Designation: D7832/D7832M – 14

Standard Guide for Performance Attributes of Waterproofing Membranes Applied to Below-Grade Walls / Vertical Surfaces (Enclosing Interior Spaces)[1]

This standard is issued under the fixed designation D7832/D7832M; 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 guide lists test methods intended to establish a minimum level of acceptable performance attributes for reinforced or laminated waterproofing membranes applied to below-grade walls.

1.2 This guide does not include cementitious, integral, or bentonite waterproofing systems.

1.3 This guide does not include membranes applied under slabs on grade or on suspended slabs below grade or applied to soil retaining systems, water containment structures, or tunnels.

1.4 It is not possible to establish a precise correlation between laboratory tests on waterproofing membranes and performance attributes after installation due to variations in chemicals in the soil, design, material, and installation.

1.5 The values stated in either inch-pound or SI 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 non-conformance with the standard.

1.6 *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:*[2]

C1305 Test Method for Crack Bridging Ability of Liquid-Applied Waterproofing Membrane

C1522 Test Method for Extensibility After Heat Aging of Cold Liquid-Applied Elastomeric Waterproofing Membranes

D95 Test Method for Water in Petroleum Products and Bituminous Materials by Distillation

D471 Test Method for Rubber Property—Effect of Liquids

D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents

D570 Test Method for Water Absorption of Plastics

D896 Practice for Resistance of Adhesive Bonds to Chemical Reagents

D903 Test Method for Peel or Stripping Strength of Adhesive Bonds

D1079 Terminology Relating to Roofing and Waterproofing

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

D1790 Test Method for Brittleness Temperature of Plastic Sheeting by Impact

D4551 Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane

D5147 Test Methods for Sampling and Testing Modified Bituminous Sheet Material

D5385 Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

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

D5683 Test Method for Flexibility of Roofing and Waterproofing Materials and Membranes

D5849 Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement)

D6134 Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems

D7234 Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

D7281 Test Method for Determining Water Migration Resistance Through Roof Membranes

[1] This guide is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.22 on Waterproofing and Dampproofing Systems.

Current edition approved July 1, 2014. Published July 2014. DOI: 10.1520/D7832_D7832M-14.

[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.

E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
E1745 Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
2.2 *International Codes Council:*[3]
International Building Code

3. Terminology

3.1 For definitions relating to waterproofing, refer to Terminology D1079.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *perform*—the ability of all essential properties to meet or exceed specified test values.

3.2.2 *protection course*—prefabricated boards, drainage composites, sheets, or insulation applied to the positive surface of the membrane to protect it from damage from backfilling and construction operations.

3.2.3 *waterproofing membrane*—a single or multiple ply membrane, factory manufactured or liquid applied and which is internally reinforced or laminated to a plastic sheet. It is intended to prevent the passage of liquid water under continuous or intermittent hydrostatic, dynamic, or static pressure. The membrane is fully or partially attached, and is applied to the positive or wet side of a vertical substrate below-grade.

4. Significance and Use

4.1 A waterproofing membrane should maintain its watertight integrity for the life of the building in a continuously or intermittently moist environment and may be subject to continuous or intermittent hydrostatic pressure. It should resist chemicals that can harm the membrane and root growth. This guide lists minimum performance attributes required of waterproofing membranes applied to below-grade walls. Products not previously used as waterproofing membrane materials require additional tests beyond the scope of this guide. This guide is not intended for use on in-service waterproofing materials. Waterproofing membranes and other components should conform to ASTM product standards, if available.

4.2 *Limitations*—Prior to use and in service, waterproofing may be exposed to a variety of conditions so no one test will provide evaluations related to performance for all exposures. Neither will all tests be necessary in all evaluations for specific exposures.

5. Waterproofing Membrane Classifications

5.1 *Type of Material:*
5.1.1 *Type I*—Bituminous
5.1.1.1 *Grade 1*—Single or Multiple Ply Adhered.
5.1.1.2 *Grade 2*—Liquid-Applied.
5.1.2 *Type II*—Non-bituminous Organic.
5.1.2.1 *Grade 1*—Single Ply.
(1) Class 1—Adhered Sheet
(2) Class 2—Partially Attached Sheet
5.1.2.2 *Grade 2*—Liquid-Applied (Polyurethane, Polymethyl methacrylic, Polyester, Polyether).

6. Waterproofing Membrane Performance Attributes

6.1 The following general attributes are required for a waterproofing membrane:
6.1.1 Perform under continuously moist conditions and alternate wetting and drying.
6.1.2 Perform under hydrostatic pressure.
6.1.3 Resist acids, alkalis, and other chemicals including such as those commonly contained in fertilizers and soil poisoners.
6.1.4 Resist fungus and bacteria in soils.
6.1.5 Possess low water absorption.
6.1.6 Resist puncture for membranes that lack a protection course.
6.1.7 Possess a moderate degree of elongation and elasticity.
6.1.8 Possess sufficient flexibility to enable unrolling or curing properly without failure. (Not required for Type I, Grade 1 or Type II, Grade 2.)
6.1.9 Possess crack bridging capabilities.
6.1.10 Adhere tenaciously to the substrate.

7. Design of Waterproofing Assembly

7.1 *Waterproofing Membrane*—The waterproofing membrane may be single ply or multi-ply or a reinforced film of one or more component liquid-applied materials, depending on the materials involved. Where applicable, the properties of the waterproofing membrane shall meet or exceed the minimum values shown in Tables 1-3.

7.2 The membrane material selected for use shall pass the tests outlined in Table 1, modified to reflect the below-grade conditions anticipated for the locality of use (see 4.2).

[3] Available from International Code Council (ICC), 500 New Jersey Ave., NW, 6th Floor, Washington, DC 20001, http://www.iccsafe.org.

TABLE 1 Waterproofing Material Physical Properties for Types I and II

Property	Standard	Criteria
A. Resistance to Hydrostatic Pressure	Test Method D5385	No leaks at 103 kPa [15 psi] [34.65 ft head] or at the maximum hydrostatic pressure determined by the subsurface soil investigation per IBC para. 1802.2.3
	Test Method D7281	Pass
B. Resistance to Deterioration from Organisms and Substances in Contacting Soil	Test Methods E154	<0.3 perms water vapor permeability
	Specification E1745	Section 7 (using a 3 in. thick precast concrete paver in lieu of cast-in-place concrete).
C. Adhesion to Substrate (Except for Grade 1, Class 2)	Test Method D7234	>1518 kPa [220 psi] using a 50 mm [2 in.] dolly
	Test Method D903	3 pli [535.8 gm/cm]

TABLE 2 Waterproofing Material Physical Properties for Type I

Property	Standard	Criteria
A. Low Temperature Unrolling Type 1A	Test Method D5636	No Cracking at 0°C [32°F]
B. Crack Bridging	Test Method D5849	Test Condition 1, Test Condition 2, or Test Condition 5 for 500 cycles select appropriate temperature for the weather conditions for which the membrane is applied.
C. Flexibility	Test Method D5683	No Cracking
D. Water Absorption	Test Method D95	Procedure BW, <2 % by weight. Run 45 cycles of immersion in water at 23°C and 50°C [73°F and 122°F] for 24 h for start of test and after 45th cycle.

TABLE 3 Waterproofing Material Physical Properties for Type II

Property	Standard	Criteria
A. Water Absorption	Test Method D570	<3 % by weight when tested per Section 7A
	Test Method D471	<3 % by weight when tested per Section 12 at 23°C [73°F] for 2998 h
B. Linear Dimension Change (PVC only)	Specification D4551	<5 % at 70°C [158°F] 1 h per Test Method D1204
C. Extensibility After Heat Aging	Test Method C1522	6.4 mm [¼ in.]
D. Crack Bridging Ability	Test Method C1305	No Cracking
E. Low Temperature Flexibility and Crack Bridging for Liquid-Applied Membranes	Test Method C1305	Pass
F. Resistance of Plastics to Bacteria	Specification D4551	No effect 12 of 12 samples pass
G. Resistance to Chemical Reagents	Practice D896	No delamination, blistering, emulsification, or (undiluted deterioration 15 N/5P/5Potash)
H. Resistance to Petroleum	Test Methods E154 Section 14	<0.3 perms

8. Keywords

8.1 bacteria resistances; chemical resistances; cyclical fatigues; hydrostatic pressures; liquid-applied; moisture contents; performance levels; single and multi-ply; waterproofing membranes