



Designation: D6223/D6223M – 21

# Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements<sup>1</sup>

This standard is issued under the fixed designation D6223/D6223M; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This specification covers prefabricated modified bituminous sheet materials reinforced with a combination of polyester fabric and glass fiber, with or without granules, that use atactic polypropylene (APP) 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 specific roof constructions or application techniques are beyond the scope of this specification.

1.3 The specified tests and property limits used to characterize the sheet materials covered by this specification 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, the need for field applied coatings, and others, are factors beyond the scope of this material specification.

1.4 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 nonconformance with the standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**D1079 Terminology Relating to Roofing and Waterproofing**  
**D5147/D5147M Test Methods for Sampling and Testing Modified Bituminous Sheet Material**

**D5636/D5636M Test Method for Low Temperature Unrolling of Felt or Sheet Roofing and Waterproofing Materials**

## 3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to Terminology **D1079**.

## 4. Classification

4.1 Type I and II modified bituminous sheet materials reinforced with a combination of polyester fabric and glass fiber reinforcements are covered by this specification (see **Table 1**).

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

4.2.1 *Grade G*—Granule surfacing.

4.2.2 *Grade S*—Smooth surfacing.

## 5. Material and Manufacture

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

5.2 *Grade G* materials are 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

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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.

**TABLE 1 Physical Properties of APP-Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements<sup>A</sup>**

Property	Type I	Type II
Peak load at 23 ± 2 °C [73.4 ± 3.6 °F] MD and XMD, before and after heat conditioning, min, kN/m [lbf/in.]	11.4 [65]	17.5 [100]
Elongation at 23 ± 2 °C [73.4 ± 3.6 °F] MD and XMD, before and after heat conditioning, at peak load, min, %	3	3
Peak load at -18 ± 2 °C [0 ± 3.6 °F] MD and XMD, min, kN/m [lbf/in.]	26.3 [150]	35 [200]
Elongation at -18 ± 2 °C [0 ± 3.6 °F] MD and XMD, at peak load, min, %	3	3
Tear Strength at 23 ± 2 °C [73.4 ± 3.6 °F], min, N [lbf]	533 [120]	800 [180]
Low-temperature flexibility, before and after heat conditioning, max, °C [°F]	0 [32]	0 [32]
Dimensional stability, max, %	1	1
Compound stability, min, °C [°F]	110 [230]	110 [230]
Granule embedment, max loss, grams (Grade G only)	2	2
Water absorption, max, %	3.2	3.2
Moisture content, max, %	1	1
Low-temperature unrolling, max, °C [°F]	5 [41]	5 [41]

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

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 To prevent sticking in the roll, any selvage will be surfaced with mineral or other surfacing material which will not interfere with adhesion or bonding during application.

## 6. Physical Properties

6.1 The sheet shall conform to the minimum physical properties prescribed in [Table 1](#).

6.2 The finished product shall not crack or 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 upon between the purchaser and the supplier and shall not vary more than 1 %.

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

7.1.3 The selvage width shall be within 6 mm [ $\frac{1}{4}$  in.] of the nominal selvage width and shall be not less than 76 mm [3 in.] in width from the width edge of the sheet.

7.2 The mass and thickness of the finished product shall be as prescribed in [Table 2](#).

**TABLE 2 Dimensions and Mass of APP-Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements<sup>A</sup>**

Property	Type I	Type II
Thickness, min, mm [mils], Grade S	3.5 [140]	3.5 [140]
Grade G	4.0 [160]	4.0 [160]
Net mass per unit area, min., g/m <sup>2</sup> [lbs/100 ft <sup>2</sup> ] Grade S	3662 [75]	3662 [75]
Grade G	4394 [90]	4394 [90]
Bottom side coating thickness, min, mm [mils], Grade S	1 [40]	1 [40]
Grade G	1 [40]	1 [40]

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

## 8. Workmanship, Finish, and Appearance

8.1 The finished product shall be completely coated 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 products, mineral granules shall be uniformly distributed over the entire surface of the sheet in an even layer, excluding any selvage, and shall be firmly embedded in the APP-modified bituminous coating. 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 selvage will mate with an 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 [D5147/D5147M](#), unless otherwise indicated.

9.2 *Ultimate Elongation*—See Test Methods [D5147/D5147M](#), Section 6.

9.3 *High-Temperature Stability*—Sample the material and determine the high-temperature stability in accordance with Test Methods [D5147/D5147M](#), Section 15, and as described herein. Report the highest test temperature at which flowing, dripping, or drop formation does not occur. Materials may be tested in 5.5 °C [10 °F] increments.

9.4 *Low-Temperature Unrolling*—Sample the material and determine the low-temperature unrolling in accordance with Test Methods [D5636/D5636M](#), and as described herein. Report the lowest test temperature at which none of the specimens show cracking or surface rupture. The temperature at or below which the product must pass is stated in [Table 1](#).