



# Standard Specification for Chemically Modified Asphalt Cement for Use in Pavement Construction<sup>1</sup>

This standard is issued under the fixed designation D 6154; 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 specification covers asphalt cements that have been modified by the addition of a chemical gellant. It was developed to provide a reference for specifying chemically modified asphalt cement and reflects the properties of currently available commercial products. The tests are intended to measure degree of modification not performance characteristics. This is not intended to be a performance-based specification.

1.2 Chemically modified asphalt cements are normally produced by addition of a chemical stabilizer. However, any asphalt modifier may be used which will give the required test results when blended with the desired asphalt.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 The following precautionary statement pertains to the test method portion only, Section 5, of this specification: *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 5 Test Method for Penetration of Bituminous Materials<sup>2</sup>

D 36 Test Method for Softening Point of Bitumens (Ring and Ball Apparatus)<sup>3</sup>

D 92 Test Method for Flash and Fire Point by Cleveland Open Cup<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.45 on Modified Asphalt Specifications.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.03.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.04.

<sup>4</sup> Annual Book of ASTM Standards, Vol 05.01.

D 140 Practice for Sampling Bituminous Materials<sup>2</sup>

D 1754 Test Method for Effect of Heat and Air on Asphaltic Materials (Thin Film Oven Test)<sup>2</sup>

D 2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene<sup>2</sup>

D 4957 Test Method for Apparent Viscosity of Asphalt Emulsion Residues and Non-Newtonian Bitumens by Vacuum Capillary Viscometer<sup>2</sup>

## 3. Materials and Manufacture

3.1 The asphalt cement used to prepare the chemically modified asphalt cement shall be prepared by the refining of crude petroleum by suitable methods.

## 4. Physical Properties

4.1 The chemically modified asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 180°C.

4.2 The chemically modified asphalt cement shall conform to the requirements of Table 1.

## 5. Methods of Sampling and Testing

5.1 Sample and test the chemically modified asphalt cement in accordance with the following methods:

5.1.1 *Sampling*—See Practice D 140.

5.1.2 *Penetration*—See Test Method D 5.

5.1.3 *Viscosity at 60°C*—See Test Method D 4957.

5.1.4 *Viscosity at 135°C*—See Test Method D 4957.

5.1.5 *Flash Point, Cleveland Open Cup*—See Test Method D 92.

5.1.6 *Solubility in Trichloroethylene*—See Test Method D 2042.

5.1.7 *Softening Point*—See Test Method D 36.

5.1.8 *Thin-Film Oven Test*—See Test Method D 1754.

**TABLE 1 Requirements for Chemically Modified Asphalt Cement**

Test <sup>A</sup>	Grade			
	CM 2.5-10	CM 5-20	CM 10-30	CM 20-40
Viscosity <sup>B,C,D</sup> , 60°C, min, Pa-s, 1 s <sup>-1</sup>	25.0	50.0	100	200
Viscosity <sup>C,E,D</sup> , 135°C, Pa-s, 10 s <sup>-1</sup>	0.2 to 2.0	0.4 to 4.0	0.7 to 6.0	1.0 to 8.0
Penetration, 4°C, 200 g, 60 s, dmm	40 to 100	30 to 65	20 to 45	12 to 35
Penetration, 25°C, 100 g, 5 s, dmm	140 to 185	100 to 140	65 to 100	35 to 65
Flash Point, Cleveland open cup, min, °C	246	246	246	246
Softening Point, min, °C	45	49	53	57
Solubility in trichloroethylene, min, %	99.0	99.0	99.0	99.0
Tests on residue from thin-film oven test:				
Aging Index, max	2.5	2.5	2.5	2.5
Vis. ATFOT/BTFOT				

<sup>A</sup> Handling of all samples for testing shall be in accordance with 7.2 of Test Method D 4957, that requires heating the sample in an oven maintained at 195 ± 2°C. Stir the sample occasionally until homogenous and pour in a suitable container for testing. Pouring temperatures should be 180 ± 5°C on all tests.

<sup>B</sup> Normally run using a No. 200 Modified Koppers Viscometer tube at 300 mm of vacuum.

<sup>C</sup> Normally run using a No. 50 Modified Koppers Viscometer tube at 100 mm of vacuum.

<sup>D</sup> Some test methods report in poise, rather than Pa-s. To convert, multiply poise by 0.1 to equal Pa-s.

<sup>E</sup> The selection of tube size and vacuum should be varied to achieve measurement near the specified shear rate to avoid extrapolation of data.

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