



ACCEPTANCE CRITERIA FOR ORIENTED STRUCTURAL STRAW BOARD (OSSB)

AC307

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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.

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1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish the basis for recognizing oriented structural straw board (OSSB) as a structural-use panel complying with DOC Voluntary Product Standard PS 2-92, in an ICC-ES report under the 2003 *International Building Code*[®] (Section 104.11), the 2003 *International Residential Code*[®] (Section R104.11), the BOCA[®] *National Building Code*/1999 (Section 106.4), the 1999 *Standard Building Code*[®] (Section 103.7), and the 1997 *Uniform Building Code*[™] (Section 104.2.8).

1.2 Scope: Roof and wall panel products evaluated under this acceptance criteria shall meet all requirements set forth in this criteria and PS 2 for $7/16$ -inch (11.1 mm) mat-formed panels for a span rating of 24/16 and an Exposure 1 classification. Evaluation of products under this criteria is limited to use with wood frame construction and to cereal straws such as wheat, barley, oats and rice.

1.3 Codes and Reference Standards:

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

1.3.2 2000 *International Residential Code*[®] (IRC), International Code Council.

1.3.3 BOCA[®] *National Building Code*/1999 (BNBC).

1.3.4 1999 *Standard Building Code*[®] (SBC).

1.3.5 1997 *Uniform Building Code*[™] (UBC).

1.3.6 ASTM C177-97, Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus, ASTM International.

1.3.7 ASTM D 2718-95, Test Method for Structural Panels in Planar Shear (Rolling Shear), ASTM International.

1.3.8 ASTM D 2719-89 (1994), Test Methods for Structural Panels in Shear Through-the-Thickness, ASTM International.

1.3.9 ASTM D 3043-95, Methods of Testing Structural Panels in Flexure, ASTM International.

1.3.10 ASTM D 3273-00, Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber, ASTM International.

1.3.11 ASTM D 3345-74 (1999), Test Method for Laboratory Evaluation of Wood and Other Cellulosic Materials for Resistance to Termites, ASTM International.

1.3.12 ASTM D 5764-97a, Standard Test Method for Evaluating Dowel-Bearing Strength of Wood and Wood-Based Products, ASTM International.

1.3.13 ASTM D 6815-02a, Standard Specification for Evaluation of Duration of Load and Creep Effects of Wood and Wood-Based Products, ASTM International.

1.3.14 ASTM E 4-99, Practices for Force Verification of Testing Machines, ASTM International.

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

1.3.16 ASTM E 1623, Test Method for Determination of Fire and Thermal Parameters of Materials, Products, and Systems Using an Intermediate Scale Calorimeter (ICAL), ASTM International.

1.3.17 AWPA E10-91, Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures, American Wood-Preservers' Association.

1.3.18 CSA O437.1-93, CSA Standards for OSB and Waferboard, CSA International.

1.3.19 DOC Voluntary Product Standard PS 2-92, Performance Standard for Wood-Based Structural-Use Panels.

1.4 Definitions:

1.4.1 OSSB: Oriented structural straw board is an engineered composite panel comprised of agricultural straw particles that have had geometric manipulation to accept binder on all surfaces. After binder application, the particles are oriented into a mat to increase bending stiffness in the machine direction. The mat is hot-pressed to yield a panel of structural strength and stiffness meeting the requirements noted in PS 2.

1.4.2 Major Axis: The major axis typically corresponds to the manufacturing machine direction and exhibits high mechanical properties relative to the minor axis. The major axis typically corresponds to the 8-foot dimension of a 4-foot-by-8-foot panel.

1.4.3 Minor Axis: The minor axis typically corresponds to the manufacturing cross-machine direction and exhibits lower mechanical properties relative to the major axis. The minor axis typically corresponds to the 4-foot dimension of a 4-foot-by-8-foot panel.

1.4.4 Other Definitions: See Sections 2 and 4 in PS 2 for definitions not specifically addressed in this criteria.

2.0 BASIC INFORMATION

2.1 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.

2.2 Test Reports: Test reports shall comply with AC85. All reports shall be issued or certified by an accredited testing laboratory. Details describing the test configuration, test methods and test procedures, including load application rate, shall be provided in the test report.

2.3 Test Specimens: Test specimens shall be sampled in accordance with Section 3.1 of AC85. Specimens shall be tested in an "as manufactured" condition or after conditioning to standard moisture conditions.

2.4 Measurements: Measured dimensions of sampled panels and test specimens shall be recorded in accordance with the degree of accuracy specified in PS 2. Load-measuring equipment shall have a degree of accuracy of 2 percent as determined in accordance with ASTM E 4.

2.5 Identification: The product shall be clearly and properly identified by product and company name, plant

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location or number, inspection agency name or logo, a means of establishing date of manufacture, and the ICC-ES evaluation report number. The identification markings shall also include applicable certification marks. All identification markings shall be legible and durable and, as a minimum, shall last through typical handling, distribution, jobsite storage and installation, to allow for easy field identification.

Any further identification required by PS 2 shall be included with each shipment.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 General: Panel products evaluated under this acceptance criteria shall meet all requirements set forth in this criteria and PS 2 for mat-formed panels for a span rating of 24/16 and Exposure 1 classification. The exception to PS 2 in this criteria is that the composed mat consists partially or entirely of straw.

3.2 Performance Requirements: According to the PS 2 standard, all panels must satisfy tests under three different performance categories to meet the roof and wall ratings. OSSB panels, for the span and exposure ratings listed in this acceptance criteria, shall meet all aspects of these categories. The basic requirements are outlined as follows (section numbers refer to sections in PS 2).

3.2.1 Panels shall meet concentrated static load, uniform load, wall racking and fastener holding as outlined in PS 2 for a span rating 24/16 and Exposure 1 classification, except as noted in Section 3.5 and footnote 3 to Table 1, in this criteria. The minimum performance requirements for these tests for the given span and exposure rating are shown in Table 1 (values are from PS 2). Additionally, the following tests shall be conducted and the resulting values reported.

3.2.1.1 Planar shear according to ASTM D 2718.

3.2.1.2 Shear through the thickness according to ASTM D 2719.

3.2.1.3 Flexural rigidity and flexural strength in accordance with ASTM D 3043 (Method "C" or "D").

3.2.1.4 Dowel bearing strength in accordance with ASTM D 5764.

3.2.2 The panels shall meet the physical property requirements described in Section 5.5.2 for the span rating and exposure noted in this criteria. The oven-dry vacuum soak method shall be used for the linear expansion procedure.

3.2.3 The panels shall meet the durability performance requirements for a bond durability Exposure 1 classification, described in Section 5.5.3.1.

3.2.4 The OSSB panels shall demonstrate fungal decay equivalency to recognized OSB complying with PS 2, for white rot and brown rot fungi in accordance with AWPA E10.

3.2.5 The OSSB panels shall demonstrate mold growth resistance equivalency to recognized OSB complying with PS 2, in accordance with ASTM D 3273. The inoculum used is to be typical of standard mold testing.

3.2.6 The panels shall satisfy the resistance to elevated temperature requirement noted in Section 5.5.3.4, for Exposure 1, even though they meet the requirements noted in Section 5.5.3.1.

3.2.7 The panels shall demonstrate the bacteria resistance outlined in Section 5.5.3.5. OSSB shall display equivalency to currently recognized OSB complying with PS 2.

3.2.8 The panels shall be tested and evaluated in accordance with the requirements noted in ASTM D 6815 for duration of load and creep.

3.2.9 The panels shall demonstrate equivalency to currently recognized panels for thickness swell in accordance with Table 4 of CSA 0437.0, when tested per clause 5.3.4 (24 hour soak) of CSA 0437.1.

3.2.10 The panels shall be tested and meet the requirements noted in Section 803 of the IBC, if the panels are to be left exposed to the interior of a building.

3.3 Moisture Content: Manufactured panels shall not exceed 18 percent moisture oven-dry basis at time of shipping, as determined by Section 6.4.11.

3.4 Termite Resistance: Termite resistance testing shall be conducted in accordance with ASTM D 3345. OSSB shall be compared in this test to a control OSB product (complying with PS 2) with the same span rating and exposure classification as designated for OSSB in the acceptance criteria. OSSB shall perform in a manner equivalent to or better than the performance of the OSB control.

3.5 Racking Shear: If the product is to be recognized for racking shear values other than: for wood frame construction; the basic shear value [240 plf (11.5 kN/m²)] associated with nailing at 6 inches (152 mm) on center, boundary nailing; minimum panel width of 48 inches (1219 mm); and seismic categories A, B and C, a racking shear test program, based on the ICC-ES Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing Materials used in Braced Wall Panels (AC269), shall be submitted to ICC-ES for review prior to the commencement of testing. Also see Table 1 for additional details.

3.6 Fire Performance: The OSSB material governed by this criteria is to be used strictly in nonexposed-to-the-interior construction. However, in order to demonstrate equivalency to OSB (complying with PS 2) for use in fire-resistance-rated assemblies, the OSSB shall be tested in accordance with ASTM E 1623 to establish comparative values for ignition temperature, heat release and heat of combustion, and ASTM C 177 to establish comparative values for thermal transmission properties.

For use in Class A, B or C roof assemblies, tests shall be conducted in accordance with ASTM E 108. **Exception:** The OSSB is permitted to be used where nonclassified roofing is permitted by the code.

4.0 QUALITY CONTROL

After product qualification under Section 3.0 of this criteria (corresponding to Section 6.2 of PS 2), the OSSB panels shall undergo regular product evaluation in accordance with Section 6.3 of PS 2. This is to ensure that product quality is maintained. Panels shall satisfy all aspects of Section 6.3 of PS 2.

The OSSB structural-use panel products shall be produced under a quality control program administered by an inspection agency currently accredited by the International Accreditation Service, or otherwise acceptable to ICC-ES. A

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quality control manual developed in collaboration with the approved agency and complying with the ICC-ES Acceptance Criteria for Quality Control Manuals (AC10), shall be submitted. The quality control manual shall specify quality control testing and process control requirements. The products shall be evaluated in accordance with PS 2 for:

4.1 Mechanical Properties: Panels shall be evaluated in accordance with Section 6.3.3 of PS 2 for bending stiffness and strength.

4.2 Physical Properties: Panels shall be evaluated in accordance with Section 6.3.4 of PS 2 for panel thickness, moisture content and linear expansion.

4.3 Adhesive Bond Properties: Panels shall be evaluated in accordance with Section 6.3.5 of PS 2 for breaking load after moisture cycling according to designation under exposure classification.

4.4 Process Control:

4.4.1 Data from tests outlined in Section 3 and Sections 4.1 to 4.3 of this criteria shall be evaluated prior to shipment of the material represented by the sample. Analytical procedures shall determine if product capacities are in

statistical control. The control levels selected shall be consistent with the mill specification.

4.4.2 When the analysis described in Section 4.4.1 of this criteria indicates that the product is below the control level, the associated portion of production shall be subject to re-examination in accordance with the acceptance procedures provided in the quality assurance manual in conjunction with the requirements of PS 2.

4.4.3 All pertinent records shall be maintained on a current basis and be available for review by both in-house and inspection agency personnel. As a minimum, such records shall include:

4.4.3.1 All inspection reports and records of test equipment calibration, whether accomplished by in-house or by inspection agency personnel.

4.4.3.2 All test data, including retests and data associated with rejected production.

4.4.3.3 Details of any corrective actions taken and the disposition of any production rejected as a result of tests or inspection. ■

TABLE 1—PS 2-92 STRUCTURAL PROPERTY REQUIREMENTS FOR 11.1 mm ($7/16$ ") SHEATHING WITH 24/16 SPAN RATING WITH EXPOSURE 1 CLASSIFICATION FOR ORIENTED STRUCTURAL STRAW BOARD (OSSB)

TEST	SPECIMEN CONDITION ¹	PROPERTY REQUIREMENTS
Static—roof span Maximum deflection @ 200 lbf	Dry Wet	0.500 inch NR ²
Minimum ultimate load	Dry Wet	400 lbf 400 lbf
Impact—roof span Minimum ultimate load following impact	Dry Wet	300 lbf 300 lbf
Roof span Maximum deflection @ 35 lbf/ft ²	Dry	0.100 inch
Minimum ultimate load	Dry	150 lbf/ft ²
Racking test³ Maximum deflection @ 240 lbf/ft	Dry	0.200 inch
Minimum ultimate load	Dry	600 lbf/ft
Fastener tests Nail lateral resistance	Dry Wet/redry	934 lbf 712 lbf
Nail withdrawal resistance	Dry Wet/redry	20 lbf 15 lbf

For **SI**: 1 lbf = 4.46 N, 1 inch = 25.4 mm, 1 lbf/ft² = 0.0479 kN/m².

¹Condition as per test method.

²No requirement.

³Racking test values have been revised based on limitations noted in Section 3.5 of this criteria.