



# Standard Specification for SEBS-Modified Mopping Asphalt Used in Roofing<sup>1</sup>

This standard is issued under the fixed designation D 6152; 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 SEBS (styrene-ethylene-butylene-styrene)-modified asphalt intended for use in built-up roof construction, construction of some modified bitumen systems, construction of bituminous vapor retarder systems, and for adhering insulation boards used in various types of roof systems.

1.2 This standard is intended as a material specification. Issues regarding the suitability of specific roof constructions or application techniques are beyond its scope.

1.3 The specified tests and property values used to characterize SEBS-modified asphalt are intended to establish minimum properties. In place system design criteria or performance attributes are factors beyond the scope of this specification.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *This standard does not purport to address 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 Bitumen (Ring-and-Ball Apparatus)<sup>3</sup>
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup<sup>4</sup>
- D 140 Practice for Sampling Bituminous Materials<sup>2</sup>
- D 312 Specification for Asphalt Used in Roofing<sup>3</sup>
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension<sup>5</sup>
- D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials<sup>3</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D-08 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.03 on Surfacing and Bituminous Materials for Membrane Waterproofing and Builtup Roofing.

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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.

<sup>5</sup> Annual Book of ASTM Standards, Vol 09.01.

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

D 3111 Test Method for Flexibility of Hot-Melt Adhesives by Mandrel Bend Test Method<sup>6</sup>

## 3. Terminology

3.1 *Definitions*— For definitions of general terms used in this specification, refer to Terminology D 1079.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *elastic recovery, n*—the degree to which a material returns to its normal dimensions after being distorted.

3.2.2 *low temperature flexibility, n*—the ability of a material to bend at a prescribed rate around a mandrel of a prescribed diameter at a prescribed low temperature without cracking or breaking.

## 4. Materials and Manufacture

4.1 The base asphalt shall be prepared from crude petroleum.

4.2 The SEBS-modified asphalt shall incorporate sufficient SEBS as the primary polymeric modifier to meet the requirements of this specification.

## 5. Physical Requirements

5.1 The SEBS modified asphalt shall be homogeneous and free of water.

5.2 The SEBS modified asphalt shall conform to the physical properties prescribed in Table 1.

## 6. Sampling

6.1 Sample the material as prescribed in Practice D 140.

6.2 If the material is shipped in hot filled cardboard or plastic kegs, obtain samples from the kegs in accordance with the following procedure:

6.2.1 Remove the container from the block of SEBS-modified asphalt, cutting away the liner if present.

6.2.2 Using a hatchet or a hot knife, cut two vertical wedges approximately 50 mm (2 in.) wide and 50 mm (2 in.) deep along the entire length of the material block. Cut the wedges into 100-mm (4-in.) lengths.

6.2.3 Place the wedges in a can with a capacity of 3.8 L (1 gal). Loosely cover the can and heat in a convection oven at  $210 \pm 5^\circ\text{C}$  ( $410 \pm 9^\circ\text{F}$ ) for a period of  $2\frac{1}{2} \pm \frac{1}{2}$  h. Stir the sample thoroughly to ensure homogeneity.

<sup>6</sup> Annual Book of ASTM Standards, Vol 15.06.

**TABLE 1 Physical Requirements of SEBS-Modified Asphalt Used in Roofing<sup>A</sup>**

Property	Min	Max
Softening point, °C (°F)	85 (185)	116 (240)
before and after heat exposure		
Softening point change, °C (°F)	-5 (-9)	5 (9)
after heat exposure		
Flash point, °C (°F)	260 (500)	...
Penetration, units at 25°C (77°F)	20	60
before and after heat exposure		
Penetration change, units at 25°C (77°F)	-5	12
after heat exposure		
Solubility in trichloroethylene, %	99	...
Tensile elongation, %, at 25°C (77°F)	750	...
Elastic recovery, %	80	...
Low temperature flexibility, pass at °C (°F)	...	-7 (20)

<sup>A</sup> The properties in this table are "as manufactured" unless otherwise noted.

## 7. Test Methods

7.1 Determine compliance with the requirements of this specification in accordance with the following methods:

7.1.1 *Softening Point*— Test Method D 36.

7.1.2 *Flash Point*— Test Method D 92.

7.1.3 *Penetration*— Test Method D 5.

7.1.4 *Solubility*—Test Method D 2042.

7.1.5 *Tensile Elongation*—Test Method D 412.

7.1.6 *Low Temperature Flexibility*—Test Method D 3111.

7.1.7 *Elastic Recovery*— Test Method D 412.

7.2 Specimens for tensile elongation, elastic recovery, and low temperature flexibility shall be cut from a molded or hot poured plaque  $2.00 \pm 0.15$  mm ( $0.079 \pm 0.006$  in.) thick.

7.2.1 The following simple procedure may be used for preparing a hot poured plaque. Heat the asphalt to  $210 \pm 5^\circ\text{C}$  ( $410 \pm 9^\circ\text{F}$ ) in a convection oven. While heating, place two metal strips of the thickness stated above along the sides of a piece of release paper. Pour the heated SEBS-modified asphalt onto the release paper, immediately cover with another piece of release paper, then roll out with a rolling pin, piece of pipe, etc., using the metal strips as guides to maintain proper specimen thickness.

7.3 Determine tensile elongation as prescribed by Test Method D 412 using die C. The test shall be made at  $23.0 \pm 2.0^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) and with a speed of  $500 \pm 25$  mm/min ( $20 \pm 1$  in./min).

7.4 Determine low temperature flexibility as prescribed by Test Method D 3111 using a  $25 \pm 1$ -mm ( $1.00 \pm 0.04$ -in.) diameter mandrel. The specimens shall be  $2.00 \pm 0.15$  mm ( $0.079 \pm 0.006$  in.) thick.

7.5 Determine elastic recovery using the tensile set procedure as prescribed by Test Method D 412 using die C. The test shall be made at  $23.0 \pm 2.0^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) and with a speed of  $500 \pm 25$  mm/min ( $20 \pm 1$  in./min). Elongate the specimen 300 %, then immediately release the lower jaw to allow recovery. Record elastic recovery as follows:

$$\text{Recovery, \%} = 100(4L-X)/3L \quad (1)$$

where:

$L$  = initial length between benchmarks, and

$X$  = length between benchmarks after recovery.

7.6 Determine high temperature stability by conditioning the specimen as prescribed in Section 8. Determine the softening point of the specimen as prescribed by Test Method

D 36. The softening point of the specimen shall not change by more than  $10^\circ\text{C}$ . Determine the penetration of the specimen as prescribed by Test Method D 5. The penetration of the specimen shall not change by more than 12 units. The softening point and penetration of the SEBS-modified asphalt shall remain within the specification limits after conditioning.

## 8. Stability During Heat Exposure

### 8.1 Scope:

8.1.1 The stability of SEBS-modified asphalt is evaluated by the retention of softening point and penetration after heat exposure. The heat exposure shall be conducted for 8 h at  $260 \pm 5^\circ\text{C}$  ( $500 \pm 9^\circ\text{F}$ ).

8.1.2 This procedure may require heating asphalt to a temperature in excess of its flash point. Take care to provide adequate ventilation and to avoid ignition sources.

### 8.2 Apparatus:

8.2.1 *Can*—Use a lidded can with a capacity of 0.95 L (1 qt) and capable of withstanding a temperature of  $300^\circ\text{C}$  ( $572^\circ\text{F}$ ). The can shall not be coated or lined with a material that will react with asphalt at  $300^\circ\text{C}$  ( $572^\circ\text{F}$ ).

### 8.3 Procedure:

8.3.1 In a convection oven heat the SEBS-modified asphalt to  $210 \pm 10^\circ\text{C}$  ( $410 \pm 18^\circ\text{F}$ ) and pour  $500 \text{ g} \pm 50 \text{ g}$  into a 0.95 L (1 qt) can. Place the lid loosely on the can.

8.3.2 Immediately place the can in a convection oven preheated to  $260 \pm 5^\circ\text{C}$  ( $500 \pm 9^\circ\text{F}$ ). Maintain the convection oven at this temperature for  $8 \text{ h} \pm 5 \text{ min}$ .

8.3.3 Cool the SEBS-modified asphalt to a temperature suitable for pouring softening point and penetration test specimens.

8.3.4 Stir the SEBS-modified asphalt before pouring to ensure homogeneity.

## 9. Inspection

9.1 Inspection of the material shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

## 10. Rejection and Resubmittal

10.1 Failure to conform to any of the requirements prescribed in the specification shall constitute grounds for rejection. In case of rejection, the seller shall have the right to reinspect the rejected material and resubmit the lot after removal of those packages not conforming to the requirements.

## 11. Packaging and Package Marking

11.1 The SEBS-modified asphalt shall be packaged suitably, if not shipped in bulk, to permit acceptance by the carrier and to afford adequate protection from the normal hazards of handling and shipping.

11.2 Each container (or bill of lading if shipped in bulk) shall be marked plainly with the name of the manufacturer or seller, the ASTM designation and type of product, the flash point, and the manufacturer's recommended application temperature for mop and mechanical spreader application.

## 12. Keywords

12.1 asphalt; built-up roof construction; modified bitumen roof construction; mopping asphalt; SEBS

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