

## ACCEPTANCE CRITERIA FOR RIGID, POLYETHYLENE, BELOW-GRADE, DAMPPROOFING AND WALL WATERPROOFING MATERIAL

AC114

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Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes. (Some reports may also reference older code families such as the BOCA National Codes, the Standard Codes, and the Uniform Codes.) Section 104.11 of the *International Building Code*® reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

This acceptance criteria has been issued to provide interested parties with guidelines for demonstrating compliance with performance features of the codes referenced in the criteria. The criteria was developed through a transparent process involving public hearings of the ICC-ES Evaluation Committee, and/or on-line postings where public comment was solicited.

New acceptance criteria will only have an “approved” date, which is the date the document was approved by the Evaluation Committee. When existing acceptance criteria are revised, the Evaluation Committee will decide whether the revised document should carry only an “approved” date, or an “approved” date combined with a “compliance” date. The compliance date is the date by which relevant evaluation reports must comply with the requirements of the criteria. See the ICC-ES web site for more information on compliance dates.

If this criteria is a revised edition, a solid vertical line (|) in the margin within the criteria indicates a technical change from the previous edition. A deletion indicator (→) is provided in the margin where wording has been deleted if the deletion involved a technical change.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

NOTE: The Preface for ICC-ES acceptance criteria was revised in July 2011 to reflect changes in policy.

*Acceptance criteria are developed for use solely by ICC-ES for purpose of issuing ICC-ES evaluation reports.*

# ACCEPTANCE CRITERIA FOR RIGID, POLYETHYLENE, BELOW-GRADE, DAMPPROOFING AND WALL WATERPROOFING MATERIAL (AC114)

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this criteria is to establish requirements for rigid, polyethylene, below-grade, exterior material to be recognized in an ICC Evaluation Service, LLC (ICC-ES), evaluation report under the 2009 and 2006 *International Building Code*<sup>®</sup> (IBC), and the 2009 and 2006 *International Residential Code*<sup>®</sup> (IRC). The material is recognized as a dampproofing material in accordance with Section 1805 of the 2009 IBC or Section 1807 of the 2006 IBC. The material is recognized as a wall waterproofing and dampproofing material in accordance with Section R406.2 of the 2009 and 2006 IRC. The bases of the criteria are Section 1805 of the 2009 IBC or Section 1807 of the 2006 IBC, and Section R406 of the 2009 and 2006 IRC.

The reason for development of this criteria is that the code does not address the use of materials identified in Section 1.2 of this criteria for use in dampproofing or waterproofing applications.

**1.2 Scope:** This criteria is applicable to below-grade, exterior-wall, sheet membrane which performs as a wall waterproofing and dampproofing material. The sheet membrane is installed against concrete, concrete block (parged as required), insulated concrete forms or treated wood foundations. The membrane keeps ground moisture (rainwater) from coming into direct contact with the foundation wall.

### 1.3 Referenced Standards:

**1.3.1** CCMC Technical Guide 07111 for Rigid Polyethylene or Polystyrene Dampproofing Membrane.

**1.3.2** ASTM E 96-05, Test Method for Water Vapor Transmission of Materials, ASTM International.

### 1.4 Definitions:

**1.4.1 Dampproofing:** A membrane which resists the passage of water in liquid form, in the absence of hydrostatic pressure.

**1.4.2 Waterproofing:** A membrane which resists the passage of water in liquid form, in the presence of a hydrostatic pressure water table above the interior floor slab elevation or intermittent ground water.

**1.4.3 Proponent:** The individual or company seeking an evaluation report for below-grade wall dampproofing/waterproofing materials.

**1.4.4 Shelf Life:** The maximum time the packaged wall dampproofing/waterproofing material can be stored under specified conditions and still meet the performance requirements.

**1.4.5 Substrate:** The material onto which the wall dampproofing/waterproofing material is applied.

## 2.0 BASIC INFORMATION

**2.1 General:** The following information shall be submitted:

### 2.1.1 Product Description:

a. A complete description of the wall dampproofing/waterproofing material, including its properties, fasteners, sealants, and other specialty items required for the various types of installations proposed.

b. Storage and handling procedures, including precautions to prevent damage to the product.

c. Details of quality control procedures during manufacturing.

d. Statements on limitations pertinent to product use, including ultraviolet exposure.

e. Description of protective barriers as applicable.

**2.1.2 Installation Instructions:** Printed installation procedures available to the installer, which shall include the following information:

**2.1.2.1** Methods of attachment of wall dampproofing/waterproofing material to specific substrates, including overlap, fasteners, sealant application, and handling. Application procedures shall be specific as to substrates on which recognition is sought, such as portland cement plaster, treated wood, masonry and concrete. Conditions necessary for proper application shall be included, such as ambient temperature, age of substrate, substrate temperature, site condition (wet or muddy) and the material temperature.

**2.1.2.2** Substrate preparation, addressing the following:

a. Removal of deleterious materials that may affect performance.

b. Treatments of voids, cracks, tie-rod holes, joints, honeycombed areas, brick ledges and other excessively rough areas.

**2.1.2.3** Maximum spacing, method of installation and other information on expansion and control joints.

**2.1.2.4** Details and instructions for termination/flashing of wall dampproofing/waterproofing system.

**2.1.2.5** Drainage features complying with Section 1805.4 of the 2009 IBC or Section 1807.4 of the 2006 IBC, and/or Section R405 of the IRC, unless the drainage system is an integral part of the dampproofing or waterproofing system. For integral systems, the permitted drainage in gallons per hour per lineal foot width, and inch thickness of drainage media, must be specified. Other information should include location, size and disposal to drainage systems.

**2.1.2.6** Type, location, and installation procedures for all flashing, counterflashing, caulking and other special treatments.

**2.1.2.7** Conditions necessary for proper application of protective barriers, when used.

**2.1.2.8** Details for protection of wall dampproofing/waterproofing materials above grade from ultraviolet light.

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**2.1.2.9** Evidence showing that the sealant adhesive for the joints is compatible with the membrane and is durable for the intended use.

**2.2 Testing Laboratories:** Testing laboratories shall comply with the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

**2.3 Test Reports:** Testing of the membrane and its accessories to show compatibility and performance as required by the codes. Test reports shall comply with AC85.

**2.4 Product Sampling:** Products shall be sampled in accordance with Section 3.2 of AC85.

### 3.0 TEST AND PERFORMANCE REQUIREMENTS

Rigid, high-density, polyethylene, wall dampproofing/waterproofing materials shall meet the requirements indicated in Table 1.

### 4.0 TEST METHODS

**4.1 General:** Specimens shall be conditioned at  $73.4 \pm 3.6^\circ\text{F}$  ( $23 \pm 3^\circ\text{C}$ ) and  $50 \pm 5$  percent relative humidity for a minimum of 40 hours prior to testing.

#### 4.2 Thickness and Weight:

**4.2.1** Thickness is measured using a micrometer or dial indicator. The mean value of at least 10 measurements is required to determine the thickness.

**4.2.2** Weight per unit area is calculated for three samples approximately 10 inches (254 mm) square, ignoring the effect of protrusions or bubbles. Dimensions are measured to the nearest 0.02 inch (0.5 mm), and weight is measured using a balance with a resolution of 0.0004 ounce (0.01 gram).

**4.3 Dynamic Impact Test:** Three specimens, measuring approximately 3.5 inches (90 mm) square, are conditioned for four hours at room temperature. They are tested with a Gardner Impact Tester or equivalent using a 2.2-pound (1 kg) impact load, an impact or with a flat impact end with cross-sectional area of 0.15 square inch ( $97 \text{ mm}^2$ ), and an aluminum block as a substrate. The impact or is released from a height of 9.8 inches (250 mm). The test is repeated five times on each specimen, for a total of 15 impacts. The specimens are then visually examined for indentation and punctures.

**4.4 Static Puncture:** Three specimens, measuring approximately 3.5 inches (90 mm) square, are conditioned for four hours at room temperature. A 55.1-pound (25 kg) weight is placed onto the surface of each specimen for one hour. A flat aluminum block is used as a substrate. The load is applied through a tip with cross-sectional area of 0.155 square inch ( $100 \text{ mm}^2$ ). The test is conducted at two different spots on each specimen. The specimens are then visually examined for indentation and punctures.

**4.5 Low-temperature Flexibility:** Three specimens, measuring approximately 2.5 inches by 5 inches (60 mm by 120 mm), and a 0.125-inch-diameter (3.2 mm) mandrel, are conditioned at  $-22 \pm 1^\circ\text{F}$  ( $-30 \pm 1.5^\circ\text{C}$ ) for two hours. Each specimen is bent over the mandrel through 180

degrees in 1 to 1.5 seconds. The specimens are then visually examined at the bent area for cracks.

**4.6 Water Vapor Permeability:** Three round specimens taken from the edge of the flat material, each having a diameter of approximately 3 inches (75 mm), are used to set up three wet cups, identical in size, in accordance with ASTM E 96, Procedure for Water Method. Each cup is placed in a room with controlled conditions of  $79.8 \pm 3.6^\circ\text{F}$  ( $21 \pm 3^\circ\text{C}$ ) and 50 percent relative humidity for one week. Loss in weight is recorded daily. Water vapor transmission is calculated in accordance with Section 13 of ASTM E 96.

**4.7 Tensile Strength and Elongation:** Five specimens, 0.5 inch (12.7 mm) wide by 3.94 inches (100 mm) long, are cut in both machine and cross-machine directions from flat material. Machine direction is denoted by the direction perpendicular to the small ribs that run through the sample. Cross direction is denoted by the direction parallel to the ribs.

Specimens are tested using a tensile test apparatus and are clamped into the machine with a specimen grip spacing of 2.95 inches (75 mm). The rate of loading is 2.95 inches (75 mm) per minute. Each specimen is pulled until it breaks or until it is stretched to a length of 15.75 inches (400 mm). Load is recorded in pounds (kN/m), elongation is recorded as a percentage of original length.

**4.8 Water Immersion:** Three specimens approximately 4 inches (100 mm) square and prepared from flat material are placed in a water bath at  $122^\circ\text{F}$  ( $50^\circ\text{C}$ ) for seven days. Each specimen is weighed and measured before and after immersion. Samples are surface-dried before post-immersion weights are recorded. Dimensional and weight change due to immersion are calculated as a percentage of initial values. Two 0.5-inch-by-3.94-inch (12.7 mm by 100 mm) specimens, one in each direction, are prepared from each conditioned sheet and are tested for tensile strength and elongation as noted in Section 4.7 of this criteria.

**4.9 Heat Aging:** Three specimens approximately 6 inches (150 mm) square and prepared from flat material are placed in an air circulating oven maintained at  $212^\circ\text{F}$  ( $100^\circ\text{C}$ ) for seven days. Each specimen is weighed and measured before and after the heat aging. Dimensional and weight change due to heat aging are calculated as a percentage of initial values. Two 0.5-inch-by-3.94-inch (12.7 mm by 100 mm) specimens, one in each direction, are prepared from each sheet and are tested for tensile strength and elongation as noted in Section 4.8 of this criteria.

**4.10 Chemical Exposure:** Two specimens approximately 6 inches (152 mm) square and prepared from flat material are placed in separate baths kept at room temperature. One bath contains a 1 N solution of ammonium chloride, the other bath contains a 1 N solution of sodium sulfate. (1 N = 1 mol/liter of water.) Each specimen is immersed in solution for seven days. At the end of the immersion period, the specimens are washed clean and visually inspected for deterioration. Five specimens, 0.5 inch (12.7 mm) by 3.94 inches (100 mm),

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are prepared in both directions from specimens in each solution and are tested for tensile strength and elongation as noted in Section 4.7 of this criteria.

**4.11 Compressive Strength:** Three specimens, each approximately 3.5 inches (90 mm) square and including nine raised portions, are prepared. Each specimen is compressed uniformly in a compression testing machine at a rate of 0.20 inch (5 mm) per minute. Compressive strength per raised support and unit area are calculated.

**5.0 QUALITY CONTROL**

**5.1** Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

**5.2** Third-party follow-up inspections are not required under this acceptance criteria.■

**TABLE 1—REQUIREMENTS FOR RIGID, HIGH-DENSITY, POLYETHYLENE, WALL DAMPPROOFING/WATERPROOFING SHEET MATERIALS**

PROPERTIES	NUMBER OF SPECIMENS	REQUIREMENTS	CRITERIA SECTION
Thickness, min.	10	0.025 in. (0.6 mm) in flat area, 0.02 in. (0.5 mm) in bubble area	4.2
Weight, min.	3	1.6 oz./ft <sup>2</sup> (500 g/m <sup>2</sup> )	4.2
Dynamic Impact Load	3	12 of 15 shall demonstrate no indentation or puncture	4.3
Static Puncturing	3	5 of 6 shall demonstrate no indentation or puncture	4.4
Low-temperature Flexibility	3	No cracking	4.5
Water Vapor Permeability, max.	3	0.239 grains/h/ft <sup>2</sup> (0.167 g/h/m <sup>2</sup> )	4.6
Tensile Strength, min. <sup>1</sup> Elongation, min. <sup>1</sup>	5 5	45.6 lb/in. width (8 kN/m) 25%	4.7
Water Immersion: Dimensional Change, max. Weight Change, max. Tensile Strength, min. <sup>1</sup> Elongation, min. <sup>1</sup>	3 3 2 2	1% 0.10% 80% of original 70% of original	4.8
Heat Aging: Dimensional Change, max. Weight Change, max. Tensile Strength, min. <sup>1</sup> Elongation, min. <sup>1</sup>	3 3 2 2	1% 0.10% 80% of original 70% of original	4.9
Chemical Exposure to Ammonium Chloride: Tensile Strength, min. <sup>1</sup> Elongation, min. <sup>1</sup>	5 5	No visible deterioration 80% of original 70% of original	4.10
Chemical Exposure to Sodium Sulfate: Tensile Strength, min. <sup>1</sup> Elongation, min. <sup>1</sup>	5 5	No visible deterioration 80% of original 70% of original	4.10
Compressive Strength	3	14.5 psi (100kPa)	4.11

<sup>1</sup>Tensile and elongation tests are conducted in both machine and cross-machine directions.