



## ACCEPTANCE CRITERIA FOR FIBER CEMENT SIDING USED AS EXTERIOR WALL SIDING

AC90

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### 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*<sup>®</sup> 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 FIBER CEMENT SIDING USED AS EXTERIOR WALL SIDING

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements for fiber cement siding to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the the 2006 *International Building Code*<sup>®</sup> (IBC), the 2006 *International Residential Code*<sup>®</sup> (IRC), the *BOCA<sup>®</sup> National Building Code/1999* (BNBC), the 1999 *Standard Building Code*<sup>®</sup> (SBC) and the 1997 *Uniform Building Code*<sup>™</sup> (UBC). Bases of recognition are IBC Section 104.11, IRC Section R104.11, BNBC Section 106.4, SBC Section 103.7 and UBC Section 104.2.8.

**1.2 Scope:** This criteria is limited to mechanically attached fiber cement siding complying with ASTM C 1186 as referenced in IBC Section 1404.10 and IRC Table R703.4. The siding materials are for exterior use and are provided as panels, as soffit boards, as shingle or shake products or as horizontal lap siding. Recognition is limited to Type V construction under the BNBC and UBC and to Type VI construction under the SBC, unless the fiber cement complies with Section 3.6 of this criteria.

Compliance with this criteria is sufficient to permit minimum 1/4-inch-thick (6.4 mm) fiber-cement siding under the IBC.

### 1.3 Codes and Reference Standards:

**1.3.1** 2006 *International Building Code*<sup>®</sup> (IBC), International Code Council.

**1.3.2** 2006 *International Residential Code*<sup>®</sup> (IRC), International Code Council.

**1.3.3** *BOCA<sup>®</sup> National Building Code/1999* (BNBC).

**1.3.4** 1999 *Standard Building Code*<sup>®</sup> (SBC).

**1.3.5** 1997 *Uniform Building Code*<sup>™</sup> (UBC).

**1.3.6** ASTM C 1186-02, Flat Non-asbestos Fiber-cement Sheets, ASTM International.

**1.3.7** ASTM E 72-02, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction, ASTM International.

**1.3.8** ASTM E 119-00, Test Methods for Fire Tests of Building Construction and Materials, ASTM International.

**1.3.9** ASTM E 136-99, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM International.

**1.3.10** ASTM E 330-02, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference, ASTM International.

**1.3.11** ASTM E 331-00, Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference, ASTM International.

**1.3.12** ASTM G 153-00a, Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM International.

**1.3.13** ASTM G 155-04, Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM International.

**1.3.14** ICC-ES Acceptance Criteria for Structural Evaluation of Proprietary Sheathing Materials Used as Braced Wall Panels (AC269).

**1.3.15** APA PRP-108, Performance Standards & Qualification Policy for Structural-Use Panels, June 2001, American Plywood Association.

### 1.4 Definitions:

**1.4.1 Fastening System:** A fastening system is defined as a method to mechanically attach the siding to framing or to an exterior sheathing which in turn is mechanically attached to the framing.

## 2.0 BASIC INFORMATION

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

**2.1.1 Product Description:** Complete information concerning material specifications, thickness, size and the manufacturing process.

**2.1.2 Installation Instructions:** Installation details and limitations, fastening methods, joint treatments, and face treatments.

**2.1.3 Packaging and Identification:** A description of the method of packaging and field identification of the panel. Identification provisions shall include the evaluation report number and the name or logo of the inspection agency.

**2.1.4 Field Preparation:** A description of the methods of field-cutting, application and finishing.

**2.2 Testing Laboratories:** 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.

**2.3 Test Reports:** Test reports shall comply with AC85.

**2.4 Product Sampling:** Products for testing shall be sampled in accordance with Section 3.1 of AC85.

## 3.0 TEST AND PERFORMANCE REQUIREMENTS

**3.1 Physical Properties:** Reports of tests that demonstrate compliance with ASTM C 1186, Type A, including supplementary requirements, shall be submitted.

**3.2 Weather-resistive Considerations:** A water-resistive barrier complying with Section 1403.2 of the IBC, Section R703.2 of the IRC, Section 2303.3 of the SBC, Section 1404.3 of the BNBC or Section 1402.1 of the UBC is required. When installed in jurisdictions enforcing the IBC, the siding shall have a minimum thickness as noted in IBC Table 1405.2 and shall be installed as described in IBC Sections 1405.15 and 1405.17. In jurisdictions enforcing the IRC, the siding shall have minimum thickness of 1/4 inch (6.4 mm) and shall be installed as described in IRC Table R703.4 and Section R703.10.

**3.3 Transverse Load Tests:** Reports of transverse load tests in accordance with Section 4.1 of this criteria shall be submitted.

**3.4 Racking Shear Tests:** When optional recognition is sought for use as shear walls that resist wind or seismic forces, racking shear tests in accordance with Section 4.2 of this criteria are required.

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**3.5 Fire-resistance-rated Construction:** When recognition is sought for use on walls required to be of fire-resistance-rated construction, reports of tests in accordance with ASTM E 119 shall be submitted.

**3.6 Noncombustible Construction:** When recognition is sought for use on walls required to be of noncombustible construction under the BNBC, SBC or UBC, data showing compliance with ASTM E 136 shall be submitted.

**3.7 Accelerated Weathering:** For recognition under the UBC, reports of accelerated weathering tests conducted in accordance with Section 4.3 of this criteria shall be submitted.

### 4.0 TEST METHODS

**4.1 Transverse Load Tests:** Testing shall be in accordance with ASTM E 330, Procedure B, or the ASTM E 72 Uniformly Distributed Loading procedure. At least three positive and three negative load tests shall be conducted with the siding fastened to the framing system in accordance with the published installation instructions. Test assemblies shall be a minimum of 4 feet by 8 feet (1219 mm by 2438 mm). Application of loads to failure shall be in at least six increments with a 10-second load duration for each increment. Test assemblies shall be mounted according to ASTM E 330 or ASTM E 72. Framing supporting the panel shall be located at the maximum spacing on which recognition is desired. ICC-ES shall approve any variations from these spans prior to commencement of tests. Load deflection readings at the midpoint of panel spans shall be reported. Conditions of acceptance shall be based on the following:

1. Allowable loading shall be based on a factor of a safety of 3.0 applied to the ultimate load, if all of the following are satisfied:

- a. No single test result varies by more than 15 percent from the average of three tests. Variations exceeding this limit will result in larger safety factors.

- b. Allowable load does not exceed established values for mechanical connectors such as nails, screws and staples.

2. Other factors of safety can be considered based on unique conditions of installation or material used.

**4.2 Racking Shear Test:** Racking shear tests shall be conducted in accordance with AC269. Specimen preparation shall be in accordance with APA Test Method S-3 (APA PRP-108). A factor of safety of 3.0 shall be used. The racking shear tests shall be conducted after wetting in accordance with Section 15 of ASTM E 72.

**4.3 Accelerated Weathering Test:** This test applies only to recognition under the UBC. Five 3-inch-by-9-inch specimens are prepared. Procedure as outlined in ASTM G 153, Cycle 1 (ASTM G 23, Method 1), or ASTM G 155, Cycle 1 (ASTM G 26, Test Method A), can be used. The test shall be conducted for 2000 hours with cycles of 102 minutes of light followed by 18 minutes of light and water spray. Black panel temperature shall be  $145^{\circ}\text{F} \pm 5^{\circ}\text{F}$  ( $63^{\circ}\text{C} \pm 2.2^{\circ}\text{C}$ ). Humidity is not controlled.

Condition of acceptance is that after exposure, there shall be no cracking, checking, crazing, erosion or other characteristics that might affect product performance as an exterior wall cladding in any specimens when viewed under minimum 5x magnification.

### 5.0 QUALITY CONTROL

**5.1** The products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by International Accreditation Service (IAS), or as otherwise acceptable to ICC-ES.

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

### 6.0 EVALUATION REPORT RECOGNITION

When cold-formed steel light-framed shear walls are recognized under the IBC and IRC for wind forces only, a condition of use will be included in the evaluation report that other means must be provided, to the satisfaction of the building official, to comply with the applicable seismic requirements. ■