



Designation: **D 5840 – 9500**

## **Standard Specification for Type II Polymer Modified Asphalt Cement for Use in Pavement Construction<sup>1</sup>**

This standard is issued under the fixed designation D 5840; 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 an appropriate polymer for use in pavement construction. It was developed to provide a reference for specifying polymer modified asphalt and reflects the properties of currently available commercial products. The tests are intended to measure compatibility and degree of modification, not performance characteristics. This is not intended to be a performance based specification.

1.2 Type II polymer-modified asphalts are typically made with styrene-butadiene rubber latex or polychloroprene latex. However, any polymer may be used that will give the required test results when blended with the desired asphalt.

### **2. Referenced Documents**

#### *2.1 ASTM Standards:*

D 5 Test Method for Penetration of Bituminous Materials<sup>2</sup>

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

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- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup<sup>3</sup>  
 D 113 Test Method for Ductility of Bituminous Materials<sup>2</sup>  
 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 2170 Test Method for Kinematic Viscosity of Asphalts (Bitumens)<sup>2</sup>  
 D 2872 Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)<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>  
~~P 243 Test~~  
 D 5801 Test Method for Toughness and Tenacity of Bituminous Materials<sup>2</sup>

### 3. Physical Requirements

- 3.1 The polymer modified asphalt cement shall be homogeneous, free from water and shall not foam when heated to 347°F (175°C).  
 3.2 The polymer modified asphalt cement shall conform to the requirements of Table 1.  
 3.3 The polymer modifier and the asphalt cement shall be compatible and pre-blended prior to use.

### 4. Sampling and Test Methods

- 4.1 Sample and test the polymer modified asphalt cement in accordance with the following test methods and practices.  
 4.1.1 *Sampling*—Practice D 140.  
 4.1.2 *Penetration*—Test Method D 5.  
 4.1.3 *Viscosity at 140°F (60°C)*—Test Method D 4957.  
 4.1.4 *Viscosity at 275°F (135°C)*—Test Method D 2170.  
 4.1.5 *Ductility*—Test Method D 113.  
 4.1.6 *Flash Point, Cleveland Open Cup*—Test Method D 92.  
 4.1.7 *Rolling Thin-Film Oven Test*—Test Method D 2872.  
 4.1.8 *Thin-Film Oven Test*—Test Method D 1754.

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

<sup>3</sup> Annual Book of ASTM Standards, Vol 05.01.

**TABLE 1 Physical Property Requirements for Type II Polymer Modified Asphalts**

Designation	II-A		II-B		II-C		II-D	
	Min	Max	Min	Max	Min	Max	Min	Max
Tests on Original Product								
Penetration at 77°F, 100 g, 5 s	400		—70		—85		—80	
Penetration at 77°F (25°C), 100 g, 5 s	100		70		85		80	
Viscosity, 140°F, 1 <sup>s</sup> <sup>-1</sup> , poise	800		1600		800		1600	
Viscosity, 140°F (60°C), 1 <sup>s</sup> <sup>-1</sup> , poise	800		1600		800		1600	
Viscosity, 275°F, cSt	300		—300		300		—300	
Viscosity, 275°F (135°C), cSt	300		300		300		300	
Ductility, 39.2°F, 5 cm/min, cm	—50		—50		—25		—25	
Ductility, 39.2°F (4°C), 5 cm/min, cm	50		50		25		25	
Flash Point, COC, °F	450		—450		450		—450	
Flash Point, COC, °F (°C)	450 (232)		450		450 (232)		450	
Toughness, 77°F, 20 in./min, in.-lb	—75		—110		—75		—110	
Toughness, 77°F (25°C), 20 in./min (51 cm/min), in.-lb (mN-m)	75		110		75		110	
Tenacity, 77°F, 20 in./min, in.-lb	—50		—75		—50		—75	
Tenacity, 77°F (25°C), 20 in./min (51 cm/min), in.-lb (mN-m)	50		75		50		75	
Tests on Aged Residue <sup>A</sup>								
Ductility, 39.2°F, 5 cm/min, cm	—25		—25		—10		—10	
Ductility, 39.2°F (4°C), 5 cm/min, cm	25		25		10		10	
Viscosity, 140°F, 1 <sup>s</sup> <sup>-1</sup> , poise		4000		8000		4000		8000
Viscosity, 140°F (60°C), 1 <sup>s</sup> <sup>-1</sup> , poise		4000		8000		4000		8000
Toughness, 77°F, 20 in./min, in.-lb					—75		—100	
Toughness, 77°F (25°C), 20 in./min (51 cm/min), in.-lb (mN-m)					75		100	
Tenacity, 77°F, 20 in./min, in.-lb					—50		—75	
Tenacity, 77°F (25°C), 20 in./min (51 cm/min), in.-lb (mN-m)					50		75	

<sup>A</sup> The thin-film oven test or the rolling thin-film test may be used.

4.1.9 *Toughness and Tenacity*—~~Proposed Test~~—Test Method P 243  
D 5801.

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