ACCEPTANCE CRITERIA FOR PLASTIC BATTENS USED IN CLAY OR CONCRETE TILE ROOF SYSTEMS

AC200

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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*® 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.

ACCEPTANCE CRITERIA FOR PLASTIC BATTENS USED IN CLAY OR CONCRETE TILE ROOF SYSTEMS

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for recognition of plastic battens used in clay or concrete tile roof systems, in ICC Evaluation Service, Inc. (ICC-ES), evaluation reports under the 1997 *Uniform Building Code*™ (UBC), the 2003 *International Building Code*® (IBC), and the 2003 *International Residential Code*® (IRC). The bases of recognition are UBC Section 104.2.8, IBC Section 104.11 and IRC Section R104.11.

1.2 Scope: The acceptance criteria is limited to recognition of plastic battens used with interlocking clay or concrete roofing tile with projecting anchor lugs installed in accordance with Table 15-D-2 of the UBC, Table 1507.3.7 of the IBC, and Table R905.3.7 of the IRC. The tile lugs shall fully engage the batten. Battens recognized in accordance with this criteria are limited to installations where roof tiles are fastened through the batten to the deck in accordance with the applicable code, with the exception of "S" tiles for which all tiles must be fastened. Battens recognized in accordance with this criteria shall be designed and formed in such a manner that the battens allow water draining down the slope of the roof to pass through the battens.

Use of the plastic battens is limited in jurisdictions enforcing the IBC to areas having maximum basic wind speeds (3-second gust) of 100 mph (161 km/h) and to a maximum mean roof height of 60 feet (18 288 mm), and in jurisdictions enforcing the IRC to maximum basic wind speeds (3-second gust) of 100 mph (161 km/h) and maximum mean roof height of 40 feet (12 192 mm), unless the evaluation report on the roof tile includes recognition for higher wind speeds or mean roof height when the plastic battens are incorporated.

1.3 Codes and Referenced Standards:

1.3.1 2003 *International Building Code*®, International Code Council.

1.3.2 2003 *International Residential Code*®, International Code Council.

1.3.3 1997 *Uniform Building Code*™, International Conference of Building Officials.

1.3.4 ASTM Standard E 108-00, Standard Test Methods for Fire Tests of Roof Coverings, American Society for Testing and Materials.

1.3.5 ASTM D 790-02, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials, ASTM International.

1.3.6 UL 790-97, Tests for Fire Resistance of Roof Covering Materials, Underwriters Laboratories.

1.4 Definitions:

1.4.1 Recovered Material: Waste material and byproducts which have been recovered or diverted from solid waste; the term does *not* include those materials and byproducts generated from, and commonly reused within, an original manufacturing process.

1.4.2 Post-consumer Waste: Material or product that has served its intended use and has been discarded after passing through the hands of a final user. Post-consumer waste is a part of the broader category "recycled material."

1.4.3 Recycled Material: Material that can be utilized in place of a raw or virgin material in manufacturing a product, and that consists of materials derived from post-consumer waste, industrial scrap, material derived from agricultural waste and other items, all of which can be used in the manufacture of new products.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information concerning the battens, including materials and dimensions.

2.1.2 Installation Instructions: Complete installation instructions, including fastening methods.

2.1.3 Packaging and Identification: Description of the method of packaging and field identification of the battens. The packaging shall include the manufacturer's name and address, the product name, the name or logo of the inspection agency and the evaluation report number.

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: Sampling of the plastic battens for tests under this criteria shall comply with Section 3.1 of AC85.

2.5 Recycled or Recovered Material Qualification: The introduction of recycled or recovered material into recognized plastic battens shall be qualified to establish that battens with recycled or recovered content meet the requirements of this acceptance criteria. The definitions in Section 1.4 apply.

3.0 REQUIRED DATA

3.1 Reports of approved plastics tests in compliance with Section 4.1 of this criteria shall be submitted.

3.2 Reports of flexural strength tests in compliance with Section 4.2 of this criteria shall be submitted.

3.3 Reports of temperature cycling tests in compliance with Section 4.3 of this criteria shall be submitted.

3.4 Reports of crushing load tests in compliance with Section 4.4 of this criteria shall be submitted.

3.5 Reports of creep tests in compliance with Section 4.5 of this criteria shall be submitted.

3.6 Reports of ultraviolet light exposure tests in compliance with Section 4.6 of this criteria shall be submitted.

3.7 Reports of roof classification tests in compliance with Section 4.7 of this criteria shall be submitted.

Exception: Battens limited to nonrated roofing.

4.0 TEST PROCEDURES

4.1 Approved Plastics: Plastics used in battens shall comply as an approved plastic in accordance with UBC Section 217 or, for recognition under the IBC or IRC, IBC

Section 2606.4, except that the smoke-developed requirements in the UBC and IBC are waived.

4.2 Flexural Strength:

4.2.1 General: Five specimens shall be exposed to ultraviolet light in accordance with Section 4.6 of this criteria, and five specimens shall be held as control specimens. After the 210-hour exposure, both the exposed specimens and the control specimens shall be tested in accordance with ASTM D 790.

4.2.2 Conditions of Acceptance: Loss in flexural properties resulting from the ultraviolet light exposure will be evaluated on a case-by-case basis.

4.3 Temperature Cycling:

4.3.1 General: A roof deck consisting of the roof sheathing material for which recognition is sought shall be attached to a rigid wood frame in a manner simulating the field installation procedure recommended by the manufacturer. An underlayment shall be included in the test assembly. A minimum of five rows of the batten shall be attached to the sheathing in accordance with the manufacturer's instructions. Each row of battens shall have a joint representative of field conditions.

The test specimen shall be subjected to 25 consecutive cycles of this test, each cycle consisting of one hour of water exposure at room temperature prior to six hours at minus 40˚F (–40˚C), 2 hours at 70˚F (21.1˚C), 14 hours at 180˚F (82˚C), and 1 hour at 70˚F (21.1˚C). Between cycles, such as on weekends and holidays, the samples may be maintained at 70˚F (21.1˚C). A plus 5˚F (2.8˚C) tolerance is allowed on all the above temperatures. Spray nozzles for the water exposure shall be located approximately 7 feet (2134 mm) above the test decks and shall deliver 6 inches (152 mm) of water per hour at a temperature of 40˚F to 60˚F (4.4˚C to 15.6˚C). The test decks shall be installed at the lowest slope recommended for field installation. At the conclusion of the 25 cycles, the specimens shall be examined under minimum 5x magnification.

4.3.2 Conditions of Acceptance: The product is considered to have passed this test if no crazing, cracking or other deleterious surface or joint changes are noted at the end of the test. Additionally, there shall be no sign of failure or distress in the battens or the sheathing at the fastener locations.

4.4 Crushing Load:

4.4.1 General: Five representative specimens shall be tested.

4.4.2 Apparatus: Test apparatus shall include a 3-inch-diameter (76 mm) steel plate with rounded corners, a device capable of imposing a 200-pound (890 N) load, and a measuring device capable of determining surface penetration to the nearest 0.01 inch (0.25 mm).

4.4.3 Procedure: The test specimens shall consist of a 12-inch-long (305 mm) section of the batten continuously supported by a rigid backing such as concrete. The 200-pound (890 N) load is imposed on the plate that is centered on the specimen. The surface penetration is determined to the nearest 0.01 inch (0.25 mm). The superimposed load is reduced to zero and reloaded a minimum of four additional times, with penetration and residual readings taken each time without removal of the plate. The specimen is to be inspected after the test and the condition at the steel plate interface noted.

4.4.4 Conditions of Acceptance: There shall be no tearing, cracking, or permanent deformation in any tested batten.

4.5 Creep Test:

4.5.1 General: The battens shall be installed on a simulated roof deck in accordance with the roof tile manufacturer's instructions. The fastener type and spacing of the fastener attaching the battens to the roof deck shall be representative of field installation. A load equivalent to 2.5 times the weight of the roof tile is applied to the batten in a downward direction parallel to the slope of the roof, through a loading device used to simulate a roof tile lug. The test assembly is exposed to a minimum temperature of 150˚F (65˚C) and maintained at a 12:12 (100%) slope for a period of 12 hours.

4.5.2 Conditions of Acceptance: Movement of the batten in the direction of the roof slope shall not exceed $^1/_{32}$ inch (0.8 mm). Permanent set shall not exceed $^1/_{32}$ inch (0.8 mm). There shall be no indentation in the batten greater than $^1/_{32}$ inch (0.8 mm) at the location where the lug engages the batten. All tiles shall remain in place for the duration of the exposure.

4.6 Ultraviolet Light Exposure:

4.6.1 General: Exposure to ultraviolet sunlamps for 210 hours (10 hours per day for 21 days) in an enclosure providing the following characteristics: Ultraviolet exposure shall be directed on the specimen surface that will be exposed to sunlight in normal application. The lamps and enclosure shall be adjusted so that the temperature on the sample is between 135˚F and 140˚F (57.2˚C and 60˚C). Sun-lamp bulbs shall be General Electric Type H275 RUV (275 W) or equivalent bulbs providing UV characteristics of 5.0 W/m^2/nm irradiance at a wavelength of 315 to 400 nm at one meter.

4.6.2 Conditions of Acceptance: No visible surface or structural changes such as peeling, chipping, cracking, flaking or pitting when observed under minimum 5x magnification. Additionally, ultraviolet-exposed specimens must be subjected to flexural strength tests with conditions of acceptance as noted in Section 4.2.

4.7 Roof Classification: For recognition of installation on buildings required to have a Class A, B or C roofing classification or noncombustible classification, reports of roof classification tests on two Class A intermittent flame and four Class A burning brand decks in accordance with UBC Standard 15-2, ASTM E 108 or UL 790, shall be submitted. The roof tile shall be flat lightweight concrete tile having a maximum installed weight of 6.5 pounds per square foot (311 Pa).

5.0 QUALITY CONTROL

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

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

6.0 EVALUATION REPORT RECOGNITION

The evaluation report shall include a condition of use that use of the battens shall be approved by the building official.■