



# Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements<sup>1</sup>

This standard is issued under the fixed designation D 6163; 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 prefabricated modified bituminous sheet materials with glass fiber reinforcement, with or without granules, which use styrene butadiene styrene (SBS) thermoplastic elastomer as the primary modifier and are intended for use in the fabrication of multiple ply roofing and waterproofing membranes.

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

1.3 The specified tests and property limits used to characterize the sheet materials are intended to establish minimum properties. In-place roof system design criteria, such as fire resistance, field strength, impact/puncture resistance, material compatibility, uplift resistance, and others, are factors beyond the scope of this material 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.

## 2. Referenced Documents

### 2.1 ASTM Standards:

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials<sup>2</sup>

D 5147 Test Methods for Sampling and Testing Modified Bituminous Sheet Materials Used in Roofing and Waterproofing<sup>2</sup>

## 3. Terminology

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

3.1.1 *elongation at 5 % of maximum load, n*—the elongation measured on the load-elongation curve at which point the load has dropped to 5 % of its maximum value.

## 4. Classifications

4.1 Modified bituminous sheet materials reinforced with

glass fiber, Type I, Type II and Type III are covered by this specification.

4.2 The following grades are used to describe the material surfacing:

4.2.1 Grade *G*—Granule surfaced.

4.2.2 Grade *S*—Smooth surfaced.

## 5. Material and Manufacture

5.1 In the process of manufacture, the reinforcement is impregnated and coated on both sides with an SBS modified bituminous coating. The SBS modified bituminous coating shall be permitted to be compounded with a mineral stabilizer.

5.2 The Grade *G* sheet is surfaced on the weather side with mineral granules, except for any selvage. To prevent sticking in the roll, the reverse side and any selvage shall be permitted to be covered with a fine mineral surfacing or any other surfacing that will not interfere with adhesion or bonding of the lap during application.

5.3 Sheet material intended for application by heat welding (torching) shall meet the minimum bottom coating requirement found in Table 1.

## 6. Physical Properties

6.1 The sheet shall conform to the minimum physical properties prescribed in Table 2.

6.2 The finished product shall not crack nor be so sticky as to cause tearing or other material damage upon being unrolled at any product temperature between 4 and 60°C (40 and 140°F).

## 7. Dimensions, Mass, and Permissible Variations

7.1 The finished product shall conform to the following dimensions and variations:

7.1.1 The width of the roll shall be as agreed between the purchaser and the seller and shall not vary more than 1 %.

7.1.2 The area of the roll shall be no less than as agreed between the purchaser and the seller.

7.1.3 The selvage width shall be within 6.4 mm ( $\frac{1}{4}$  in.) of the nominal selvage width and shall be not less than 76.2 mm (3 in.) in width without a laying line and 63.5 mm (2.5 in.) in width if the sheet has a laying line. If a laying line is provided, the line must not be less than 76.2 mm (3 in.) from the edge of the sheet.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.04.

**TABLE 1 Dimensions and Masses of SBS Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements**

Description	Type I	Type II	Type III
Thickness, min, mm (mils),			
Grade S	2.0 (80)	2.0 (80)	2.0 (80)
Grade G	2.4 (95)	2.7 (105)	3.0 (120)
Net mass/unit area, min, g/m <sup>2</sup> (lbs/100 ft <sup>2</sup> )			
Grade S	2197 (45)	2197 (45)	2197 (45)
Grade G	3173 (65)	3661 (75)	3661 (75)
Bottom coating thickness, heat welding application products, min, mm (mils)			
Grade S	1.0 (40)	1.0 (40)	1.0 (40)
Grade G	1.0 (40)	1.0 (40)	1.0 (40)

**TABLE 2 Physical Properties of SBS Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements<sup>A</sup>**

Property	Type I Grade: G and S	Type II Grade: G and S	Type III Grade: G and S
Maximum load at $-18 \pm 2^\circ\text{C}$ ( $0 \pm 3.6^\circ\text{F}$ ), MD and XMD, min, before and after heat conditioning, lbf/in. (kN/m)	12.3 (70)	26.25 (150)	32 (180)
Elongation at $-18 \pm 2^\circ\text{C}$ ( $0 \pm 3.6^\circ\text{F}$ ), MD and XMD, min, at maximum load, before and after heat conditioning, (%)	1	2	2
Maximum load at $23 \pm 2^\circ\text{C}$ ( $73.4 \pm 3.6^\circ\text{F}$ ), MD and XMD, min, before and after heat conditioning, lbf/in. (kN/m)	5.3 (30)	14 (80)	26 (150)
Elongation at $23 \pm 2^\circ\text{C}$ ( $73.4 \pm 3.6^\circ\text{F}$ ), MD and XMD, min, at maximum load, before and after heat conditioning, (%)	2	4	3
Elongation at 5% of maximum load $23 \pm 2^\circ\text{C}$ ( $73.4 \pm 3.6^\circ\text{F}$ ), MD and XMD, min, (%)			
as manufactured:	3	40	2
after heat conditioning:	3	20	2
Tear strength at $23 \pm 2^\circ\text{C}$ ( $73.4 \pm 3.6^\circ\text{F}$ ), min, lbf (N)	156 (35)	489 (110)	934 (210)
Low temperature flexibility, max, before and after heat conditioning, $^\circ\text{C}$ ( $^\circ\text{F}$ )	-18 (0)	-18 (0)	-15 (5)
Dimensional stability, max, (%)	0.5	0.5	0.5
Compound stability at $102^\circ\text{C}$ ( $215^\circ\text{F}$ )	no failures	no failures	...
Compound stability at $91^\circ\text{C}$ ( $195^\circ\text{F}$ )	...	...	no failures
Granule embedment, g, (max) (Grade G only)	2	2	2

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

7.2 The mass and thickness of the finished product shall be as prescribed in Table 1.

## 8. Workmanship, Finish, and Appearance

8.1 The finished product shall be coated completely in a continuous, unbroken film and shall be free of such defects as holes, tears, cracks, wrinkles, or permanent deformations, blisters, ragged or untrue edges, and areas of uncoated reinforcement.

8.2 The surface of the weather side shall be uniform in finish and texture.

8.3 For Grade G material, the mineral granules shall be distributed uniformly over the entire surface in an even layer excluding any selvage, shall be embedded firmly in the SBS modified bituminous coating, and the line of demarcation

between the granule-surfaced portion of the weather side and any selvage shall be straight and parallel to the edges of the sheet.

8.4 When unrolled on a smooth plane, the sheet shall be straight and true so that the lap will mate with the adjacent sheet within the tolerance for the lap without wrinkles, buckles, or fishmouths.

## 9. Sampling and Test Methods

9.1 Sample the material and determine the properties described in this specification in accordance with Test Methods D 5147, unless otherwise indicated.

9.2 *Elongation at 5 % of Maximum Load*—Sample the material and determine the elongation at  $23 \pm 2^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) in accordance with Test Methods D 5147 (Section 6)

and as defined in 3.1.1.

## 10. Inspection

10.1 *Inspection*—Inspection shall be in accordance with the requirements of this specification.

10.2 *Inspection Alternatives*—Alternative inspection requirements shall be determined by and as agreed upon between the purchaser and supplier.

## 11. Rejection and Resubmittal

11.1 *Failure to Conform*—Failure to conform to any of the requirements as stated in this specification constitutes grounds for rejection.

11.2 *Rejection Redress*—The supplier shall have the right to inspect the rejected materials. The supplier and the purchaser shall agree to the quantity of rolls deemed unacceptable. The supplier shall then have the right to submit the same number of new rolls as replacement.

## 12. Packaging and Package Marking

12.1 The finished material shall be furnished as rolls. The rolls shall be wrapped securely to prevent shifting of material and to permit normal handling. If a roll contains a manufacturing splice, the splice shall be marked clearly; no roll shall contain more than one splice or two pieces.

12.2 Unless otherwise agreed upon by the supplier and purchaser, each product package shall be marked plainly with the supplier's name, the product name, the ASTM designation including type and grade, the net coverage, and the type of bitumen if not evident in the label name of the product.

## 13. Keywords

13.1 glass fiber reinforcement; modified bituminous sheet; styrene butadiene styrene (SBS); thermoplastic elastomer

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