



Standard Test Method for Solubility of Asphalt Binders in Toluene by Centrifuge¹

This standard is issued under the fixed designation D 5546; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers determination of the degree of solubility of asphalt binders in toluene using centrifugal separation. The method is an alternative to Test Method D 2042, and may be preferable to Test Method D 2042 when testing modified asphalt binders.

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 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:

D 36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)²

D 96 Test Methods for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)³

D 2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene⁴

3. Summary of Test Method

3.1 The sample is dissolved in toluene and centrifuged to separate the insoluble material. The insoluble material is dried and weighed.

4. Significance and Use

4.1 This test method is a measure of the solubility of polymer-modified asphalt in toluene. The portion that is soluble in toluene represents the active cementing constituents. Additional tests to characterize the insoluble residue may be conducted. Such tests might include infrared spectroscopy, microscopy, ash content, and so forth.

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.47 on Miscellaneous Asphalt Tests.

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² *Annual Book of ASTM Standards*, Vol 04.04.

³ Discontinued. See *2000 Annual Book of ASTM Standards*, Vol 05.01.

⁴ *Annual Book of ASTM Standards*, Vol 04.03.

5. Apparatus and Materials

5.1 Centrifuge:

5.1.1 A centrifuge with a swinging bucket rotor capable of spinning two or more filled centrifuge tubes shall be used. The centrifuge shall be capable of delivering a minimum relative centrifugal force (RCF) of 700 at the tip of the tubes, and maintaining this RCF for a minimum of 10 min.

5.1.2 The revolving head, trunnion rings, and trunnion cups, including the cushions, shall be constructed soundly to withstand the maximum centrifugal force capable of being delivered by the power source. The trunnion cups and cushions shall support the tubes firmly when the centrifuge is in motion. The centrifuge shall be enclosed by a metal chamber strong enough to eliminate danger if any breakage occurs. The centrifuge chamber shall be isolated from potential ignition sources.

5.2 *Centrifuge Tubes*—For referee testing, each centrifuge tube shall be a 203-mm cone-shaped tube conforming to the dimensions given in Fig. 1. For routine quality assurance testing, alternate centrifuge tubes may be used. Alternate centrifuge tubes shall have a cone shaped bottom, a length between 150-210 mm, and a nominal capacity of 100 ml. All centrifuge tubes shall be made of thoroughly annealed glass and shall be marked at the 100-ml level.

NOTE 1—Centrifuge tubes meeting the requirements of Test Methods D 96 are widely available, and are suitable for use in this test. The 203-mm centrifuge tubes described in D 96 are suitable for referee testing. The 167-mm centrifuge tubes described in D 96 are suitable for routine quality-assurance testing.

5.3 *Erlenmeyer Flask*—A 125-mL Erlenmeyer flask shall be used.

5.4 *Oven*—An explosion-proof, ventilated oven capable of maintaining a temperature of $130 \pm 5^\circ\text{C}$ shall be used to dry the insoluble material.

5.5 *Balance*—A balance or scale with a capacity of 100 g or higher, sensitive to 0.1 mg and accurate within 0.1 % of the load.

NOTE 2—Static electricity may cause unstable mass measurements, due in part to the characteristics of the glass centrifuge tubes. This problem can be minimized by mounting a passive ion source inside the balance draft shield. Passive ion sources are available from electronic balance manufacturers, distributors and service companies.

6. Reagent

6.1 Toluene, reagent grade.