



Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers asphalt cement for use in the construction of pavements.

1.2 This specification covers the following penetration grades:

40–50,	120–150, and
60–70,	200–300.
85–100,	

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

- D5 Test Method for Penetration of Bituminous Materials
- D36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- D113 Test Method for Ductility of Bituminous Materials

¹ This specification is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.40 on Asphalt Specifications.

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² 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.

- D140 Practice for Sampling Bituminous Materials
- D1754 Test Method for Effects of Heat and Air on Asphaltic Materials (Thin-Film Oven Test)
- D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

3. Manufacture

3.1 Asphalt cement shall be prepared by the refining of crude petroleum by suitable methods.

4. Properties

4.1 The asphalt cement shall be homogeneous and shall not foam when heated to 175°C [350°F].

4.2 The asphalt cement shall conform to the requirements given in Table 1 or Table 2, as specified by the purchaser. Table 2 requirements limit the temperature susceptibility of asphalt over Table 1 requirements. Asphalts that meet Table 2 requirements will also meet Table 1 requirements of the same grade.

5. Methods of Sampling and Testing

5.1 The material shall be sampled and the properties enumerated in this specification shall be determined in accordance with the following ASTM methods:

- 5.1.1 *Sampling*—Practice D140.
- 5.1.2 *Penetration*—Test Method D5.
- 5.1.3 *Softening Point*—Test Method D36.
- 5.1.4 *Flash Point*—Test Method D92.
- 5.1.5 *Ductility*—Test Method D113.
- 5.1.6 *Thin Film Oven Test*—Test Method D1754.
- 5.1.7 *Solubility in Trichloroethylene*—Test Method D2042.

6. Keywords

- 6.1 asphalt cement; pavement; penetration

TABLE 1 Requirements for Asphalt Cement for Use in Pavement Construction

	Penetration Grade									
	40–50		60–70		85–100		120–150		200–300	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Penetration at 25°C [77°F], 100 g, 5 s	40	50	60	70	85	100	120	150	200	300
Flash point, °C [°F] (Cleveland open cup)	230 [450]	...	230 [450]	...	230 [450]	...	220 [425]	...	175 [350]	...
Ductility at 25°C [77°F], 5 cm/min, cm	100	...	100	...	100	...	100	...	100 ^A	...
Solubility in trichloroethylene, %	99.0	...	99.0	...	99.0	...	99.0	...	99.0	...
Retained penetration after thin-film oven test, %	55 +	...	52 +	...	47 +	...	42 +	...	37 +	...
Ductility at 25°C [77°F], 5 cm/min, cm after thin-film oven test test	50	...	75	...	100	...	100 ^A	...

^AIf ductility at 25°C [77°F] is less than 100 cm, material will be accepted if ductility at 15°C [60°F] is 100 cm minimum at the pull rate of 5 cm/min.

TABLE 2 Requirements for Penetration Graded Asphalt Cement

	Penetration Grade									
	40–50		60–70		85–100		120–150		200–300	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Penetration at 25°C [77°F], 100 g, 5 s	40	50	60	70	85	100	120	150	200	300
Softening Point, °C [°F]	49 [120]	...	46 [115]	...	42 [108]	...	38 [100]	...	32 [90]	...
Flash point, °C [°F], (Cleveland open cup)	230 [450]	...	230 [450]	...	230 [450]	...	220 [425]	...	175 [350]	...
Ductility at 25°C [77°F], 5 cm/min, cm	100	...	100	...	100	...	100	...	100 ^A	...
Solubility in trichloroethylene, %	99.0	...	99.0	...	99.0	...	99.0	...	99.0	...
Retained penetration after thin-film oven test, %	55 +	...	52 +	...	47 +	...	42 +	...	37 +	...
Ductility at 25°C [77°F], 5 cm/min, cm after thin-film oven test test	50	...	75	...	100	...	100 ^A	...

^AIf ductility at 25°C [77°F] is less than 100 cm, material will be accepted if ductility at 15°C [60°F] is 100 cm minimum at the pull rate of 5 cm/min.

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