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February 1, 2012

**TO: PARTIES INTERESTED IN ALTERNATIVE ASPHALT ROOFING SHINGLES**

**SUBJECT: Proposed Revisions to the Acceptance Criteria for Alternative Asphalt Roofing Shingles, Subject AC438-0212-R1 (JV/CA)**

Dear Colleague:

We are seeking your comments on proposed revisions to the subject acceptance criteria, as presented in the enclosed draft. The revisions, which are being posted on the ICC-ES web site for 30 days of public comment, may be summarized as follows:

1. Revision to the second paragraph of Section 1.1, deleting the statement that the asphalt shingles being evaluated under this criteria can be considered acceptable alternatives to asphalt shingles complying with ASTM D 3462.

This revision clarifies that the acceptance criteria is intended to establish that the shingles will meet the minimum performance requirements of the International Codes, not to establish that a product is a direct equivalent of a product complying with the referenced standard. The revised language is similar to statements found in other criteria (such as Section 1.1 of AC07).

2. Adding ASTM D 1079 (Standard Terminology Relating to Roofing and Waterproofing) to Section 1.4 (Codes and Referenced Standards).

The standard is being added due to the fact that it is being referenced in the proposed revision to Section 2.1.3. See Item 3, below.

3. Revising Section 2.1.3 (Shingle Application) to clarify shingle headlap and offset requirements.

This revision clarifies how the headlap is to be determined. It also deletes the sentence that mentions overlaps and interlocks since a related sentence providing overlaps and interlocks (in lieu of complying with the minimum 2-inch headlap) was deleted from the criteria at the October meeting. The deletion of provisions for overlaps and interlocks brings about the need for the proposed new sentence which addresses offsets between adjacent courses of shingles, as specified in the manufacturer's published installation instructions.

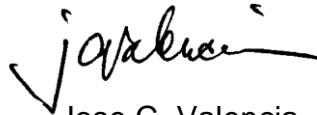
While the Evaluation Committee will be voting on the revised criteria during the 30-day comment period, we will seriously consider all comments from the public and will pull the criteria back for reconsideration if public comments raise major issues. In that case, we would seek a new committee vote; further revise the draft and post it for a new round of public comments; or put the revised criteria on the agenda for a future Evaluation Committee hearing.

If they are of interest, please review the proposed revisions and send us your comments at the earliest opportunity. At the end of the 30-day comment period, we will post on our web site the correspondence we have received and, in memo form, the responses of our technical staff.

To submit your comments, please use the form on the web site and attach any letters or other materials. If you would like an explanation of the "alternate criteria process," under which we are soliciting comments, this too is available on the ICC-ES web site.. Please do not try to communicate directly with any Evaluation Committee member about a criteria under consideration, as committee members cannot accept such communications.

Thank you for your interest and your contributions. If you have any questions, please contact me at (800) 423-6587, extension 5693, or Chris Allen, P.E., Senior Staff Engineer, at extension 3275. You may also reach us by e-mail at [es@icc-es.org](mailto:es@icc-es.org).

Yours very truly,



Jose C. Valencia, CSI  
Staff Architect

JCV/raf

Encl.

cc: Evaluation Committee

## PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR ALTERNATIVE ASPHALT ROOFING SHINGLES

AC438

Proposed February 2012

Previously approved October 2011

### PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes. (Some reports may also reference older code families such as the BOCA National Codes, the Standard Codes, and the Uniform 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.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits 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. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, 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 injury or unreasonable damage.

NOTE: The Preface for ICC-ES acceptance criteria was revised in July 2011 to reflect changes in policy.

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

# PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR ALTERNATIVE ASPHALT ROOFING SHINGLES (AC438)

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements for alternative asphalt roofing shingles made from woven or nonwoven felt to be recognized in an ICC Evaluation Service, LLC (ICC-ES), evaluation report under the 2009 *International Building Code*® (IBC) and the 2009 *International Residential Code*® (IRC). Bases of recognition are IBC Section 104.11 and IRC Section R104.11.

The reason for the development of this criteria is to provide guidelines for the evaluation of alternative asphalt roofing shingles that can be considered acceptable alternatives to asphalt shingles complying with ASTM D 3462, since the codes do not provide test methods and performance requirements for such alternatives.

**1.2 Scope:** Shingles that comply with this criteria shall be recognized for use as an alternative roof covering to the asphalt shingles specified in IBC Section 1507.2.5 and IRC Section R905.2.4.

### 1.3 Definitions:

**1.3.1 Felt:** A flexible sheet manufactured by the interlocking of glass fibers or other fibers with a binder, or through a combination of mechanical work, moisture and heat.

**1.3.2 Steep-slope Roofing:** Roofing on roof slopes of two units vertical in 12 units horizontal (17 percent slope) or greater.

**1.3.3 Alternative Asphalt Roofing Shingles:** Shingles used for application on steep-slope roofs, complying with this criteria and consisting of one or more layers of felt, impregnated and coated on both sides with asphalt and surfaced on the weather side with mineral granules or an alternate surfacing material that provides protection for the asphaltic coating.

### 1.4 Codes and Referenced Standards:

**1.4.1** 2009 *International Building Code*® (IBC), International Code Council.

**1.4.2** 2009 *International Residential Code*® (IRC), International Code Council.

**1.4.3** ASTM D 146-04, Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing, ASTM International.

**1.4.4** ASTM D 228 / D228M-09, Standard Test Methods for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and Shingles Used in Roofing and Waterproofing, ASTM International.

**1.4.5** ASTM D 1079-10, Standard Terminology Relating to Roofing and Waterproofing.

**1.4.6** ~~1.4.5~~ ASTM D 3161-06, Test Method for Wind Resistance of Asphalt Shingles (Fan Induced Method), ASTM International.

**1.4.7** ~~1.4.6~~ ASTM D 3462-07, Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules, ASTM International.

**1.4.8** ~~1.4.7~~ ASTM D 7158-07, Standard Test Method for Wind Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method), ASTM International.

**1.4.9** ~~1.4.8~~ ASTM E 108-07a, Test Methods for Fire Tests of Roof Coverings, ASTM International.

**1.4.10** ~~1.4.9~~ ASTM G 155-05a, Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM International.

**1.4.11** ~~1.4.10~~ Florida Building Code Test Protocol HVHZ, Test Application Standard (TAS) No. 100-95, Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuous Roof Systems.

**1.4.12** ~~1.4.11~~ UL 790-04, Standard Test Methods for Fire Tests of Roof Coverings, Underwriters Laboratories Inc.

## 2.0 BASIC INFORMATION

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

**2.1.1 Product Description:** A complete description of the roofing shingle, including formulation, density, materials, protective coatings, and the manufacturing process for each component. A complete description of all other products used in the roof covering assembly shall also be submitted.

**2.1.2 Installation Instructions:** Dimensioned scale drawings and installation details, noting installation limitations and size and location of fasteners. Installation shall comply with IBC Section 1507.2 or IRC Section R905.2, as applicable.

**2.1.3 Shingle Application:** Shingles evaluated under this criteria are intended to be installed with a headlap of not less than 2 inches (51 mm). ~~Any cutout or shingle joint, if provided, must have a minimum of 2 inch (51 mm) overlap or interlock.~~ The headlap must be as described in ASTM D 1079 for products installed in a shingle fashion. In addition to the required headlap, subsequent courses of shingles must be offset from the preceding course as specified in the manufacturer's published installation instructions.

**2.1.3.1. Weathering Surface:** All surfaces exposed to the weather, when the product is properly installed, shall be covered with a surfacing material that protects the asphaltic coating.

**2.1.4 Packaging and Identification:** A description of the method of packaging and field identification of the roofing shingles. Identification shall include the report holder's name and address, the product name, the color of the product, the area of roof surface covered, the evaluation report number, the name or logo of the inspection agency, and a detailed list of required label markings including roof fire classification and wind resistance. The manufacturer's installation instructions shall be included in or on the shingle packaging.

**2.1.5 Field Preparation:** Method of field cutting, trimming or forming, and treatment of cut edges.

**2.2 Testing Laboratories:** Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria

## PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR ALTERNATIVE ASPHALT ROOFING SHINGLES (AC438)

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 roofing shingle for tests under this criteria shall comply with Section 3.1 of AC85.

### 3.0 TEST AND PERFORMANCE REQUIREMENTS

#### 3.1 Physical Requirements:

Reports of tests must demonstrate that the shingles comply with all the physical requirements listed in Table 1. The roof covering is sampled in accordance ASTM D 228, and the samples used to determine conformance to the requirements of this criteria. Additionally, the specifications of felts, asphalts, and surfacings of the shingles used in the qualification tests, and their physical dimensions, must be determined by the test laboratory and included in the test report.

**3.2 Dimensions:** The shingles shall not vary in length or width by more than  $\frac{1}{8}$  inch (3.2 mm) from dimensions established for each size, except that the length of the shingles without cutouts shall not vary by more than  $\frac{1}{4}$  inch (6.4 mm).

**3.3 Workmanship, Finish and Appearance as Packaged:** In addition to the physical requirements noted in Table 1, the finished shingles shall be free of visible defects such as holes, ragged edges, rents, cracks or indentations. The felt substrate shall be uniformly encapsulated with the asphaltic coating. The weathering surface shall be uniform in finish and may be embossed to simulate a grain texture. The surfacing material shall cover the entire surface and shall be firmly embedded or adhered to the asphaltic coating.

#### 3.4 Fire Classification:

Fire classification tests shall be conducted in accordance with either ASTM E 108 or UL790.

**Condition of Acceptance:** A minimum Class C classification is required.

#### 3.5 Wind Resistance:

**3.5.1 General:** The shingles shall be tested for wind resistance in accordance with ASTM D 7158.

**Condition of Acceptance:** A minimum Class D classification in accordance with ASTM D 7158 is required.

**Exception:** Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161.

**3.5.2 Alternative Testing:** The shingles shall be tested for wind resistance in accordance with ASTM D 3161.

**Condition of Acceptance:** A minimum Class A classification in accordance with ASTM D 3161 is required.

#### 3.6 Wind-driven Rain Resistance:

A wind-driven rain test shall be conducted using the Florida Building Code (FBC) Test Protocol TAS-100. See Section 4.3.

## 4.0 TEST METHODS

### 4.1 Weather Resistance:

Accelerated weathering tests shall be performed in accordance with ASTM G 155. Shingles shall be cut into two or more pieces of sufficient size, from the weathering surface, so that following exposure per Section 4.1.1, twenty test specimens may be cut for use during breaking strength testing in accordance with Section 4.2. If there are any questions as to the number and size of the pieces to be exposed, the testing agency should contact ICC-ES before exposing the weathering surface to accelerated weathering tests. Half of the specimens shall be weathered in accordance with Section 4.1.1 and the other half shall be used as unweathered control specimens.

**4.1.1 Test Exposure Conditions:** The weathering tests shall be performed on the specimens prepared as described in Section 4.1, with the weathering side facing the lamps. The specimens shall be mounted for exposure under no strain. The xenon-arc apparatus shall be operated in accordance with ASTM G 155, Cycle 1, for 2000 hours.

**Note:** If the operational fluctuations are greater than the maximum allowable after the equipment has stabilized, the test should be discontinued and the cause of the problem corrected before continuing.

**4.1.2 Conditions of Acceptance:** The weathered specimens shall show no visual signs of surfacing material loss, cracks, erosion or exposed felt substrate.

### 4.2 Breaking Strength After Weathering:

Ten specimens, each measuring 1 inch by 5 inches (25.4 by 127 mm), shall be cut from the exposure surface of the exposed shingle in the machine direction. Ten additional specimens, each measuring 1 inch by 5 inches (25.4 by 127 mm), shall be cut from the unweathered control sheet in the machine direction. The ten control specimens and the ten weathered specimens shall be tested for breaking strength in accordance with Section 13 of ASTM D 146.

**4.2.1 Conditions of Acceptance:** The average breaking strength of the ten weathered specimens shall be no less than 80 percent of the average breaking strength of the ten unweathered specimens.

### 4.3 Wind-driven Rain Resistance:

The wind driven rain test shall be performed using Florida Building Code Test Protocol TAS-100, at the minimum slope, specified by the manufacturer's published installation instructions, for which recognition is sought.

**4.3.1 Conditions of Acceptance:** Any test specimen which exhibits water infiltration through the sheathing shall be considered as failing the wind-driven rain test. Any test specimen which has the prepared roof covering or any portion thereof "blow off," tear or blow upward without reseating during the test shall be considered as failing the wind driven rain test.

### 4.4 Temperature-cycling Test:

**4.4.1 General:** A minimum of three full-width shingles, no less than 12 inches (305 mm) long, shall be tested, with one shingle installed over the shingle joint of the other two shingles. The shingles shall be subjected to 12 consecutive cycles of this test, each cycle consisting of 14 hours at an ambient temperature of 180°F (82°C),

## PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR ALTERNATIVE ASPHALT ROOFING SHINGLES (AC438)

followed by one hour at an ambient temperature of 70°F (21.1°C), followed by one hour of water exposure at room temperature, followed by six hours at an ambient temperature of minus 40°F (-40°C), followed by two hours at an ambient temperature of 70°F (21.1°C). Between cycles, such as on weekends and holidays, the samples may be maintained at an ambient temperature of 70°F (21.1°C). A +5°F (+2.8°C) tolerance is allowed on the specified temperatures. The shingles shall be applied to a nominally  $\frac{15}{32}$ -inch-thick wood structural panel, and fastened in accordance with the manufacturer's published installation instructions. Spray nozzles for the water exposure shall be located approximately seven feet (2134 mm) above the test specimens and shall deliver 6 inches (152 mm) of water per hour at a water temperature of 40°F to 60°F (4.4°C to 15.6°C). The test panel shall be installed at the minimum slope for which recognition is sought, as specified in the manufacturer's published installation instructions, but in no case at a slope of less than 2:12 (17 percent slope). At the conclusion of the 12 cycles, the specimens shall be examined under 5x magnification.

### 4.4.2 Conditions of Acceptance:

The specimens shall not show signs of tearing or cracking of the filled asphalt coating that exposes the reinforcing felt of the shingle, or separation greater than  $\frac{1}{4}$  inch (6.4 mm) at the joints between the specimens. Additionally, there shall be no signs of tearing of the shingle at the fastener locations or pull-through of the fasteners. No portion of the asphalt-coated reinforcing felt shall break or separate from the specimens.

### 4.5 Reroofing:

Reroofing shall be in accordance with IBC Section 1510 and IRC Section R907.

## 5.0 QUALITY CONTROL

**5.1** The shingles shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or otherwise acceptable to ICC-ES. Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

**5.2** Specifications of the felts, asphalts, and surfacings of the shingles qualified by testing and their physical dimensions shall be included in the quality documentation.

**5.3** A qualifying inspection shall be conducted at each manufacturing facility when required by the ICC-ES Acceptance Criteria for Inspections and Inspection Agencies (AC304).

## 6.0 EVALUATION REPORT RECOGNITION

The evaluation report shall include the following information:

**6.1** Product information, installation instructions, and packaging and identification information based on requirements in Section 2.1.

**6.2** The shingles shall be installed with underlayment as required in IBC Sections 1507.2.3 and 1507.2.8 or IRC Sections R905.2.3 and R905.2.7, as applicable.

**6.3** Complete descriptions of the roof covering assemblies qualified in accordance with Sections 3.4, 3.5, 3.6 and 4.3 and, if applicable, Section 4.5 for reroofing. ■

**PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR ALTERNATIVE ASPHALT ROOFING SHINGLES (AC438)**

**TABLE 1—PHYSICAL REQUIREMENTS FOR SHINGLES**

DESCRIPTION	STANDARD OR SECTION	REQUIREMENT (CONDITIONS OF ACCEPTANCE)	
Dimensions	See Section 3.2	See Section 3.2	
Behavior on heating: Loss of volatile matter, % Sliding of granular surfacing	ASTM D 228	1.5% (max.) 1/16 inch (2 mm), maximum	
Tear strength	ASTM D 1922, as modified in ASTM D 228	3.75 lbs (16.7 N), minimum	
Penetration of asphalt, 0.1 mm (tested without mineral stabilizer)	ASTM D 5	15, minimum	
Asphalt softening point	ASTM D 36	190°F (88°C), minimum 235°F (113°C), maximum	
Asphalt softening point for polymer modified products	ASTM D 36	190°F (88°C), minimum 320°F (160°C), maximum	
Fastener pull-through resistance at 73°F +/- 4°F Average of single-layer specimens Average of double-layer specimens	ASTM D 3462	20 lbs (90 N), minimum 30 lbs (135 N), minimum	
Fastener pull-through resistance at 32°F +/- 4°F Average of single-layer specimens Average of double-layer specimens	ASTM D 3462	23 lbs (104 N), minimum 40 lbs (180 N), minimum	
Pliability at 73°F +/- 4°F Weather side up, machine direction Weather side up, cross direction Weather side down, machine direction Weather side down, cross direction	ASTM D 3462	4 of 5 shall pass (min.) 4 of 5 shall pass (min.) 4 of 5 shall pass (min.) 4 of 5 shall pass (min.)	
Weight of displaced surfacing material	ASTM D 4977	Surface Material Loading per 100 ft <sup>2</sup>	Surface Material Displaced
		> 18 lb. 9 – 18 lb. < 9 lb.	1 g (max.) 0.80 g (max.) 0.60 g (max.)

**TABLE 2 — ADDITIONAL REQUIREMENTS OUTLINED IN SECTIONS 3.3–3.5 AND 4.1–4.4**

DESCRIPTION	STANDARD AND/OR SECTION	REQUIREMENT (CONDITIONS OF ACCEPTANCE)
Workmanship, finish and appearance	See Section 3.3	See Section 3.3
Roof fire classification	UL790 or ASTM E 108	Class C, minimum
Wind resistance	ASTM D 7158 (See Section 3.5.1)	Class D, minimum
Wind resistance (Alternative testing)	ASTM D 3161 (See Sections 3.5.1 and 3.5.2)	Class A, minimum
Weather resistance	ASTM G 155 (See Section 4.1)	See Section 4.1.2
Breaking strength after weathering	ASTM D146 (See Section 4.2)	See Section 4.2.1
Wind-driven rain resistance	FBC Protocol TAS-100 (See Sections 3.6 and 4.3)	See Section 4.3.1
Temperature cycling	See Section 4.4	See Section 4.4.2