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Designation: C1471/C1471M – 05 (Reapproved 2021)

Standard Guide for the Use of High Solids Content Cold Liquid-Applied Elastomeric Waterproofing Membrane on Vertical Surfaces[1]

This standard is issued under the fixed designation C1471/C1471M; 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 describes the use of a high solids content, cold liquid-applied elastomeric waterproofing membrane that meets the performance criteria specified in Specification C836/C836M, subject to intermittent hydrostatic pressure in a waterproofing system intended for installation on vertical cast-in-place concrete surfaces.

1.2 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

1.3 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.

1.4 *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.*

1.5 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C117 Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

C717 Terminology of Building Seals and Sealants

C836/C836M Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

C898/C898M Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course

D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

3. Terminology

3.1 *Definitions*—Refer to Terminology C717 for definitions of terms used in this standard.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *drainage composite*—geocomposite consisting of a geotextile filter fabric and a drainage core of various thicknesses and shapes.

4. Significance and Use

4.1 This grade provides considerations for the design and installation of liquid-applied waterproofing systems. The intent is to provide information and guidelines for consideration by designers. Typical uses for these systems include, among others, planters and foundation walls with drainage systems.

4.2 This guide is intended to be considered in conjunction with Guide C898/C898M to provide total system guidelines.

5. Comparison to Other Standards

5.1 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

6. General

6.1 *General*—The major components to be considered for a below-grade building wall waterproofing system are the structural wall or substrate to be waterproofed, waterproofing membrane, membrane protection, drainage, and backfill. Additional components to be considered are membrane terminations, penetrations, joints, and thermal insulation.

6.2 *Compatibility*—It is essential that all components and contiguous elements be compatible, and that they be coordinated to form an integrated waterproofing system.

[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 Dec. 1, 2021. Published December 2021. Originally approved in 2000. Last previous edition approved in 2014 as C1471/C1471M – 05 (2014)ε1. DOI: 10.1520/C1471_C1471M-05R21.

[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.

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6.3 *Continuity*—It is essential that the waterproofing membrane, including all joints and transitions, is continuous. Special attention must be paid to changes in plane, transitions from one substrate to another, terminations, and abutting waterproofing systems. Expansion and control joints in abutting vertical and horizontal surfaces must maintain the continuity of the system. It is recommended that, during system development and documentation, isometric drawings be made of three-dimensional connections and transitions.

7. Substrate

7.1 *General*—The building wall substrate referred to in this guide is reinforced, cast-in-place concrete.

7.2 *Strength*—The strength of concrete is a factor to be considered with respect to liquid-applied membranes so far as it relates to surface finish, bond strength, and continuing integrity (absence of cracks and other concrete defects that could affect the integrity of the membrane).

7.3 *Density and Moisture Content*—The density and moisture content of concrete when cured are interrelated. Excessively high moisture content can affect adhesion of the membrane to a substrate, as moisture may condense at the membrane-to-concrete interface and cause membrane delamination. Lower moisture contents are achieved with the use of hard, dense stone aggregate. This type of coarse aggregate will generally provide structural concrete with moisture content from 3 to 5 % when cured. The concrete substrate should have a minimum density of 2100 kg/m^3 [130 lb/ft^3] and a maximum moisture content of 8 % when cured.

7.4 *Admixtures*—Polymeric, latex, or other organic chemical based admixtures or modifiers can coat the concrete particles and reduce the adhesion of the membrane to the substrate. If the concrete substrate will contain any admixtures, the membrane manufacturer should be consulted and should approve the use of the membrane with the specific proposed admixtures.

7.5 *Release and Curing Agents*—Form release agents and form oils are often used to facilitate the removal of the concrete form work, and curing agents are sometimes applied to the green (uncured) concrete surface. These chemicals can reduce the adhesion of the membrane to the concrete, and their use should be coordinated with and be accepted by the membrane manufacturer. Form oils should not be used on areas to receive waterproofing. If form oils were used, sandblasting or other approved methods must be used to remove the form oils prior to waterproofing application.

7.6 *Finish*—The structural wall should have a smooth form finish. The surface should provide a mechanical bond for the membrane but not be so rough as to preclude achieving continuity of the membrane and the specified membrane thickness across its surface. All fins, projections, tie rod holes, and honeycomb must be repaired. The removal of fins and similar projections is especially critical, because they cause thin spots in the membrane that are easily punctured. The concrete surface at the top of the wall and at the footing should be of the same quality as the face of the wall. The footing should be troweled smooth and be free of fins, burrs, and large irregularities. A minimum width of 200 mm, with 300 mm preferred, should be available on the footing to effectively terminate the waterproofing membrane. The top of the footing should be sloped away from the wall.

7.7 *Dryness*—Membrane manufacturers' requirements for substrate dryness vary and can include being visibly dry, passing a 4-h glass test, passing Test Method D4263 with no condensate, or having a specific maximum moisture content as measured by a moisture meter. Refer to and meet the manufacturer's requirements for the particular membrane being applied. It is recommended that the membrane not be applied sooner than 28 days after concrete placement.

7.8 *Joints*—Joints in structural concrete walls are referred to in this guide as reinforced joints, unreinforced joints, and expansion joints.

7.8.1 *Reinforced Joints*—Reinforced joints consist of hairline cracks, cold joints, construction joints, or control joints held together with steel reinforcing bars or wire fabric. These are considered static joints with little or no anticipated movement because the reinforcement is continuous across the joint.

7.8.2 *Unreinforced Joints*—Unreinforced joints consist of butted construction joints and isolation joints not held together with steel reinforcing bars or wire fabric. These joints are generally considered as non-moving or static joints. However, they should be considered as capable of some movement, the magnitude of which is difficult to predict.

7.8.3 *Expansion Joints*—Expansion joints are designed to accommodate a predetermined amount of movement. Such movement can be due to thermal change, shrinkage, creep, deflection, or other factors. In detailing watertight expansion joints, the amount of movement must be determined using a reasonable factor of safety since accurate prediction of the magnitude of movement is difficult. The size and configuration of the joint should then be related to the capability of the membrane and joint seal materials to accommodate the anticipated movement.

8. Waterproofing Membrane

8.1 *General*—Application of the membrane may be by brush, trowel, roller, or spray equipment, or combinations thereof, depending on the manufacturer's recommended or required procedures and the job site conditions. A two-coat application is preferable to a single-coat application, because it provides some redundancy and it is easier to meet or exceed the minimum required membrane thickness. It also reduces the tendency for membrane material to slide or sag, and pinholes in the first coat can be covered by the second coat.

8.1.1 One-part membrane materials should be stirred thoroughly prior to application With two-part materials, stir each component separately before combining. Thoroughly mix the two components together so the curing agent is uniformly dispersed in the base component, ensuring even curing of the membrane. Mixing should be at a slow speed, 80 to 150 rpm, to avoid entrapping air in the material. The bottom and sides of the container should be scraped with a square-edged spatula during mixing.

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