5.1 Sample soaps in accordance with Test Methods [D460](#).

5.2 Sample other detergents in accordance with Test Methods [D501](#).

## 6. Procedure Using Hand-Sieving Method

6.1 Use a nest of clean, dry sieves consisting of a No. 12 (1700  $\mu\text{m}$ ), No. 40 (425  $\mu\text{m}$ ), and a No. 100 (150  $\mu\text{m}$ ) sieve. Other size sieves may be used when required by the individual specifications. Transfer a 100 g  $\pm$  0.1 g well-mixed sample without previous drying to the top sieve. Simultaneously shake the sieves by hand with occasional tapping of the edge of the bottom sieve on a large rubber stopper or a flat, thick piece of rubber. When the portion of the soap passing through the bottom sieve (No. 100) is less than 0.1 g/min of shaking (this can be well judged by sifting into a large, dark colored pan) remove the top sieve and shake separately over a clean, dark pan to be certain that no more of the residue will pass through. Place any material passing through the largest sieve on the next size sieve, using a small camel's hair brush to remove the material from the catch pan. Repeat the same procedure of sifting successively with each sieve used. Carefully weigh the portions retained on each sieve and the portion passing the smallest sieve.

6.2 Duplicate particle size determinations shall be made and the average of the two tests used in the calculations.

## 7. Procedure Using Machine-Sieving Method

7.1 Use a nest of clean dry sieves consisting of a No. 12 (1700  $\mu\text{m}$ ), No. 40 (425  $\mu\text{m}$ ), and a No. 100 (150  $\mu\text{m}$ ) sieve. Other size sieves may be used when required by the individual specifications. Transfer a 100 g  $\pm$  0.1 g well-mixed sample, without previous drying, to the top sieve. Place the nest of sieves in a mechanically operated sieve shaker and allow the machine to run for 10 min. Carefully weigh the portions retained on each sieve, and the portion passing the smallest sieve.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D12](#) on Soaps and Other Detergents and is the direct responsibility of Subcommittee [D12.12](#) on Analysis and Specifications of Soaps, Synthetics, Detergents and their Components.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

7.2 Duplicate particle size determinations shall be made and the average of the two tests used in the calculations.

## 8. Calculation

8.1 Calculate the percentage of material retained on the No. 12 (1700  $\mu\text{m}$ ) sieve by dividing the weight of the residue on the sieve by the original weight of the sample and multiplying by 100.

8.2 Calculate the percentage of the material retained on the No. 40 (425  $\mu\text{m}$ ) sieve by adding the weight of the residue retained on the No. 12 (1700  $\mu\text{m}$ ) sieve to the weight of the residue on the No. 40 sieve, dividing the sum by the original weight of the sample, and multiplying by 100.

8.3 Calculate the percentage of the material retained on the No. 100 (150  $\mu\text{m}$ ) sieve by adding the weight of the residues retained on all three sieves, dividing the sum by the weight of the original sample, and multiplying by 100.

## 9. Precision and Bias

9.1 Because of the nature and the wide variety of materials being tested, this test method is not amenable to the generation of precision and bias data. However, the test method continues to be used and referenced.

## 10. Keywords

10.1 particle size; sieves; soap

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