Designation: D7067 – 05

StandardSpecification for Reinforced White PIB Sheet Used in Roofing Membrane[1]

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1. Scope

1.1 This specification covers white reinforced non-vulcanized polymeric sheet made from polyisobutylene (PIB) intended for use as a single-ply roof membrane exposed to the weather. The sheet shall be reinforced with fiber or fabric.

1.1.1 The polymers used in these sheets have thermoplastic characteristics at time of installation.

1.2 The tests and property limits used to characterize these sheets are minimum values.

1.2.1 In-place roof systems design criteria such as fire resistance, field seaming strength, impact/puncture resistance, material compatibility, and uplift resistance, among others, are factors that must be considered, but are beyond the scope of this specification.

1.3 The following precautionary caveat pertains to the test methods portion only, Section 8, of this specification: *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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D413 Test Methods for Rubber Property—Adhesion to Flexible Substrate

D471 Test Method for Rubber Property—Effect of Liquids

D518 Test Method for Rubber Deterioration—Surface Cracking (Withdrawn 2007)[3]

D751 Test Methods for Coated Fabrics

D1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting

D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment

D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

D2136 Test Method for Coated Fabrics—Low-Temperature Bend Test

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Classification

3.1 The following type is used to identify the principal polymeric component of the coating portion of the sheet:

3.1.1 *Type I*—Polyisobutylene (PIB).

3.2 The following grade describes the sheet construction:

3.2.1 *Grade 1*—Backed with fibers.

3.3 A general description of reinforcing/backing material including the type of fiber used and the weight per unit area of the reinforcing or backing material shall be provided, upon request.

4. Materials and Manufacture

4.1 The coating shall be white in color and formulated from polyisobutylene and other compounding ingredients. The principal polymer used in the coating shall be a minimum of 75 % in relation to the total polymer present.

4.2 The sheet shall be capable of being bonded to itself to make watertight field splices and repairs. The manufacturer or supplier shall recommend bonding methods and materials.

5. Physical Properties

5.1 Table 1 contains physical property requirements that shall be met.

5.2 Table 2 contains property values for the coating portion on the weather side of the sheet. (When requested, the manufacturer shall provide a sample of the coating used on the

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

TABLE 1 Physical Properties of the Backed Sheet

Property thickness, min, mm (in.)	2.0 (0.080)
Breaking strength, min, N (lbf)	710 (160)
Elongation, min, %	35
Tearing strength, min, N (lbf)	89 (20)
Low temperature bend	Pass
Linear dimensional change, max, %	0.5
Fabric adhesion, min, N/m (lbf/in.), width	1750 (10)
Hydrostatic resistance, min, kPa (psi)	1200 (175)
Ozone resistance, no cracks (7× magnification)	Pass
Weather resistance, no cracks or crazing (7× magnification)	Pass

TABLE 2 Physical Properties of the Coating Portion on the Weather Side of the Sheet (No Backing)

Property tensile strength, min, MPa (psi)	4.7 (680)
Elongation, min, %	470
Tear resistance, min, kN/m (lbf/in.)	15.8 (100)
Ozone resistance, no cracks	Pass
Water absorption, max, mass, %	0.2

weathering side of the supplied sheet at the thickness applied during manufacture, for testing purposes.) See 8.2.

6. Dimensions, Mass, and Permissible Variations

6.1 The width and length of the sheet shall be agreed upon between the purchaser and the supplier.

6.1.1 The width and length tolerance shall be + 3, −0 %.

6.2 Sheet thickness specified greater than the minimum shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

6.2.1 The thickness tolerance shall be +15, −10 % of the specified nominal thickness. In no case shall the total sheet thickness be less than the minimum listed in Table 1. The minimum thickness of coating on Grade 1 sheets (backed with fibers) shall not be less than 50 mm (0.020 in.). (See Annex A1 for method of thickness measurement for coating on weather side of sheet.)

7. Workmanship, Finish, and Appearance

7.1 The sheet, including factory seams if present, shall be watertight and visually free of pinholes, particles of foreign matter, undispersed raw material, or other manufacturing defects that might affect serviceability.

7.2 Edges of the sheet shall be straight and flat to permit seaming to one another without fishmouthing.

8. Test Methods

8.1 *Backed Sheet,* see Table 1.

8.1.1 *Dimensions*—In accordance with Test Methods D751, after unrolling or unfolding and permitting the sheet to relax at 23 ± 2°C (73 ± 4°F) for 1 h minimum.

8.1.2 *Breaking Strength and Elongation*—In accordance with Test Methods D751, grab method.

8.1.3 *Tearing Strength*—In accordance with Test Methods D751, tongue tear method, 200 mm (8 in.) minimum by 200 mm (8 in.) minimum specimen size.

8.1.4 *Low-Temperature Bend*—In accordance with Test Method D2136, at −40 ± 2°C (−40 ± 4°F).

8.1.5 *Linear Dimensional Change*—In accordance with Test Method D1204, 1 h minimum at 100 ± 2°C (212 ± 4°F).

8.1.6 *Fabric Adhesion*—In accordance with Test Methods D751; 5.0 mm/s (12 in./min.) jaw speed.

8.1.7 *Ply Adhesion*—In accordance with Test Methods D413, Machine Method, Type A specimens; 0.85 mm/s (2 in./min.) jaw speed.

8.1.8 *Hydrostatic Resistance*—In accordance with Test Methods D751, Method A.

8.1.9 *Ozone Resistance*—In accordance with Test Method D1149, Method B (bent loop) exposure of Test Method D518; inspect at 7× magnification after exposure to 50 ± 5 pphm ozone at 40 ± 2°C (104 ± 4°F) for 70 h minimum.

8.1.10 *Weather Resistance*—Accelerated weathering test shall be performed by Practice G154 or Practice G155.

8.1.10.1 *Practices G154 and G151*—2000 h fluorescent lamp UVA-340, Cycle 20 h UV at 80 ± 3°C (uninsulated black panel temperature), 4 h condensation at 50 ± 3°C (uninsulated black panel temperature). If irradiance is controlled, set point shall be 0.68 ± 0.03 W/(m^2·nm).

8.1.10.2 *Practices G155 and G151*—2000 h xenon arc light exposure practice using daylight filter 0.35 ± 0.02 W/(m^2·nm) at 340 nm; 690 min light exposure; 30 min light and deionized water spray; uninsulated black panel temperature: 80 ± 3°C; relative humidity 50 ± 5 %. For equipment that allows temperature control, chamber air shall be 48 ± 3°C.

8.2 *Coating Portion on Weather Side of Supplied Sheet,* see Table 2.

8.2.1 *Tensile Strength and Elongation*—In accordance with Test Method D412, Method A, Die C.

8.2.2 *Tear Resistance*—In accordance with Test Method D1004, specimens tested shall be at the applied thickness on the supplied sheet. Because the results are directly dependent on thickness, the data is reported in N/m (lbf/in.).

8.2.3 *Ozone Resistance*—In accordance with Test Method D1149, specimens strained 50 % while exposed to 100 MPa (pphm) ozone at 40 ± 2°C (104 ± 4°F) for 166 h.

8.2.4 *Water Absorption*—In accordance with Test Method D471, Sections 8 and 9, at 50 ± 2°C (122 ± 4°F) for 166 h.

9. Inspection

9.1 Inspection of the material shall be agreed upon between involved parties.

10. Rejection and Resubmittal

10.1 Failure to conform to any one of the requirements prescribed in this specification shall constitute grounds for rejection. The seller shall have the right to reinspect the rejected shipment and resubmit the lot after removal of those packages not conforming to the specified requirements.

11. Product Marking

11.1 The sheet shall be identified on the side intended to be exposed to the weather with this ASTM designation number and ASTM type and the name of the manufacturer or supplier. The type and size of the identification is at the manufacturer's option. Such identification shall occur at intervals not to exceed 3 m (9 ft, 10 in.) in the long direction. The identification shall