



February 25, 2008

TO: PARTIES INTERESTED IN EVALUATION REPORTS ON WATER-RESISTIVE AND AIR BARRIERS

SUBJECT: Acceptance Criteria for Water-resistive Barriers, Subject AC38-0208-R1 (ST/MB)

Dear Madam or Sir:

Enclosed is a copy of the subject revised acceptance criteria approved by the ICC-ES Evaluation Committee on February 7, 2008, effective March 1, 2008.

The approved revisions to the criteria may be summarized as follows:

1. Include requirements for the optional evaluation of air permeance, when a report applicant desires to have this attribute included in an evaluation report.
2. Editorially revise the criteria to reference the 2006 *International Building Code*® (IBC) and the 2006 *International Residential Code*® (IRC).
3. Editorially revise Section 3.2 to reflect the language contained in the 2006 IRC.
4. Editorially revise Tables 2 and 3 to reflect the current terminology contained in the referenced standard (ASTM E84).
5. Remove reference to CCMC Technical Guide 07102 and describe, in the criteria, the technical requirements for the water-ponding test procedure that are contained in the CCMC Technical Guide 07102.

Evaluation reports issued on or after the effective date noted above, and falling within the scope of this criteria, will be required to comply with the enclosed edition of the criteria. Evaluation reports issued prior to the effective date may be in compliance either with the enclosed acceptance criteria or with the previous edition. Evaluation reports based on a superseded version of an acceptance criteria must be brought into compliance with the most recent edition at the time the reports are reissued. Therefore, applicants should submit data verifying compliance at the time they apply for reexamination.

If you have any questions, please contact Steven R. Thorsell, AIA, CSI, Director of ICC-ES Projects, at (800) 423-6587, extension 4313. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,

A handwritten signature in black ink that reads 'Kurt Stochlia'.

Kurt Stochlia, P.E.
Vice President

KS/ST/raf

Enclosure

cc: Evaluation Committee



ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

AC38

Approved February 2008

Effective March 1, 2008

Previously approved June 2004, July 2000, September 1990

PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard 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.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

This acceptance criteria has been issued to provide all interested parties with guidelines for demonstrating compliance with performance features of the applicable code(s) referenced in the acceptance criteria. The criteria was developed and adopted following public hearings conducted by the ICC-ES Evaluation Committee, and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this criteria, while reports issued prior to this date may be in compliance with this criteria or with the previous edition. If the criteria is an updated version from the previous edition, a solid vertical line (|) in the margin within the criteria indicates a technical change, addition, or deletion from the previous edition. A deletion indicator (→) is provided in the margin where a paragraph has been deleted if the deletion involved a technical change. This criteria may be further revised as the need dictates.

ICC-ES may consider alternate criteria, provided the report applicant submits valid 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. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria set forth in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria 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 an evaluation report, if the product, material, or type 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 unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

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ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

1.0 INTRODUCTION

1.1 Purpose: The purpose of this criteria is to establish requirements for recognition of water-resistive barriers in ICC Evaluation Service, Inc. (ICC-ES), evaluation reports under the 2006 *International Building Code*[®] (IBC), the 2006 *International Residential Code*[®] (IRC), the BOCA[®] *National Building Code/1999* (BNBC), the 1999 *Standard Building Code*[®] (SBC) and the 1997 *Uniform Building Code*[™] (UBC), and optionally as an air barrier material under the 2006 International Energy Conservation Code (IECC)..

1.2 Scope: This criteria is limited to sheet materials used on exterior walls as water-resistive barriers under Sections 1404.2 and 2510.6 of the IBC, Section R703 of the IRC and Section 1404.3 of the BNBC; moisture protection barriers under Section 2303.3 of the SBC; and weather-resistive barriers under Sections 1402.1 and 2506.4 of the UBC, and optionally as an air barrier material under IECC Sections 402.4.1 and 502.4.3.

1.3 Definitions:

1.3.1 Water-resistive Barrier: For the purposes of this criteria, the term water-resistive barrier describes a material that is intended to perform as a secondary barrier behind an exterior cladding, providing a means to resist penetration of liquid water that penetrates behind the exterior covering or cladding, and includes within its scope water-resistive barriers under Section 1404.2 of the IBC, Section R703 of the IRC and Section 1404.3 of the BNBC; moisture protection barriers under Section 2303.3 of the SBC; and weather-resistive barriers under Section 1402.1 of the UBC.

1.3.2 Paper-based Barrier: Paper-based barriers are building papers composed predominantly of sulfate pulp fibers, that comply with UBC Standard 14-1, and that are intended for use as water-resistive barriers.

1.3.3 Felt-based Barrier: Felt-based barriers are asphalt-saturated organic felts that comply with ASTM D 226, and are intended for use as water-resistive barriers.

1.3.4 Polymeric-based Barrier: Polymeric-based barriers are proprietary polymeric sheet materials for use as water-resistive barriers.

1.3.5 Air Barrier Material: A material in building construction that is designed and installed to reduce air leakage either into or through an opaque wall.

1.4 Codes and Reference Documents:

1.4.1 2006 *International Building Code*[®] (IBC), International Code Council.

1.4.2 2006 *International Residential Code*[®] (IRC), International Code Council.

1.4.3 2006 *International Energy Conservation Code*[®] (IECC), International Code Council.

1.4.4 BOCA[®] *National Building Code/1999* (BNBC).

1.4.5 1999 *Standard Building Code*[®] (SBC).

1.4.6 1997 *Uniform Building Code*[™] (UBC).

1.4.7 UBC Standard 14-1 (1997), Kraft Waterproof Building Paper.

1.4.8 ASTM D 226-97a, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing, ASTM International.

1.4.9 ASTM D 779-03, Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method, ASTM International.

1.4.10 ASTM D 5034-95, Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test), ASTM International.

1.4.11 ASTM E 96-00e01, Test Method for Water Vapor Transmission of Materials, ASTM International.

1.4.12 ASTM E 2178-03 Standard Test Method for Air Permeance of Building Materials, ASTM International.

1.4.13 AATCC Test Method 127-1985, Water Resistance: Hydrostatic Pressure Test. (A copy of the test method may be obtained from the American Association of Textile Chemists and Colorists, at PO Box 12215, 1 Davis Drive, Research Triangle Park, North Carolina, (919) 549-8141.)

2.0 BASIC INFORMATION AND REPORTS OF TESTS

2.1 Product Description: Descriptions of the materials and the manufacturing process shall be submitted.

2.2 Installation Instructions: Installation instructions shall be submitted. The instructions shall include requirements that the barrier be installed horizontally on vertical walls, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and that where vertical joints occur, the barrier shall be lapped not less than 6 inches (152 mm) and must include the maximum exposure time permitted by the manufacturer. If the material is to be evaluated as an air barrier material in addition to a water-resistive barrier, installation instructions shall identify specific installation provisions for air barrier material applications.

2.3 Packaging and Identification: A description of the method of packaging and identifying the material shall be submitted. Product labeling shall include the evaluation report number at regular intervals.

2.4 Testing Laboratories, Reports of Tests and Product Sampling:

2.4.1 Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.4.2 Test reports shall comply with AC85.

2.4.3 Test specimens shall be sampled in accordance with Section 3.2 of AC85.

2.4.4 Unless otherwise specified in the applicable test method, a minimum of five specimens shall be tested.

3.0 REQUIRED DATA

3.1 For paper-based barriers under the IBC, IRC or UBC, reports of tests demonstrating compliance with UBC Standard 14-1 shall be submitted. Test methods for dry tensile strength, water resistance and water vapor transmission tests are noted in Table 2 of this criteria.

ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

3.2 For felt-based barriers under the IBC, IRC, BNBC, SBC or UBC, reports of tests demonstrating compliance with ASTM D 226, and with Section 3.3.4 of this criteria, shall be submitted.

3.3 For polymeric-based barriers under the IBC, IRC, BNBC, SBC or UBC, data in accordance with Sections 3.3.1 through 3.3.4 of this criteria shall be submitted. Test methods for dry tensile strength or dry breaking force, water-resistance and water vapor transmission tests are noted in Table 3 of this criteria.

3.3.1 Reports of dry tensile strength tests shall be conducted in accordance with ASTM D 828 or D 882. Reports of dry breaking force tests shall be conducted in accordance with ASTM D 5034, using the Grab Method set forth in Section 4.2.1.1 of ASTM D 5034 and using a constant-rate-extension (CRE) testing machine as described in Section 4.2.2.1 of ASTM D 5034. Test specimens shall be tested in both warp (machine) and filling (cross) direction as set forth in Section 7.3 of ASTM D 5034. The number of test specimens shall be as required in Section 7.3 of ASTM D 5034. Minimum conditions of acceptance shall be as noted in Table 1 of this criteria.

3.3.2 Water-resistance tests shall be conducted in accordance with ASTM D 779. For Grade D barriers, where testing in accordance with ASTM D 779 is not applicable, tests shall be conducted in accordance either with the water ponding test set forth in either Section 4.2.1 or 4.2.2 of this criteria. For each of the three specified tests, the testing shall be conducted on both control and weathered specimens. Control specimens shall be conditioned at 73°F (23.7°C) and 50 percent relative humidity for a minimum of 40 hours. Weathered specimens shall be conditioned in accordance with Section 4.1 of this criteria.

For tests conducted under ASTM D 779, minimum conditions of acceptance shall be as noted in Table 1 of this criteria. For tests conducted under Section 6.4.5 of CCMC 07102, conditions of acceptance shall be that no water shall transmit through the membrane. For tests conducted under Section 4.2 of this criteria, the condition of acceptance is that no leakage is permitted on the underside of any specimen.

3.3.3 Reports shall be submitted of water-vapor transmission tests conducted in accordance with ASTM E 96, Desiccant Method. Conditions of acceptance shall be as noted in Table 1 of this criteria.

3.3.4 Reports shall be submitted of tests demonstrating that the material does not crack when bent over a $\frac{1}{16}$ -inch-diameter (1.6 mm) mandrel at a temperature of 32°F (0°C).

3.4 When the product is to be evaluated as an air barrier material, reports of air permeance testing in accordance with ASTM E 2178 shall be submitted. A minimum of three specimens shall be tested. The specimens shall be taken from across the width of the roll. Minimum conditions of acceptance shall be an air permeance less than or equal to 0.02 L/(s·m²) @ 75 Pa (0.004 cfm/ft² @ 0.3 inch w.g. (1.57 psf)) for all three specimens.

4.0 TEST METHODS

4.1 Weathering Tests: This test method applies to polymeric-based barriers.

4.1.1 General: Three samples, each measuring 18 inches by 48 inches (457 mm by 1219 mm), are required.

One sample shall be used for preparing control specimens and shall be conditioned at 73°F (23.7°C) and 50 percent relative humidity for a minimum of 40 hours. Two samples shall be exposed to ultraviolet light, followed by exposure to accelerated aging in accordance with Sections 4.1.2 and 4.1.3 of this criteria.

4.1.2 Ultraviolet Light Exposure: Two 18-inch-by-48-inch (457 mm by 1219 mm) samples shall be exposed to light from ultraviolet sun lamps for 210 hours (10 hours per day for 21 days) in an enclosure as depicted in Figure 1. Ultraviolet light exposure shall be directed on the sample surfaces that will be exposed to sunlight in normal application. Lamps and enclosure shall be adjusted so the specimen temperature is between 135°F and 140°F (57°C and 60°C). Sunlamp bulbs shall be General Electric Type H275 RUV (275 W) or equivalent bulbs, providing UV characteristics of 5.0 W/m²/nm irradiance at a wavelength of 315 to 400 nm at 1 meter.

4.1.3 Accelerated Aging: Three 10-inch-square (254 mm²) specimens shall be cut from the ultraviolet-light-exposed samples. The three specimens shall be subjected to 25 cycles of drying and soaking as follows:

1. Oven drying at 120°F (49°C) for three hours, with all surfaces exposed.
2. Immersion in room-temperature water for three hours, with all surfaces exposed.
3. After removal from the water, specimens are blotted dry, then air-dried for 18 hours at a 75°F ± 5°F (23.8°C ± 2.8°C) room temperature, with all surfaces exposed.

4.2 Alternate Water-resistance Test Method: These test methods are applicable to polymeric-based barriers, and may be used in lieu of the water-resistance test method described in ASTM D 779.

4.2.1 Control specimens and weathered specimens that have been conditioned in accordance with Section 4.1 of this criteria shall be tested in accordance with AATCC Test Method 127, except that the specimens shall be held at a hydrostatic head of 55 cm for a period of five hours.

4.2.2 Water Ponding Test: A ring shall be constructed with a sample of the membrane fastened between two 200-millimeter-diameter aluminum rings using a rubber-type gasket. The membrane shall be placed between the rings and cupped to permit a depth of 30.5 mm of tap water to be exposed on 160 cm² of its surface. The test shall be conducted at room temperature (20±2°C and 65±3% RH). The ring shall be raised about 250 mm above a sheet of plain craft paper placed underneath the membrane to aid in monitoring any passage of water.

The membrane shall be maintained at constant conditions of temperature (20±2°C) and relative humidity (65±3%) and inspected at frequent intervals over a period of two hours. Ten test specimens shall be chosen at random from the membrane supplied.

No water seepage shall be observed through the membrane during the water ponding test. (Copied with permission from CCMC Guide MF07102, Technical Guide for Sheathing, Membrane, Breather-type, Section 6.4.5. The CCMC Guide is published by Canadian Construction Materials Centre.)

ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

5.0 SPECIAL REQUIREMENTS

5.1 For use over wood-based sheathing with exterior portland cement plaster, exterior insulation and finish systems or cementitious exterior coatings in jurisdictions using the IBC, IRC or UBC, the water-resistive barrier shall be installed in accordance with IBC. Section 2510.6, IRC Section R703.6.3 or UBC Section 2506.4, as applicable.

5.2 For recognition of Grade D barriers as having a 60-minute water-resistance rating, data shall be submitted in accordance with either Section 5.2.1 or 5.2.2.

5.2.1 For paper-based barriers or polymeric-based barriers tested for water resistance in accordance with

ASTM D 779, tests shall demonstrate a minimum water resistance of 60 minutes.

5.2.2 For polymeric-based barriers tested in accordance with Section 4.2 of this criteria, tests shall demonstrate that the barrier resists a hydrostatic head of 55 cm for a period of five hours.

6.0 QUALITY CONTROL

6.1 A quality control manual complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

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

TABLE 1—GRADE REQUIREMENTS FOR WATER-RESISTIVE BARRIERS

PHYSICAL PROPERTY REQUIREMENT	GRADE			
	A	B	C	D
Average dry tensile strength, minimum, pounds per inch width, both directions, (Sections 3.1, 3.2 and 3.3)	20	20	20	20
Average dry breaking force, minimum, pounds force, for polymeric woven and non-woven barriers (Section 3.3)				
Warp (machine) direction	40	40	40	40
Filling (cross) direction	35	35	35	35
Average water resistance, permeation of water through membrane, hours, minimum	24	16	8	1/6
Average water vapor transmission, grams per sq. meter per 24 hours:				
Maximum	4	6	—	—
Minimum	—	—	—	35

For **SI**: 1 pound per inch = 175 N/m, 1 pound-force = 0.454 kg-force.

TABLE 2—TEST PROCEDURES FOR PAPER-BASED BARRIERS

TEST REQUIREMENT	TEST PROCEDURE
Dry tensile strength	ASTM D 828
Water resistance	ASTM D 779
Water vapor transmission	ASTM E 96, Desiccant Method at 74.3°F (23°C)

TABLE 3—TEST PROCEDURES FOR POLYMERIC-BASED, WOVEN AND NON-WOVEN BARRIERS

TEST REQUIREMENT	TEST PROCEDURE
Dry tensile strength, or Dry breaking force	ASTM D 828 or ASTM D882, or ASTM D 5034 (Grab Method)
Water resistance	ASTM D 779, Section 4.2.2 of this criteria, or AATCC Test Method 127
Water vapor transmission	ASTM E 96, Desiccant or Water Method at 74.3°F (23°C)

ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

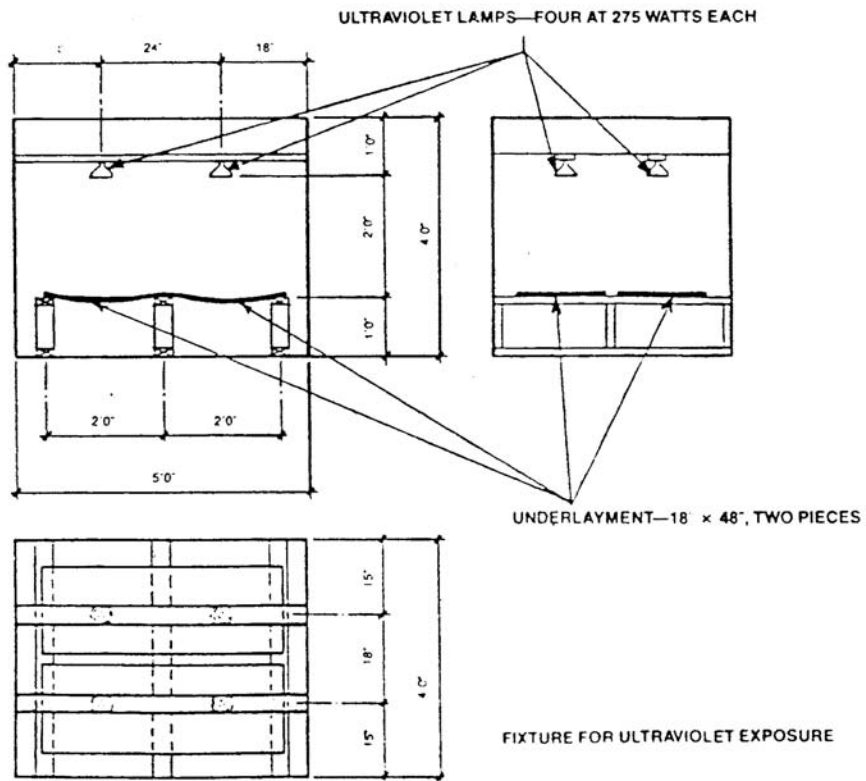


FIGURE 1