ACCEPTANCE CRITERIA FOR CONCRETE AND CLAY ROOF TILE FASTENERS

AC65

Approved June 1991

Effective July 1, 1991

(Editorially revised October 2005 and October 2008)

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

ACCEPTANCE CRITERIA FOR CONCRETE AND CLAY ROOF TILES FASTENERS

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish minimum requirements for recognition of concrete and clay roof tile fastener systems in ICC Evaluation Service, Inc. (ICC-ES), evaluation reports under the 2006 *International Building Code*® (IBC), the 2006 *International Residential Code*® (IRC), and the 1997 *Uniform Building Code*™ (UBC). Bases of recognition are IBC Sections 104.11, 1507.3.6, and 1507.3.7; IRC Sections R104.11, R905.3.6, and R905.3.7; and UBC Sections 104.2.8 and 1507.7.

1.2 Scope: This criteria applies to clay and concrete roof tile fastener systems used as alternates to corrosion-resistant, No. 11 gage, $^{5}/_{16}$-inch-head (7.9 mm) nails, wire and/or nose clips for use in high-wind areas as set forth in IBC Section 1507.3.7, IRC Section R905.3.7, and UBC Section 1507.7. The fastener systems shall be composed of metallic straps, wires and fasteners attached to a roof deck in a manner to resist gravity and wind-uplift loads on clay and concrete roof tiles.

1.3 Codes and Referenced Standards:

1.3.1 2006 *International Building Code*® (IBC), International Code Council.

1.3.2 2006 *International Residential Code*® (IRC), International Code Council.

1.3.3 1997 *Uniform Building Code*™ (UBC).

1.3.4 ASTM B 134-86, Standard Specification for Brass Wire, ASTM International.

1.3.5 ASTM A 641-03, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire, ASTM International.

1.3.6 ASTM A 580-90, Standard Specification for Stainless Steel Wire, ASTM International.

1.3.7 ASTM B 3-74, Standard Specification for Soft or Annealed Copper Wire, ASTM International.

1.3.8 ASTM A 240-05, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application, ASTM International.

1.3.9 ASTM A 653-04a, Standard Specification for Steel Sheet, Zinc-Coated Galvanized or Zinc-Iron Alloy-Coated Galvannealed by the Hot-Dip Process, ASTM International.

1.3.10 ASTM B 36-01, Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar, ASTM International.

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, shape, and the manufacturing process.

2.1.2 Installation Instructions: Installation details and limitations, and fastening methods.

2.1.3 Packaging and Identification: The method of packaging and identifying components shall be specified. Identification shall include 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 fastener system components for tests under this criteria shall comply with Section 3.2 of AC85.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 General: Preparation of test assemblies and tests must be done or witnessed by an ICC-ES–approved laboratory in accordance with Section 3.3 of AC85.

3.2 Materials:

3.2.1 General: The materials shall be any nonferrous metal or any metal having an unbroken surfacing of nonferrous metal, or steel with not less than 10 percent chromium or with not less than 0.20 percent copper (Note: requirement from Section 1502 of the UBC). Wire products shall have a minimum diameter of 0.0625 inch (1.6 mm) and shall withstand without fracture bending through 180 degrees over a mandrel of a diameter not greater than the diameter of the wire at a temperature of −20°F (−28.9°C).

3.2.2 Wire:

3.2.2.1 Brass Wire: The wire products made with brass shall comply with ASTM B 134 as alloy No. C2600 with temper H01 (Quarter Hard) with minimum tensile strength of 62,000 pounds per square inch (427.5 MPa) and maximum tensile strength of 77,000 pounds per square inch (530.9 MPa). Testing shall be in accordance with ASTM B 250.

3.2.2.2 Galvanized Steel Wire: The galvanized steel wire products shall comply with ASTM A 641 and have a minimum Class I coating; a medium temper; and minimum and maximum tensile strengths of 70,000 psi (482.6 MPa) and 100,000 psi (689.5 MPa), respectively.

3.2.2.3 Stainless Steel Wire: The stainless steel wire products shall comply with ASTM A 580 as Types No. 302, 304 or 316, having a minimum tensile strength of 75,000 psi (517.1 MPa) and a minimum elongation of 25 percent.

3.2.2.4 Copper Wire: Copper wire products made with copper shall comply with ASTM B 3, having a minimum tensile strength of 38,500 psi (265.4 MPa) and a minimum elongation of 25 percent.

3.2.3 Flat Sheets:

3.2.3.1 Stainless Steel: Sheet products made from stainless steel shall comply with ASTM A 240.

3.2.3.2 Galvanized Steel: Sheet products made from galvanized steel shall comply with ASTM A 653.

3.2.3.3 Brass: Sheet products made from brass shall comply with ASTM B 36.

3.2.4 Fasteners: Fasteners used to attach the roof tile fastener systems to roof decks of wood, plywood, or oriented strand board (OSB) shall comply with IBC Section 2303.6 or the ICC-ES Acceptance Criteria for Nails and Spikes (AC116), dated October 2006. Fasteners used to connect roof tile fastener systems to steel or concrete roof decks shall be recognized in a current ICC-ES evaluation report. Fasteners shall be electrolytically compatible with the roof tile fastener system components.

3.3 Load Tests: Load tests shall be conducted to establish the holding capacity of the roof tile fastening

system. The test apparatus can be any calibrated, standard, mechanical or hydraulic testing machine capable of applying and measuring the required load within an accuracy of ±2 percent. Details of the test protocol shall be submitted for ICC-ES approval prior to the commencement of tests.

Test specimens shall be installed in the testing machine in a manner representative of field installation conditions. A minimum of five specimens shall be tested for each type of fastening system. Load shall be applied at a rate of 2 inches per minute (50.8 mm per minute) until failure occurs. Failure load is defined as the load at which the fastening system no longer performs its intended function of securing the tiles. Allowable capacity of each fastening system is established by using a factor of safety of 4 on the average failure load.

4.0 QUALITY CONTROL

4.1 The fastening system components shall be manufactured under an approved quality control program documented in a manual complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10).

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

5.0 EVALUATION REPORT RECOGNITION

5.1 The evaluation report shall include basic information required by Sections 2.1.1 through 2.1.3, including product description, installation procedures, and packaging and identification information.

5.2 Calculations prepared by a registered design professional must be submitted to the code official for approval. The calculations shall use the allowable holding capacity determined in accordance with Section 3.3 for each fastening system, to derive the number of fasteners and the spacing required to meet the requirements for gravity and wind-uplift loads for a concrete or clay tile roof.■