



Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements¹

This standard is issued under the fixed designation D 6223; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

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 inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials²

D 5147 Test Methods for Sampling and Testing Modified Bituminous Sheet Material²

D 5636 Test Method for Low Temperature Unrolling of Felt or Sheet Roofing and Waterproofing Materials²

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this specification, refer to Terminology D 1079.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *elongation at 5 % of maximum load*—the elongation measured on the load–elongation curve at which point the load has dropped to 5 % of its maximum value.

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 may 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 may be covered with a thin polyolefin film or with other surfacing that will not interfere with adhesion or bonding of the sheet 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 40 and 140°F (4 and 60°C).

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

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² *Annual Book of ASTM Standards*, Vol 04.04.

TABLE 1 Physical Properties of APP Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements^A

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

^A The properties in this table are "as manufactured" unless otherwise noted.

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 ¼ in. (6 mm) of the nominal selvage width and shall be not less than 3 in. (76 mm) 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^A

Property	Type I	Type II
Thickness, min, mils (mm), Grade S	140 (3.5)	140 (3.5)
Grade G	160 (4.0)	160 (4.0)
Net mass per unit area, min., lbs/100 ft ² (g/m ²) Grade S	75 (36.6)	75 (36.6)
Grade G	90 (43.9)	90 (43.9)
Bottom side coating thickness, min, mils (mm), Grade S	40 (1)	40 (1)
Grade G	40 (1)	40 (1)

^A 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 D 5147 unless otherwise indicated.

9.2 *Elongation at 5 % of Maximum Load*—Sample the material and determine the elongation at 5 % of maximum load at 73.4 ± 3.6°F (23 ± 2°C) in accordance with Test Methods D 5147, Section 6, and as defined in 3.2.

9.3 *High Temperature Stability*—Sample the material and determine the high temperature stability in accordance with Test Methods D 5147, 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 10°F (5.5°C) increments.

9.4 *Low Temperature Unrolling*—Sample the material and determine the low temperature unrolling in accordance with Test Methods D 5636, 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.

10. Rejection and Resubmittal

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

10.2 *Rejection Redress*—The supplier shall have the right to inspect the rejected materials. The supplier shall then have the right to submit the same number of new rolls as replacements.

11. Packaging and Package Marking

11.1 Unless otherwise agreed upon by the purchaser and supplier, each product package shall be plainly marked with the supplier's name, the product brand, 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.

11.2 The rolls shall be securely wrapped or banded in a manner that completely encircles the roll and will prevent slipping or unrolling.

11.3 No roll shall contain more than two pieces, and no

more than 3 % of the rolls in any lot shall contain two pieces. If a roll contains a manufacturing splice, the splice shall be clearly marked.

12. Keywords

12.1 atactic polypropylene (APP); glass fiber reinforcement; modified bituminous sheet; polyolefin film; polyester reinforcement

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