



## Standard Test Method for Determining the Adherent Coating on Coarse Aggregates<sup>1</sup>

This standard is issued under the fixed designation D 5711; 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 is used to determine the adherent coating on coarse aggregate (aggregate retained on the 2.36-mm (No. 8) sieve) for the following purposes:

1.1.1 Preliminary investigation of mineral aggregate sources.

1.1.2 Control of mineral aggregates used in hot mix asphalt (HMA) pavements, seal coats, cover coats, surface treatments, cold mix asphalt, and portland cement concrete at the source of supply.

1.1.3 Control of mineral aggregate processing requirements.

1.1.4 Acceptance or rejection of aggregates based on adherent coating.

1.2 The values shown 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.*

NOTE 1—This test method is modeled after Federal Land Highways T 512-94.

### 2. Referenced Documents

2.1 *ASTM Standards:*

C 117 Test Method for Material Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing<sup>2</sup>

C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates<sup>2</sup>

C 702 Practice for Reducing Samples of Aggregate to Testing Size<sup>2</sup>

D 75 Practice for Sampling Aggregates<sup>3</sup>

D 448 Classification for Sizes of Aggregate for Road and Bridge Construction<sup>3</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.51 on Aggregate Tests.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.02.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.03.

E 11 Specification for Wire-Cloth Sieves for Testing Purposes<sup>4</sup>

### 3. Terminology

3.1 *Definitions:*

3.1.1 *adherent coating, n*—fine particles smaller than 75- $\mu$ m (No. 200) that stick (adhere) to the coarse aggregate particles.

3.1.2 *coarse aggregate, n*—aggregate predominately retained on the 2.36-mm (No. 8) sieve.

### 4. Summary of Test Method

4.1 A sample of dry aggregate is separated on the 2.36-mm (No. 8) sieve. The mass of the material coarser than the 2.36-mm (No. 8) sieve is determined and the material is washed over a 75- $\mu$ m (No. 200) sieve. After drying, the mass of the sample is again determined and compared to the original sample mass. The difference in the masses is determined and calculated as a percentage of the original mass and reported as adherent coating.

### 5. Significance and Use

5.1 This test method assigns a measurable value to the amount of fine material adhering to the aggregate.

### 6. Apparatus

6.1 *Balances*—Balances or scales readable to 0.1 g and accurate to 0.1 g or 0.1 % of the test load, whichever is greater, at any point within the range of use.

6.2 *Sieves*—37.5-mm (1.5-in.), 25-mm (1-in.), 19-mm (¾-in.), 12.5-mm (½-in.), 9.5-mm (⅜-in.), 4.75-mm (No. 4), 2.36-mm (No. 8), and 75- $\mu$ m (No. 200) in accordance with the requirements of Specification E 11.

6.3 *Mechanical Sieve Shaker*—A mechanical sieve shaker shall impart a vertical, or lateral and vertical, motion to the sieve, causing the particles thereon to bounce and turn so as to present different orientations to the sieving.

NOTE 2—Tyler Rotap, Soiltest model CL-305A and Rainhart 637 (“Maryann”) shakers have been found to be acceptable.<sup>5</sup> Others that

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 14.02.

<sup>5</sup> Available from W. S. Tyler, 3200 Bessemer City Road, Box 8900, Gastonia, NC 28053, and Soiltest Inc., 86 Albrecht Dr., P.O. Box 8004, Lake Bluff, IL 60044-8004.

provide comparable results to these models are also acceptable.

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

## 7. Sampling

7.1 Sample the aggregate in accordance with Practice D 75.

7.2 Thoroughly mix the sample and reduce it to an amount suitable for testing, using the applicable procedures described in Practice C 702. The sample for testing shall be approximately the mass desired when dry and shall be the end result of the reduction. Reduction to an exact predetermined mass is not permitted.

7.3 The mass of the test sample shall be in accordance with Table 1.

**TABLE 1 Weight of Test Sample**

Nominal Maximum Size Square Openings (mm)	Test Sample Mass Minimum (kg)	Test Sample Mass Maximum (kg)
37.5 (1.5 in.)	15	18
25.0 (1 in.)	10	12
19.0 (¾ in.)	5	7
12.5 (½ in.)	2	3
9.5 (⅜ in.)	1	2

## 8. Procedure

8.1 Dry the sample to constant mass at a temperature of  $110 \pm 5^\circ\text{C}$  ( $230 \pm 9^\circ\text{F}$ ). Conduct a sieve analysis of the aggregate in accordance with Test Method C 136, using the 37.5-mm (1.5-in.), 25-mm (1-in.), 19-mm (¾-in.), 12.5-mm (½-in.), 9.5-mm (⅜-in.), 4.75-mm (No. 4), and 2.36-mm (No. 8) sieves.

8.2 Discard all material passing the 2.36-mm (No. 8) sieve.

8.3 Determine and record the mass of the total material coarser than the 2.36-mm (No. 8) sieve. ( $W_a$ )

8.4 Determine and record the mass of the material finer than the 75- $\mu\text{m}$  (No. 200) sieve coating the material by washing in accordance with Test Method C 117. (A)

## 9. Calculation

9.1 Calculate the adherent coating on the aggregate as follows:

$$\text{Adherent Coating} = \frac{A(100)}{W_a} \quad (1)$$

where:

A = mass of material passing the 75- $\mu\text{m}$  (No. 200) sieve determined in 8.4, and

$W_a$  = dry mass of aggregate determined in 8.3.

## 10. Report

10.1 Report the adherent coating to the nearest 0.1 %.

## 11. Precision and Bias

11.1 *Precision*—This test method has been extensively modified. New precision data is being developed. The within laboratory repeatability (four repetitions) of this test method, using a Size Number 57 crushed stone (Classification D 448) that typically contains approximately 2.5 % passing the 75- $\mu\text{m}$  (No. 200) sieve, was found to have an average adherent coating test result of 0.85 % with a standard deviation of 0.07 %.

11.2 *Bias*—Since there is no accepted reference material for determining the bias for the procedure in this test method, no statement on bias is made.

## 12. Keywords

12.1 adherent coating; coarse aggregate; sieve analysis

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