



Standard Test Method for Sieve Analysis of Mineral Filler for Bituminous Paving Mixtures¹

This standard is issued under the fixed designation D 546; 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.

This standard has been approved for use by agencies of the Department of Defense.

^{ε1} NOTE—A research report was added editorially in October 1999.

1. Scope *

1.1 This test method covers the sieve analysis of mineral fillers used in bituminous paving mixtures.

1.2 The values stated in SI units are to be regarded as the 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials²

C 702 Practice for Reducing Samples of Aggregate to Testing Size²

D 242 Specification for Mineral Filler for Bituminous Paving Mixtures³

D 422 Test Method for Particle-Size Analysis of Soils³

E 11 Specification for Wire-Cloth and Sieves for Testing Purposes⁴

3. Significance and Use

3.1 The method is used to determine compliance of mineral fillers with the grading requirements of Specification D 242.

4. Apparatus

4.1 *Balance or Scale*, sensitive to 0.05 g and accurate to ± 0.05 g with a capacity of 200 g.

4.2 *Sieves*, conforming to Specification E 11 with nominal opening sizes of 75- μm (No. 200), 300- μm (No. 50), and 600- μm (No. 30) sieves.

4.3 *Oven*—An oven of sufficient size, capable of maintaining a uniform temperature of $110 \pm 5^\circ\text{C}$ ($230 \pm 9^\circ\text{F}$).

5. Test Sample

5.1 Obtain the sample for test in accordance with the requirements of Specification D 242 and reduce to testing size in accordance with Practice C 702. Use a minimum of 100 g of dry material for each sieve analysis.

6. Procedure

6.1 Dry the test sample to constant mass at a temperature of $110 \pm 5^\circ\text{C}$ ($230 \pm 9^\circ\text{F}$) and determine the mass to the nearest 0.05 g.

6.2 After drying and determining the mass, place the test sample on the 600- μm (No. 30) sieve, which shall be nested above the 300- μm (No. 50) and 75- μm (No. 200) sieves. Wash the material by means of a stream of water from a faucet (Note 1). Continue the washing until the water coming through the sieve is clear (Note 2). Dry the residue from each sieve to constant mass at a temperature of $110 \pm 5^\circ\text{C}$ ($230 \pm 9^\circ\text{F}$) (Note 3). Calculate the mass of material retained on each sieve as a percentage of the original sample.

NOTE 1—A spray nozzle or a piece of rubber tubing attached to a water faucet may be used for the washing. The velocity of the water, which may be increased by pinching the tubing, must be controlled to prevent loss of any of the sample by splashing over the sides of the sieves.

NOTE 2—Take care to avoid accumulation of water on the 75- μm (No. 200) sieve, because it may become clogged and the operation cannot be completed within a reasonable period.

NOTE 3—Some material passes the 75- μm (No. 200) sieve on dry sieving that did not pass during the washing operation. When desired, additional information may be obtained by dry sieving the portion of the sample retained on the 75- μm (No. 200) sieve, in accordance with Test Method D 422.

¹ This test method is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.51 on Aggregate Tests.

Current edition approved Jun. 10, 1999. Published August 1999. Originally issued as D 546 – 39 T. Last previous edition D 546 – 94.

² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.08.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

*A Summary of Changes section appears at the end of this standard.

TABLE 1 Average Precision

Precision	Test Result Value, % in Size Fraction ^A	Standard Deviation, (1s), % ^B	Acceptable Range of Test Results, (d2s), % ^B
Single Operator	Less than 2	0.14	0.5 ^C
	More than 2	0.7	2.0
Multilaboratory	Less than 2	0.17	0.5
	More than 2	1.0	2.8

^A The percent between consecutive sieves, or percent retained on the largest sieve, 600- μ m (No. 30), or percent passing the smallest sieve, 75- μ m (No. 200).

^B These numbers represent, respectively, the (1s) and (d2s) limits as described in Practice C 670.

^C The minimum d2s is 0.5 % in this case since results of the test are expressed to the nearest 0.5 %.

7. Report

7.1 Report the results of the sieve analysis as the total percentage passing each sieve, expressed to the nearest 0.5 %.

8. Precision and Bias ⁵

8.1 *Precision*—The estimates of precision for this test method are shown in Table 1. They are based on results of an interlaboratory testing program where replicable samples of four different mineral fillers were tested in 20 laboratories

using this test method. The materials tested ranged from a coarse mineral filler, that had about 93 % passing the 600- μ m (No. 30) sieve and 51 % passing the 75- μ m (No. 200), to finer mineral fillers that had about 99 % passing the 300- μ m (No. 50) sieve and 95 % passing the 75- μ m (No. 200) sieve.

8.2 *Bias*—Research to determine the bias of this test method has not been conducted. Therefore, no statement on bias is made.

9. Keywords

9.1 bituminous paving mixtures; grading; mineral filler; sieve analysis

⁵ A research report is available from ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Request RR: D04-1017.

SUMMARY OF CHANGES

This section identifies the location of changes to this Test Method that have been incorporated since the last issue. Committee D-4 has highlighted those changes that affect the technical interpretation or use of this Test Method.

(1) The use for the mineral filler was changed from “road and paving materials” in the title and scope.

(2) Minor rephrasing of the text was done in 4.2, 6.1, 6.2, 8.1, 8.2, 9.1, and Note 1, Note 2, and Note 3.

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