

ACCEPTANCE CRITERIA FOR PREFABRICATED PARALLEL CHORD WOOD TRUSSES

AC224

Approved October 2005

Effective November 1, 2005

(Editorially revised January 2010)

Previously approved February 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 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 purposes of issuing ICC-ES evaluation reports.

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1.0 INTRODUCTION

1.1 Purpose: The purpose of this criteria is to establish minimum requirements for recognition of prefabricated parallel chord wood and wood-based trusses in ICC-ES evaluation reports under the 2009 *International Building Code*® (IBC), the 2009 *International Residential Code*® (IRC), the BOCA® *National Building Code/1999* (BNBC), the 1999 *Standard Building Code*® (SBC), and the 1997 *Uniform Building Code*™ (UBC).

1.2 Scope: This acceptance criteria applies to all wood trusses used as structural members, consisting of sawn lumber or structural composite lumber (SCL) parallel top and bottom chords, with a diagonal and vertical sawn lumber or SCL web members. The SCL material shall be recognized in a current ICC-ES evaluation report. The chord members are continuous and may be fabricated with finger-joints. The web members have no finger-joints; however, each end of the web members is connected to the chords either with finger-joints or by joining with tenon and mortise connections using an approved adhesive defined in Section 2.1.1. The trusses are used as roof or floor framing members.

This criteria is needed since the type of web-to-chord connections are not covered by specific code requirements or code-referenced standards.

1.3 References:

1.3.1 2009 *International Building Code*® (IBC), International Code Council.

1.3.2 2009 *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 D 2559-04, Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions, ASTM International.

1.3.7 ASTM E 73-83 (reapproved 2007), Standard Practice for Static Load Testing of Truss Assemblies, ASTM International.

1.3.8 ASTM E 119-07a, Test Method for Fire Tests of Building Construction and Materials, ASTM International.

1.3.9 ASTM D 2395-07, Standard Test Method for Specific Gravity of Wood and Wood Based Materials, ASTM International.

1.3.10 ASTM D 4442-07, Standard Test Method for Direct Moisture Content Measurement of Wood and Wood-based Materials, ASTM International.

1.3.11 CSA Standard O112.7-M1977, Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room and Intermediate Temperature Curing), Canadian Standards Association.

1.3.12 ANSI/AF&PA NDS-05 National Design Specification (NDS) for Wood Construction, 2005 edition, American Forest & Paper Association.

1.3.13 ASTM D 5055-05, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated I-Joists, ASTM International.

1.3.14 ASTM D 5456-05a, Standard Specification for evaluation of Structural Composite Lumber Products, ASTM International.

2.0 BASIC INFORMATION

2.1 General Information:

2.1.1 Product Description: The top and bottom chords shall be made of visually graded sawn lumber or SCL. Diagonal members shall be made from visually graded sawn lumber or SCL, and both ends of the truss shall be vertical members made of sawn lumber, oriented strand board (OSB) or a laminated wood panel manufactured from sawn lumber. The SCL, OSB and laminated wood panel components shall be as recognized in the truss evaluation report.

Minimum thickness of top and bottom chords, and diagonal and vertical web members, shall be a nominal 2 inches (51mm) for all sawn lumber components. Minimum thickness for all SCL components shall be 1³/₈ inches (34.9 mm). Minimum thickness of the vertical OSB components at the truss ends shall be 3/₈ inch (9.5 mm).

The adhesive shall comply with either CSA 0112.7 or ASTM D 2559.

2.1.2 Installation Instructions: Installation instructions or engineered drawings shall accompany the product to the final jobsite. The instructions shall include any special instructions required for the product as well as weather protection and handling requirements. In cases where attachment requirements, lateral support details, framing details and bearing or connection requirements are not adequately covered by general notes, standard sketches and charts shall be included with the installation instructions, or specific job drawings shall cover these requirements.

2.1.3 Identification: The product shall be clearly identified by the evaluation report number, product name, company name or logo, plant location or identifier, inspection agency name or logo, and a means for establishing the date of manufacture.

2.2 Testing Laboratories: Testing laboratories shall comply with 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: Product sampling shall be in accordance with Section 3.1 of AC85. Specimens for qualification testing shall be representative of production.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 Types of Test: The following tests shall be conducted to verify the assigned design capacities and design assumptions:

- a. Bending, including the following:
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- Deflection
- Creep recovery
- b. Shear
- c. End reaction
- d. Finger-joint or tenon and mortise joint integrity. (This shall include finger-joint or tenon and mortise joint tests and full-scale joist tests).

3.1.1 A test program shall be developed for the properties noted in this section, and shall consider the following:

- Size of the chord and web members
- Depth of the wood truss
- Grade of sawn lumber material or SCL used to fabricate the wood truss
- Web-to-chord joint detail
- Duct chase
- Point loads
- Multiple Spans

3.1.2 The test program and analytical approach shall be approved by ICC-ES prior to the commencement of any testing. The test program may take into account the possibility of proof loading the final wood or wood-based truss product.

3.2 Test Methods: Tests shall be conducted in accordance with the test methods and principles noted in ASTM E 73 or an equivalent test method.

3.3 Moisture Content and Specific Gravity: Moisture content and specific gravity shall be measured and reported for each specimen tested in the qualification program. Measurements of moisture content shall be in accordance with ASTM D 4442, and measurements for specific gravity shall be in accordance with ASTM D 2395.

3.4 (Optional) Fire-resistive Construction: Testing in accordance with ASTM E 119 shall be conducted.

4.0 DESIGN PROPERTIES AND OTHER CONSIDERATIONS

4.1 Mechanical Properties: Allowable moment, shear and end reaction capacities shall be determined using an

appropriate statistical method and the test results from Section 3. As an alternative, the allowable moment capacity may be determined using the principles of Section 6.3.1 and the confirming tests required by Section 6.3.2 of ASTM D 5055.

4.2 Stiffness: Member stiffness shall be determined analytically and verified by using deflection readings obtained during the bending tests.

4.3 Design Criteria: Design details for wood or SCL products noted in NDS are applicable to the wood or wood-based trusses.

4.4 Duration of Load: Code-prescribed adjustments for duration of load associated with sawn lumber are applicable to the sawn lumber wood trusses and their connections. Duration of load adjustments for SCL wood-based trusses and their connections shall be as prescribed in the product evaluation report.

4.5 Blocking: Wood trusses under bearing walls shall have full-depth solid blocking at the walls that are perpendicular to the trusses. Wood trusses used as blocking panels shall require compression testing to determine load-transfer capacity.

4.6 Notching and Holes: Not permitted in any truss component members, unless specifically noted otherwise in the product evaluation report.

5.0 QUALITY CONTROL

5.1 The wood trusses 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 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

5.3 Appropriate sections of Appendix A in AC14 shall be included in the quality documentation.