



# Standard Specification for Penetration-Graded Asphalt Binder for Use in Pavement Construction<sup>1</sup>

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## 1. Scope

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

NOTE 1—For asphalt binders graded by viscosity at 60°C, see Specification [D3381](#). For performance-graded asphalt binder, see Specification [D6373](#).

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*:<sup>2</sup>

- [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](#)
- [D140 Practice for Sampling Bituminous Materials](#)
- [D1754 Test Method for Effects of Heat and Air on Asphaltic Materials \(Thin-Film Oven Test\)](#)

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- [D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene](#)
- [D3381 Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction](#)
- [D6373 Specification for Performance Graded Asphalt Binder](#)
- [D7553 Test Method for Solubility of Asphalt Materials in N-Propyl Bromide](#)

## 3. Manufacture

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

## 4. Properties

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

4.2 The asphalt binder shall conform to the requirements given in [Table 1](#) or [Table 2](#), as specified by the purchaser. If no table is specified, the default shall be [Table 1](#). [Table 2](#) requirements limit the temperature susceptibility of asphalt over [Table 1](#) requirements. Asphalt binders 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](#).
- 5.1.8 *Solubility in N-Propyl Bromide*—Test Method [D7553](#).

## 6. Keywords

- 6.1 asphalt binder; pavement; penetration

**TABLE 1 Requirements for Penetration-Graded Asphalt Binder 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 <sup>A</sup>	...
Solubility, % <sup>B</sup>	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	...	...	50	...	75	...	100	...	100 <sup>A</sup>	...

<sup>A</sup>If 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.

<sup>B</sup>Use Test Method **D2042** or Test Method **D7553**.

**TABLE 2 Requirements for Penetration-Graded Asphalt Binder 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
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 <sup>A</sup>	...
Solubility, % <sup>B</sup>	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	...	...	50	...	75	...	100	...	100 <sup>A</sup>	...

<sup>A</sup>If 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.

<sup>B</sup>Use Test Method **D2042** or Test Method **D7553**.

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