



EVALUATION GUIDELINE FOR CLASSIFIED WOOD ROOF SYSTEMS

EG107

Approved September 1, 2004

(Effective October 1, 2004)

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 document has been issued to provide all interested parties with guidelines for demonstrating compliance with performance features of the applicable code(s) referenced in the document. The guideline has been approved 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 guideline, while reports issued prior to this date may be in compliance with this guideline or with the previous edition. If the guideline is an updated version from the previous edition, a solid vertical line (|) in the margin within the guideline 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 guideline may be further revised as the need dictates.

ICC-ES may consider alternate guidelines, provided the report applicant submits valid data demonstrating that the alternate guidelines are at least equivalent to the guidelines 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 guidelines set forth in this document, or that it can be demonstrated that valid alternate guidelines are equivalent to the guidelines 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

1.1 Purpose: The purpose of this guideline is to establish requirements for classified wood roof systems to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 2003 *International Building Code*[®] (IBC), the 2003 *International Residential Code*[®] (IRC), and the 1997 *Uniform Building Code*[™] (UBC). The bases of recognition include IBC Sections 104.11 and 1505, IRC Sections R104.11 and R902, and UBC Sections 104.2.8 and 1504.

1.2 Scope: This evaluation guideline is intended to establish a basis for recognition of classified wood roof systems, including both fire-retardant-treated and nonfire-retardant-treated systems. Issuance of an evaluation report is permitted after successful completion of the rain test outlined in ASTM E 108 or UL 790, using the rain test outlined in ASTM D 2898 Method A, and after successful completion of the fire tests after three years of natural weathering as described in Section 11 of UL 790. Alternately, successful test results for the amended rain test outlined in Section 4.1 of this guideline will permit issuance of an evaluation report. In all cases, issuance of an evaluation report requires that the 10-year weathering tests be in progress at the time of issuance, and that information complying with Section 5.10 of this guideline is provided. Successful results after each test period specified in Section 11 of UL 790 shall be required to maintain a valid evaluation report.

This guideline only addresses the fire classification aspects of the wood roofing products. Data showing compliance with the applicable code or other applicable ICC-ES acceptance criteria or evaluation guidelines shall also be submitted.

1.2.1 Fire-retardant-treated material shall comply with all sections of this guideline, AC10 and applicable sections of AC07.

1.2.2 Nonfire-retardant-treated material shall not be required to comply with Sections 2.3, 2.4.4, and 5.3 through 5.9 of this guideline. The supplemental inspection agency requirements, inspection frequency, labeling and quality control requirements for the manufacturer shall be in accordance with AC07 and EG09.

1.3 Codes and Standards:

1.3.1 2003 *International Building Code*[®] (IBC), International Code Council.

1.3.2 2003 *International Residential Code*[®] (IRC), International Code Council.

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

1.3.4 ASTM D 2898, Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, ASTM International.

1.3.5 ASTM E 108, Standard Test Methods for Fire Tests of Roof Coverings, ASTM International.

1.3.6 UL 790-2004, Tests for Fire Resistance of Roof Covering Materials. Underwriters Laboratories, Inc.

1.3.7 ICC-ES Acceptance Criteria for Special Roofing Systems (AC07).

1.3.8 ICC-ES Evaluation Guideline for Wood Shakes and Shingles (EG09).

2.0 BASIC INFORMATION AND REPORTS OF TESTS

2.1 Product Description: Complete information concerning material specifications, thickness, size, grade and the manufacturing or treatment process shall be submitted.

2.2 Installation Instructions: Installation details and limitations, and field cutting and fastening methods, shall be submitted.

2.3 Packaging and Identification: A description of the method of packaging and field identification of the product shall be submitted. The identification provisions shall include the following:

2.3.1 Bundle Treatment Label: Each bundle label shall include:

- Name and evaluation report number of the report holder.
- Name, telephone number and address of the treater.
- Name or logo of the inspection agency.
- Class of treatment.

2.3.2 Pallet Labels: Each pallet shall be identified to ensure product traceability to treatment or production records.

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 and shall also include the information required in Section 2.4.3 of this guideline.

2.4.3 For nontreated products, sampling shall be in accordance with Section 3.1 of AC85.

2.4.4 For treated products, the treatment process for products to be tested shall be witnessed by the laboratory or inspection agency; and all phases of the treatment process, including but not limited to the following, shall be observed, and documented in the test report and treater's quality system documentation to establish a baseline for future production:

- Moisture content of the product to be treated.
- Treatment solution analysis and concentration.
- Method of treatment.
- Amount of vacuum and pressure used for treatment.
- Method for determining chemical retention.
- Amount of chemical retention.
- Temperatures of solution and wood immediately prior to treatment.
- Time period of treatment.

EVALUATION GUIDELINE FOR CLASSIFIED WOOD ROOF SYSTEMS

- Waiting or drip period after treatment.
- Method of curing after treatment, including drying time, temperature and humidity. If the product is kiln-cured, the same parameters are needed.

3.0 REQUIRED DATA

3.1 Roof Classification Tests: Roof underlayments necessary for obtaining the classification in the tests shall be manufactured under a listing program of an agency accredited by the International Accreditation Service (IAS). Fire classification roof tests conducted in accordance with ASTM E 108 or UL 790, using the rain test in ASTM D 2898 Method A, are necessary for new construction and for installation over existing roof-covering materials. Recognition in an ICC-ES evaluation report requires successful completion of a minimum of three years of the ten-year weathering in accordance with Section 11 of UL 790. As an alternate, the Amended Rain Test described in Section 4.0 of this guideline, which differs from the rain test in ASTM D 2898, may be employed:

4.0 TEST METHOD

4.1 Amended Rain Test: The test decks shall be mounted in a frame at a slope of 4:12. Uniformly distributed water exposure is accomplished with spray nozzles that deliver an average of 0.3 ± 0.02 gal./min./ft² (0.027L/min/m²) at a temperature of 35°F to 90°F (1.6°C to 32.2°C), mounted approximately two feet above the test decks. If water is recirculated, at the end of each of the first three wetting cycles, and before each of the last three wetting cycles, water shall be drained from the system and replaced with fresh water. All other wetting cycles shall have fresh water introduced at a rate that provides a minimum of 5 gallons (19 L) of fresh water per nozzle, per cycle.

The test decks shall be subjected to three exposure cycles per day, which totals 252 eight-hour cycles for the 12-week duration. Each cycle consists of four hours of water exposure, followed by four hours of ventilation and drying.

Drying shall utilize sunlamps for both heat and ultraviolet (UV) exposure, with supplemental heaters as required to maintain a temperature of 145°F to 155°F (63°C to 68°C) measured 1 inch (25.4 mm) above the surface of the test deck, with this temperature attained within 15 minutes from the start of drying. The temperature-measuring device must be shielded from the UV radiation of the sunlamps. One lamp per 8 square feet (0.72 m²) of test deck surface shall be directed normal to and mounted 26 inches \pm 6 inches (660 mm \pm 152 mm) above the specimen. Required are General Electric Type H275 RUV (275W) or equivalent bulbs providing UV characteristics of 5.0 W/m²/nm irradiance at a wavelength of 315 to 400 nm at 1 meter. Uniform forced air movement across the surface of the decks at a rate of at least 25 ft/min. (0.125 m/s) is required, along with sufficient room air changes to assure thorough drying.

Following completion of the exposure cycling, the decks are immediately subjected to the fire tests or conditioned at 70°F to 75°F (21°C to 24°C) and 40 to 50 percent RH until tested. Testing shall comply with Table 3.1 of UL 790 for the rain test. The deck lumber shall attain a moisture content between 8 and 12 percent prior to testing. The conditions of acceptance shall be in accordance with Section 12 of UL 790.

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 the International Accreditation Service, Inc. (IAS), or 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.

5.3 The following information and procedures shall be documented in the quality control manual. Additionally, the manual shall include information on quality control tests as set forth in this document, and key processing parameters determined during sampling and qualification testing of the products. Parameters include:

5.3.1 Moisture content prior to treatment.

5.3.2 Solution analysis.

5.3.3 Solution strength.

5.3.4 Method of treatment.

5.3.5 Amount of vacuum and pressure used for treatment.

5.3.6 Method for determining chemical retention.

5.3.7 Amount of chemical retention.

5.3.8 Temperature of solution and wood during treatment.

5.3.9 Time period of treatment.

5.3.10 Waiting or drip period after treatment.

5.3.11 Drying time, temperature and humidity.

5.3.12 Procedures for ensuring proper kiln drying.

5.3.13 Inspection agency checklists for monthly inspections.

5.4 Frequency of Third-party Inspection, and Inspection Log:

5.4.1 Minimum frequency of unannounced follow-up inspections by the inspection agency shall be once per month.

5.4.2 A permanent log shall be maintained at the treatment facility showing the date of inspection, inspector's name, products inspected and duration of inspection visit.

5.4.3 Inspection records shall be maintained at the facility for a minimum of two years.

5.5 Monthly Sampling:

5.5.1 During the monthly inspection, the inspection agency shall obtain a minimum of four bundles of treated shakes and two bundles of treated shingles for each class of treatment for subsequent quarterly tests as described in Section 5.8 of this guideline.

5.5.2 Solution concentrate shall be sampled on a quarterly basis by the inspection agency for chemical and other verification tests.

EVALUATION GUIDELINE FOR CLASSIFIED WOOD ROOF SYSTEMS

5.6 In-house Requirements of the Treater:

5.6.1 When a new batch of treating solution is prepared or when adjustments are made to the solution, a sample of the treating solution shall be drawn from the working solution supply for verification testing by the in-plant quality control inspector or his designee, as specified in the approved quality control manual.

5.6.2 Continuous automatic chart recorders shall be used to record retort pressure, vacuum and temperature, as defined in the quality control manual. Charts representing each day's production shall be signed and dated by the in-plant quality control inspector or his designee as specified in the approved quality control manual, and kept in a permanent file for auditing by the inspection agency.

5.7 Maintenance of Records: The following quality control records shall be maintained on file at the treatment location for a minimum of two years:

5.7.1 Records on testing of each load of solution concentrate and working solution sampling and testing.

5.7.2 Ambient environmental conditions in the kiln used for post-treatment curing shall be automatically recorded and the chart records, traceable to each treatment charge, shall be dated and signed by the in-plant quality control inspector.

5.7.3 Verification of a contractual agreement with an inspection agency accredited by IAS. The agreement shall address:

5.7.3.1 Weekly unannounced inspections for grading wood shakes and shingles to ensure compliance of materials with the referenced codes and this guideline. For Class B shakes, flat grain shall be limited to a maximum of 5 percent of the lineal inches per bundle.

5.7.3.2 Label logs to ensure proper accounting of production.

5.8 Quarterly Fire Tests:

Each quarter, test decks shall be constructed from the shakes and shingles drawn from previous monthly inspections as outlined in Section 5.5 of this guideline, and the decks shall be subjected to the UL 790 or ASTM E 108 tests as follows:

5.8.1 For Class C, one deck each of shakes and shingles shall be subjected to the flying brand and intermittent flame tests.

5.8.2 For Classes A and B, one deck each of shakes and shingles shall be subjected to the burning-brand and intermittent flame tests.

5.9 Noncompliance:

5.9.1 If a major discrepancy or variance as outlined in the quality control manual is detected during the regular inspections, or if a failure occurs in any of the quarterly quality control fire tests:

5.9.2 An immediate follow-up inspection of the treatment facility shall be conducted by the inspection agency.

5.9.2.1 Treatment records pertaining to the batch from which the specimens were drawn shall be examined to determine the cause of failure and remedial measures taken.

5.9.2.2 Five bundles of the discrepant or failed product type(s) shall be sampled from current production and intermittent flame, burning-brand and flying brand tests conducted.

5.9.2.3 Any failure of the retested specimens shall be cause for immediate suspension of labels until a detailed investigation to determine the cause(s) has been completed.

5.9.2.4 ICC-ES shall be notified by the inspection agency, in writing, within 10 days of suspension of label service.

5.10 Weathering Decks:

5.10.1 The location and details of decks and a projected schedule of tests at one, two, three, five and 10 years, as specified in Section 11 of UL 790, shall be included in the quality control manual. The weathering decks shall be in a secure location under total control of the testing laboratory or the inspection agency.

5.10.2 A written report of test results shall be provided to ICC-ES within 30 days after completion of tests for each time period.

6.0 JOINT AUDIT

Prior to recognition or issuance of an evaluation report, ICC-ES reserves the right to conduct an audit of the treater at the treatment facility, jointly with the inspection agency. ■