



Designation: **D6933—18** **D6933 – 22**

## Standard Test Method for Oversized Particles in Emulsified Asphalts (Sieve Test)<sup>1</sup>

This standard is issued under the fixed designation D6933; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This test method covers the degree to which an emulsified asphalt may contain particles of asphalt or other discrete solids retained on a 850- $\mu$ m mesh sieve.

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 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.4 *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.*

1.5 *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>

- [D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials](#)
- [D7496 Test Method for Viscosity of Emulsified Asphalt by Saybolt Furol Viscometer](#)
- [E1 Specification for ASTM Liquid-in-Glass Thermometers](#)
- [E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

### 3. Significance and Use

3.1 The retention of an excessive amount of particles on the sieve indicates that problems may occur in handling and application of the material. Particles of asphalt retained on the sieve are often caused by agglomeration of the dispersed phase. Storage, pumping, handling, and temperature can all contribute to the formation of particles. Contamination from the tank, transport, or hose are other factors affecting particle formation.

NOTE 1—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the

<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 D04.42 on Emulsified Asphalt Test.

Current edition approved Dec. 15, 2018; May 1, 2022. Published January 2019; May 2022. Originally approved in 2004. Last previous edition approved in 2013 as D6933—13; D6933 – 18. DOI: 10.1520/D6933-18; 10.1520/D6933-22.

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

capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Specification **D3666** are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Specification **D3666** alone does not completely ensure reliable results. Reliable results depend on many factors; following the suggestions of Specification **D3666** or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

#### 4. Sample Conditioning for Testing

4.1 All emulsified asphalts shall be properly stirred to achieve homogeneity before testing.

4.2 All emulsified asphalts with viscosity testing requirements of 50 °C shall be heated to 50 ± 3 °C in the original sample container in a water bath or oven. The container should be vented to relieve pressure. After the sample reaches 50 ± 3 °C, stir the sample to achieve homogeneity.

4.3 Emulsified asphalts with viscosity testing requirements of 25 °C should be mixed or stirred at 25 ± 3 °C in the original sample container to achieve homogeneity.

NOTE 2—Emulsified asphalts with viscosity testing requirements of 25 °C may be heated and stirred as specified in 4.2, if necessary. In the event the 4.2 method is used, the sample should be cooled to 25 ± 3 °C before testing.

#### 5. Apparatus and Reagents

5.1 *Sieve*—A sieve having a nominal 76-mm frame conforming to Specification **E11**, and having a 850-µm wire sieve cloth.

5.2 *Pan*—A tin box cover or shallow metal pan of appropriate size to fit over the bottom of the standard sieve.

5.3 *Thermometric Device*—ASTM 17C for tests at 25 °C and ASTM 19C for tests at 50 °C, conforming to the requirements of Specification **E1**, or any other thermometric device of equal accuracy.

5.4 *Nonionic Surfactant Solution (1 %)*—1 g of nonionic surfactant (ethoxylated nonylphenol is recommended) dissolved in distilled water and diluted to 100 mL.

5.5 *Distilled or Deionized Water*.

5.6 *Balances*—Capable of weighing 2000 g to within ±1 g, and 500 g to within ±0.1 g.

5.7 *Oven*—Capable of maintaining temperature of 110 ± 5 °C.

5.8 *Desiccator*.

#### 6. Hazards

6.1 **Warning**—Mercury has been designated by the United States Environmental Protection Agency (EPA) and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product [Safety Data Sheet \(SDS\)](#) or Material Safety Data Sheet (MSDS) for details and the EPA's website ([www.epa.gov/mercury/faq.htm](http://www.epa.gov/mercury/faq.htm)) for additional information. Users should be aware that selling mercury, mercury-containing products, or both, in your state may be prohibited by state law.

#### 7. Procedure

7.1 The temperature at which the sieve test shall be performed is related to the emulsified asphalt's viscosity. For those materials whose viscosity in Saybolt Furol seconds as determined by Test Method **D7496** is 100 s or less at 25 °C, perform the test at ambient temperature. For those materials whose viscosity is more than 100 s at 25 °C and those whose viscosity is specified at 50 °C, use a test temperature of 50 ± 3 °C.

7.2 Determine the mass of the sieve and pan to the nearest 0.1 g and record this mass as “A.” Wet the wire cloth with nonionic surfactant solution.

7.3 Determine the mass of the sample container containing the emulsified asphalt to 0.1 g. Record this mass as “C.” Pour 800 to 1000 g of the emulsified asphalt through the sieve (if the sample container contains 800 to 1000 g of sample, pour the entire contents). Determine the mass of the sample container previously containing the emulsified asphalt to 0.1 g. Record this mass as “D.” Wash the residue on the sieve with distilled water or deionized water until the washings run clear.

7.4 Place the pan under the sieve and heat for 2 h in a  $110 \pm 5$  °C drying oven. Cool in a desiccator. Determine the mass of the sieve, pan, and residue to the nearest 0.1 g. Record this mass as “B.”

## 8. Calculation

8.1 Calculate the percentage of sample retained on the sieve as follows:

$$\text{Oversized Particles, \%} = [(B - A)/(C - D)] \cdot 100 \quad (1)$$

where:

- A* = mass of sieve and pan, g,
- B* = mass of sieve, pan, and residue,
- C* = mass of full sample container, g, and
- D* = mass of empty sample container, g.

## 9. Report

9.1 Report the percentage by mass of material retained on the sieve (residue).

## 10. Precision and Bias

10.1 The following criteria should be used for judging the acceptability of results (95 % probability):

NOTE 3—The precision data shown here was determined using 1000-g samples.

10.1.1 Duplicate results by the same operator should not be considered suspect unless they differ by more than the following amount:

Sieve Test, mass %  
0 to 0.1

Repeatability, mass %  
0.03

10.1.2 The results submitted by each of two laboratories should not be considered suspect unless they differ by more than the following amount:

Sieve Test, mass %  
0 to 0.1

Reproducibility, mass %  
0.08

10.1.3 Data is based on historical information prior to ASTM ILS, so no report number can be submitted, because it cannot be found.

10.2 The bias of this test method cannot be determined because no material having an accepted reference value is available.

## 11. Keywords

11.1 asphalt; asphalt emulsion; cationic emulsified asphalt; emulsified asphalt; oversized particles; sieve test