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Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies¹

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INTRODUCTION

Rim board assemblies are an engineered component within light-frame wood platform construction. Rim board assemblies serve in multiple structural capacities, including: providing floor closure and diaphragm attachment, transferring vertical and in-plane lateral loads, restricting out-of-plane rotation and lateral translation at the ends of the floor joists, providing deck ledger attachment, and spanning wall openings as a header material. Rim board products, which serve a principal role as a component integrated within a rim board assembly, can vary by wood species, size, shape, and type. Rim board products and assemblies require evaluation of their mechanical properties, physical properties, and their response to end use environments. Procedures established in this Specification provide a means to test rim board products and assemblies, to judge their acceptability, and to establish allowable design capacities.

1. Scope

1.1 This specification provides procedures for testing and establishing the structural capacities of proprietary rim board products and assemblies for use in light-frame wood construction using I-joist or structural composite lumber joist framing. This specification does not apply to commodity rim board products.

1.2 This specification was developed in light of currently manufactured panel, structural composite lumber, and pre-fabricated I-joist rim board products as defined in 3.2. Materials that do not conform to the definitions of 3.2 are beyond the scope of this specification.

1.3 Fire safety, sound transmission, building envelope performance, and cutting/notching attributes of rim board products and assemblies fall outside the scope of this specification.

1.4 This specification primarily considers end use in dry service conditions, such as most protected framing members, where the equilibrium moisture content for solid-sawn lumber is less than 16 %.

1.5 This specification provides methods to establish “allowable stress” design resistances for use with the National Design

Specification for Wood Construction (NDS). Derivation of design resistances from the test data in accordance with “load and resistance factor design” or “limit states design” are beyond the scope of this specification.

1.6 Quality control requirements are outside the scope of this Specification.

1.7 The performance of a rim board product will be affected by the constituent wood species, geometry, adhesive, and production parameters. Therefore, rim board products produced by each individual manufacturer shall be evaluated to determine their product properties, regardless of the similarity in characteristics to products produced by other manufacturers.

1.8 Where a manufacturer produces product in more than one facility, each production facility shall be evaluated independently. For additional production facilities, any revisions to the full qualification program in accordance with this specification shall be approved by an accredited, independent qualifying agency.

1.9 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.10 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

¹ This specification is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.05 on Wood Assemblies.

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1.11 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- D9** Terminology Relating to Wood and Wood-Based Products
 - D198** Test Methods of Static Tests of Lumber in Structural Sizes
 - D2395** Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials
 - D2915** Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products
 - D4442** Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials
 - D4761** Test Methods for Mechanical Properties of Lumber and Wood-Based Structural Materials
 - D5055** Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists
 - D5456** Specification for Evaluation of Structural Composite Lumber Products
 - D7033** Practice for Establishing Design Capacities for Oriented Strand Board (OSB) Wood-Based Structural-Use Panels
 - E4** Practices for Force Calibration and Verification of Testing Machines
- ### 2.2 Other Standards:
- NDS ANSI/AF&PA** National Design Specification for Wood Construction³
 - ANSI/ASME Standard B18.2.1** Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)³
 - ANSI/APA PRR-410** Standard for Performance-Rated Engineered Wood Rim Boards³
 - ICC-ES AC124** ICC Evaluation Service Acceptance Criteria for Rim Board Products⁴
 - PS-1** U.S. Product Standard, Structural Plywood⁵
 - PS-2** U.S. Product Standard, Performance Standard for Wood-Based Structural Use Panels⁵

3. Terminology

3.1 *Definitions*—Standard definitions of wood terms are given in Terminology **D9**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *commodity rim board, n*—products manufactured to a rim board standard with commodity product capacities and predetermined grades that are qualified and used by multiple manufacturers.

3.2.1.1 *Discussion*—Commodity rim board products are not addressed by this standard.

NOTE 1—ANSI/APA PRR-410 is an example of a commodity rim board standard.

3.2.2 *I-joist rim board, n*—a pre-fabricated I-joist rim board.

3.2.3 *rectangular wood-based rim board, n*—a structural composite lumber, oriented strand board, or plywood rim board with a rectangular cross section.

3.2.4 *rim board assembly, n*—an assemblage of framing, sheathing, and fasteners at the boundary of a platform floor or roof framed with joists.

3.2.4.1 *Discussion*—The rim board assembly, as illustrated in **Fig. 1** for a floor, consists of the sheathing, rim board, wall plate framing, the ends of any perpendicular (**Fig. 1A**) or parallel (**Fig. 1B**) joists, and the variety of fasteners that hold these components together.

3.2.5 *rim board, n*—the component of a rim board assembly that provides in-plane lateral and vertical load path continuity, stability, and closure for the full depth of the joist space.

3.2.5.1 *Discussion*—As depicted in **Fig. 1** and **Fig. 2**, the longitudinal axis runs parallel to the wall or foundation framing that supports the platform edge. The product depth extends vertically between the floor platform sheathing above and the wall or foundation plate beneath the platform. The rim board product provides vertical load transfer and lateral load transfer through the diaphragm boundary. It works with the sheathing and plate materials to restrain the rotation and lateral translation of the perpendicular floor joists at their end bearing locations. Except when used in a qualified header or cantilever application, the rim board bears upon the wall or foundation plate beneath the platform for the full length and thickness of the product.

4. Materials

4.1 *General*—As a condition to being qualified in accordance with this specification, a rim board product shall comply with the requirements and application limitations of Section 4.

4.2 *Header Applications*—Only rim board qualified for in-plane bending shall be permitted to span a wall opening, foundation opening, or extend beyond a lower wall to support a cantilevered framing offset at the rim board elevation in the structure. Rim board used as a header or cantilever shall be designed for the application using the qualified design properties established in accordance with the reference standards of 4.4. Otherwise, the rim board shall be continuously supported for the full length and thickness of the product.

4.3 *Fastener Capacities*—Rectangular wood-based rim boards and the flanges of I-joist rim boards shall have established capacities for fasteners inserted parallel with the X and Y orientations of **Fig. 2**. Minimum allowed spacings shall be set to prevent unusual splitting of the rim board. Fastener capacities are required to be developed that address (1) connection of the diaphragm to the top edge of the rim board;

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from International Code Council (ICC), 200 Massachusetts Ave., NW, Suite 250, Washington, DC 20001, <http://www.iccsafe.org>.

⁵ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.