ACCEPTANCE CRITERIA FOR ROOF UNDERLAYMENTS

AC188

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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 (**I**) 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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1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for recognition of roof underlayments in an ICC-ES 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). Bases of recognition are IBC Section 104.11, IRC Section R104.11 and UBC Section 1402.8.

1.2 Scope: This criteria is limited to membrane materials used as roofing underlayment, either self-adhering or mechanically attached, and installed over solid sheathing. The membrane materials are alternatives to the ASTM D 226, Type I and Type II, underlayments specified in Chapter 15 of the IBC and Chapter 9 of the IRC, and to the Type 15 and Type 30 underlayments specified in Chapter 15 of the UBC.

The roof underlayments are limited to buildings permitted to have nonclassified roofing in accordance with IBC Section 1505.5, and nonrated roofing in accordance with UBC Section 1504.3, unless successful fire tests are conducted in accordance with Section 3.3 of this criteria.

1.3 Referenced Documents:

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 1997 UBC Standard 15-2, Test Standard for Determining Fire Retardancy of Roof Assemblies.

1.3.5 ICC-ES Acceptance Criteria for Roof Underlayment for Use in Severe Climate Areas (AC48).

1.3.6 ASTM D 226-97a, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing, ASTM International.

1.3.7 ASTM D 412-98a, Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension, ASTM International.

1.3.8 ASTM D 828-97, Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus, ASTM International.

1.3.9 ASTM D 1682-64 (1975), Test Method for Breaking Load and Elongation of Textile Fabrics, ASTM International.

1.3.10 ASTM D 1970-01, Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials, ASTM International.

1.3.11 ASTM D 3018-90 (1994)$^{\varepsilon 1}$, Specification for Class A Asphalt Shingles Surfaced with Mineral Granules, ASTM International.

1.3.12 ASTM D 4869-93, Specification for Asphalt-Saturated (Organic Felt) Underlayment Used in Steep Slope Roofing, ASTM International.

1.3.13 ASTM E 108-00, Test Methods for Fire Tests of Roof Coverings, ASTM International.

1.3.14 UL 790-97, Tests for Fire Resistance of Roof Covering Materials—with Revisions through July, 1998.

2.0 BASIC INFORMATION AND REPORTS OF TESTS

2.1 Product Description: Description of the underlayment sheet materials, and of the manufacturing process, shall be submitted.

2.2 Installation Instructions: Installation instructions shall be submitted.

2.3 Packaging and Identification: Description of the method of packaging and identification of the underlayment shall be submitted. Product labeling shall include the evaluation report number and the name or logo of the inspection agency.

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.

2.4.3 Sampling of the underlayment for tests under this criteria shall comply with Section 3.1 of AC85.

2.4.4 Unless otherwise noted in this criteria, specimen sizes, quantities, and test configurations are as noted in the referenced standards.

3.0 REQUIRED DATA

3.1 For installation over solid sheathing, reports of tests showing conformance of the materials to the requirements of Table 1 shall be submitted.

3.2 Reports of tests shall be submitted to demonstrate that the finished product does not crack, and is not so sticky as to cause tearing or other damage, upon being unrolled at temperatures between 50˚F and 140˚F (10˚C and 60˚C).

3.3 For recognition of installation on buildings other than those permitted by the applicable code to have nonrated roof coverings, reports of roof classification tests conducted in accordance with ASTM E 108 or UL 790 (IBC, IRC) or UBC Standard 15-2 (UBC) shall be submitted.

Two Class A intermittent flame and four Class A burning brand decks shall be tested. The assemblies shall consist of a single layer of the subject underlayment installed over solid or spaced sheathing, depending on the recognition sought, and a roof covering of three-tab asphalt shingles complying with ASTM D 3018 and having a maximum installed weight of 190 pounds per 100 square feet (9.28 kg/m^2). Tests shall be conducted at a slope of 5:12 (41.67%). Test decks shall be constructed with nominal $^3/_8$-inch-thick (9.5 mm) plywood.

Based on successful completion of the tests, the evaluation report on the underlayment will state that the underlayment is permitted to be used as an alternate to the underlayment specified in the applicable code for roof coverings of brick, masonry, slate, clay or concrete roof tile, exposed concrete roof deck, ferrous or copper shingles or sheets, metal sheets and shingles and nonfire-retardant-

treated wood. The noted roof coverings are permitted to be used in IBC Section 1505.2, IRC Section R902.1 and UBC Section 1504.2, wherever a Class A, B or C roof covering assembly is required.

4.0 QUALITY CONTROL

4.1 The products 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.

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

5.0 EVALUATION REPORT RECOGNITION

5.1 Self-adhering underlayments are limited to installation on the substrates qualified through compliance with the adhesion in peel requirements of Table 1. The evaluation report will list the recognized substrates.

5.2 Installation of underlayments is limited to roof slopes of 2:12 (16.67%) and greater and installations where the roof covering does not involve hot asphalt or coal tar pitch.

5.3 Underlayments recognized through compliance with this criteria are limited to use with roof coverings that are mechanically fastened through the underlayment to the sheathing or rafters.

5.4 Attic ventilation in accordance with the applicable code is required since vapor permeance of the underlayments is not addressed by this criteria.■

TABLE 1—REQUIREMENTS FOR INSTALLATION OVER SOLID SHEATHING[1]

DESCRIPTION	TEST METHOD	REQUIREMENTS
Pliability	ASTM D 226	No cracking when bent 90˚ at a uniform speed over a rounded corner of $^1/_2$-inch radius
Accelerated aging	AC48, Section 4. 7	No visible damage such as chipping or cracking. No delamination. Additional testing for tensile strength and adhesion in peel
Ultraviolet exposure	AC48, Section 4.8	No visible damage such as chipping or cracking. No delamination. Additional testing for tensile strength and adhesion in peel
Tensile strength[2] (machine and cross-machine direction) - Control specimens - After accelerated aging - After UV exposure	AC48, Sections 4.1, 4.7, and 4.8	ASTM D 828 or D 412: minimum 20 lbf/in-width ASTM D1682: minimum 75 lbf ASTM D 1970: minimum 25 lbf/in-width
Adhesion in peel (adhered membranes only)[3] - Control specimens - After 7-day water immersion - After accelerated aging - After UV exposure	AC48, Sections 4.5, 4.7, and 4.8	Conditioned specimens must exceed 75% of the value determined for the control specimens, for each substrate
Liquid water transmission	ASTM D 4869	Shall meet the “Pass” requirements of Section 8.3.5 of ASTM D 4869
Cycling and elongation (adhered membranes only)	AC48, Section 4.6	No cracking of the material or bond failure between the product and the plywood substrate

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45N, 1 lbf/inch width = 0.175N/m.

[1]All specimens shall be conditioned in accordance with the referenced standard or acceptance criteria, unless otherwise noted in this acceptance criteria.

[2]Requirements apply to both the machine and cross-machine direction for each exposure condition. For self-adhering materials, specimens with seam treatment representative of installed conditions must be evaluated for tensile strength. For laminated membranes, failure in tensile strength is defined as the maximum load occurring upon or prior to the first occurrence of delamination of the composite, or tearing or ultimate failure of any individual component of the laminate.

[3]Adhered membranes shall be tested for adhesion-in-peel on each substrate for which recognition is sought. All exposure conditions must be evaluated for each substrate.