ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

AC38

Approved June 2004
Effective July 1, 2004
Previously approved 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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1.0 INTRODUCTION


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 and Section 1404.3 of the BNBC; weather-resistant sheathing paper under Section R703 of the IRC; moisture protection barriers under Section 2303.3 of the SBC; and weather-resistive barriers under Sections 1402.1 and 2506.4 of the UBC.

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 and Section 1404.3 of the BOCA National Building Code; weather-resistant sheathing paper under Section R703 of the IRC; 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.

1.4 Codes and Reference Documents:


1.4.3 BOCA® National Building Code®/1999 (BNBC).

1.4.4 1999 Standard Building Code® (SBC).

1.4.5 1997 Uniform Building Code™ (UBC).

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

1.4.7 Canadian Construction Materials Centre (CCMC) Technical Guide for Sheathing, Membrane, Breather-type, 07102, issued July 13, 1993, updated June 10, 1999. A copy of the technical guide can be obtained from CCMC at 45 O’Connor Street, Suite 1200, Ottawa, Ontario, K1P6N7, Canada, (613) 993-6189.

1.4.8 ASTM D226-97a, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproothing, ASTM International.


1.4.10 ASTM D5034-95, Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test), ASTM International.


1.4.12 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.

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.

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. For use in areas enforcing the IRC, the barrier shall also weigh not less than 14 pounds per 100 square feet (0.683 kg/m²).

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 specified in Section 6.4.5 of CCMC 07102, or with Section 4.2 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 1/16-inch-diameter (1.6 mm) mandrel at a temperature of 32°F (0°C).

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: This test method is applicable to polymeric-based barriers, and may be used in lieu of the water-resistance test method described in ASTM D 779 or CCMC 07102. 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.

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 UBC or IBC, two layers of a Grade D water-resistant barrier shall be installed. See Section 2506.4 of the UBC or Section 2510.6 of the IBC.

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 Control Manuals (AC10) shall be submitted.

6.2 Third-party follow-up inspections are not required under this acceptance criteria.
# ACCEPTANCE CRITERIA FOR WATER-RESISTIVE BARRIERS

## TABLE 1—GRADE REQUIREMENTS FOR WATER-RESISTIVE BARRIERS

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

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

## TABLE 2—TEST PROCEDURES FOR PAPER-BASED BARRIERS

<table>
<thead>
<tr>
<th>TEST REQUIREMENT</th>
<th>TEST PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry tensile strength</td>
<td>ASTM D 828</td>
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<tr>
<td>Water resistance</td>
<td>ASTM D 779</td>
</tr>
<tr>
<td>Water vapor transmission</td>
<td>ASTM E 96, Desiccant Method</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>TEST REQUIREMENT</th>
<th>TEST PROCEDURE</th>
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</thead>
<tbody>
<tr>
<td>Dry tensile strength, or</td>
<td>ASTM D 828 or ASTM D882, or</td>
</tr>
<tr>
<td>Dry breaking force</td>
<td>ASTM D 5034 (Grab Method)</td>
</tr>
<tr>
<td>Water resistance</td>
<td>ASTM D 779, CCMC 07102, or AATCC Test Method 127</td>
</tr>
<tr>
<td>Water vapor transmission</td>
<td>ASTM E 96, Method A or B</td>
</tr>
</tbody>
</table>
FIGURE 1

ULTRAVIOLET LAMPS—FOUR AT 275 WATTS EACH

UNDERLAYMENT—18 x 48", TWO PIECES

FIXTURE FOR ULTRAVIOLET EXPOSURE