APA PRR-410
Standard for Performance-Rated Engineered Wood Rim Boards

(Intended for publication as ANSI/APA PRR-410 when approved by the APA Standards Committee and ANSI)

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1. Scope

1.1 An engineered wood rim board is a rectangular-shaped product manufactured from either structural-use panels sawn into rim board dimensions, re-sawn structural glued laminated timber, or structural composite lumber manufactured specifically to meet the performance requirements of rim boards in wood frame construction.

1.2 An engineered wood rim board shall have been qualified as meeting one or more of the referenced product standards listed in Section 2.

1.3 Unless otherwise specified, the term "engineered wood rim boards" referenced in this standard represents the rim board products defined in Sections 1.1 through 1.2 and qualified under this standard.

1.4 This standard provides dimensions and tolerances, performance requirements, test methods, quality assurance, and trademarking for engineered wood rim boards. The use of ~~an~~ engineered rim boards in bending applications is beyond the scope of this standard.

1.5 Engineered wood rim boards shall be used in dry service conditions where the mean equilibrium moisture content of solid-sawn lumber is less than 16%.

1.6 Products carrying an engineered wood rim board trademark are to be used in accordance with the installation requirements prescribed in the code or code report, and the recommendations published by the rim board manufacturer, or its qualified agency or trade association.

1.7 The annex and discussion contained in this standard are mandatory, and notes and appendix are non-mandatory. This standard incorporates the U.S. customary units as well as the International System of Units (SI). The values given in the U.S. customary units are the standard and the SI values given in parentheses are for information only.

2. Referenced Documents

This standard incorporates dated references. These normative references are cited at the appropriate places in the text. Subsequent amendments or revisions to these references apply to this standard only when incorporated into this standard by amendments or revisions.

2.1 ASTM Standards:

D 9-09 Standard Terminology Relating to Wood and Wood-Based Products
D 198-09 Standard Test Methods of Static Tests of Lumber in Structural Sizes
D 1037-06a Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials

D 2395-07 Standard Test Methods for Specific Gravity of Wood and Wood-Base Materials
D 2915-03 Standard Practice for Evaluating Allowable Properties for Grades of Structural Lumber
D3501-05a Standard Test Methods for Wood-Based Structural Panels in Compression
D 3737-08 Standard Practice for Establishing Stresses for Structural Glued Laminated Timber (Glulam)
D 4761-05 Standard Test Methods for Mechanical Properties of Lumber and Wood-Based Structural Material
D 5456-09 Standard Specification for Evaluation of Structural Composite Lumber Products
F 1667-05 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples

2.2 Other Standards:

ANSI/AF&PA NDS-2005 National Design Specification for Wood Construction
ANSI/AF&PA SDPWS-2008 Special Design Provisions for Wind and Seismic
ANSI/AITC A190.1-2007 Structural Glued Laminated Timber
ANSI/ASME Standard B18.2.1-1996 Square and Hex Bolts and Screws (Inch Series)
APA Y510-1997 Plywood Design Specification
CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
CSA O86-09 Engineering Design in Wood
CSA O121-M1978 (R2003) Canadian Douglas Fir Plywood
CSA O122-06 Structural Glued-Laminated Timber
CSA O151-04 Canadian Softwood Plywood
CAN/CSA O325.0-07 Construction Sheathing
US Product Standard PS 1-07 Structural Plywood
US Product Standard PS 2-04 Performance Standard for Wood-Based Structural-Use Panels

3. Terminology

3.1 Definitions: See the referenced documents for definitions of terms used in this standard.

3.2 Description of terms specific to this standard:

3.2.1 *Vertical (Compression) Load Capacity* – The mechanical capacity of rim boards to transfer applied gravity loads, such as wall loads, through compressive load transfer to the sill plate of the supporting wall.

3.2.2 *Composite Panel* – Any panel containing a combination of veneer and other wood-based materials meeting the requirements of PS 2 or CSA O325.

3.2.3 *Horizontal (Shear) Load Transfer Capacity* – The mechanical capacity of rim boards to transfer applied lateral loads, such as wind or seismic, through shear load transfer provided by the connections between rim board and floor sheathing, and rim board and sill plate.

3.2.4 *Mat-Formed Panel* – Any wood-based panel which does not contain veneer, consistent with the definition of structural-use panels.

3.2.5 *Mill Specification* -- A manufacturing specification based on product evaluation to be used for quality assurance purposes by the manufacturer and the qualified agency.

3.2.6 *Rim Board* – A continuously supported, full-depth structural element developed for use with a wood floor or roof assembly performing a similar role as starter or end joist in lumber floor/roof assemblies and installed in a load bearing wall or ~~a~~ non-load bearing wall perpendicular or parallel to the joist framing to transfer horizontal (shear) and vertical (compression) loads, provide attachment for diaphragm sheathing, siding and/or exterior deck ledgers, and provide lateral support to floor or roof joists or rafters.

3.2.7 *Structural Composite Lumber (SCL)* – An engineered wood product that is intended for structural use and bonded with adhesives, and meets the definition and requirements of ASTM D 5456.

3.2.8 *Structural Glued-Laminated Timber (glulam)* – An engineered, stress rated product of a timber laminating plant comprising assemblies of specially selected and prepared wood laminations securely bonded together with adhesives, and meets the definition and requirements of ANSI/AITC A190.1 or CSA O122.

3.2.9 *Structural-Use Panel* -- A panel product composed primarily of wood which, in its commodity end use, is essentially dependent upon certain mechanical and/or physical properties for successful end-use performance and meets the definition and requirements of PS 1, PS 2, CSA O325, CSA O121 or CSA O151.

4. Dimensions and Dimensional Tolerances

4.1 The nominal thickness for engineered wood rim boards shall not be less than 1-1/4 inch (31.8 mm) for Rim Board Grade A, 1-1/8 inches (28.6 mm) for Rim Board Grade B, or 1 inch (25.4 mm) for Grade C. Engineered wood rim boards shall be identified by the Performance Category shown in Section 4.3.

4.2 The depth for engineered wood rim boards shall not exceed 24 inches (610 mm).

4.3 Dimensional tolerances - Dimension tolerances permitted at the time of manufacture for engineered wood rim boards shall be as follows:

Depth - Plus 1/8 inch (3.2 mm) or minus 0 inch (measured to 1/32 inch or 0.79 mm) for structural-use panel or structural composite lumber rim boards. Structural glued-laminated timber rim board shall be manufactured at a moisture content and depth to ensure that it meets these same tolerances over a range of application moisture contents of 5 and 16%

Note: To ensure compatibility with I-joists, the depth of rim boards manufactured from glulam should be based on a moisture content of approximately 12%.

Thickness – Tolerances shall be in accordance with Table 1.

Table 1. Thickness tolerances

Performance Category	1	1-1/8	1-1/4
Minimum Thickness[(a)]	0.950 inch (24.13 mm)	1.069 inches (27.15 mm)	1.188 inches (30.16 mm)
Maximum Thickness	1.~~031~~ 050 inches (26.67 mm)	1.~~156~~ 181 inches (30.00 mm)	1.~~281~~ 313 inches (33.34 mm)

[(a)] The label thickness

5. Required Performance Criteria

Engineered wood rim boards shall meet the performance requirements established in this section.

5.1 Sampling

5.1.1 Test samples shall be representative of typical production and shall be sampled at the manufacturing facility by a qualified agency.

5.1.2 For engineered wood rim boards manufactured from structural-use panels, a minimum of 20 full-size (typical 4 feet by 8 feet or 1219 mm by 2438 mm) panels shall be sampled for all evaluation tests. For engineered wood rim boards manufactured from other materials, a ~~minimum of~~ total of at least 200 lineal feet (61,000 mm) taken from a minimum of 2 different billets of representative production shall be sampled.

5.1.3 The sample size required for horizontal load transfer capacity, vertical load capacity, lag screw tests, and concentrated load capacity shall be sufficient for estimating the population mean within 5% precision with 75% confidence, or 10 assemblies, whichever is larger. In general, a sample size larger than 10 assemblies is needed when the coefficient of variation is greater than 13%.

5.2 Structural Performance Criteria

5.2.1 The structural performance for engineered wood rim boards shall include the horizontal load transfer capacity, vertical load capacity, 1/2-inch (12.7-mm) diameter lag screw lateral resistance, and concentrated load capacity of the product under evaluation.

5.2.2 Structural performance shall be evaluated for each engineered wood rim board thickness, depth, grade, and species combination unless otherwise noted in the test method.

5.2.3 Engineered wood rim boards shall meet the minimum structural performance given in Table 2 based on the test methods described in Section 6.

Table 2. Required Mean Test Values[(a)] for Engineered Wood Rim Boards

Rim Board Grade	Performance Category[(b)]	H[(c)] (lbf/ft)	V[(d)] (lbf/ft)		Z[(e)] (lbf)	P[(f)] (lbf)
		Depth (d) Limitation (in.)				
		d ≤ 24	d ≤ 16	16 < d ≤ 24	d ≤ 24	16 < d ≤ 24
A	1-1/4 or higher	675	15,450	9,600	1,750	10,500
B1	1-1/4 or higher	560	15,450	9,600	1,750	10,500
B2	1-1/8 or higher	560	14,550	9,600	1,750	10,500
C1	1-1/8 or higher	505	13,200	9,000	1,750	10,500
C2	1 or higher	505	9,900	4,950	~~1,750~~1,500	10,500

For SI: 1 in. = 25.4 mm, 1 lbf/ft = 0.0146 N/mm, 1 lbf = 4.448 N

(a) The tabulated values are the required mean test values. The allowable stress design (for the U.S.) and limit states design (for Canada) values are provided in Annex A.
(b) Performance categories as shown in Section 4.3.
(c) Mean test value for the horizontal (shear) load transfer capacity.
(d) Mean test value for the vertical (compression) load capacity.
(e) Mean test value for the lateral resistance of a 1/2-inch (12.7-mm) diameter lag screw.
(f) Mean test value for the concentrated load capacity.

5.3 Edge Nailing Durability Criteria

5.3.1 Samples used for evaluating the edge nailing durability of engineered wood rim boards shall be prepared from those panels required in Section 5.1.2.

5.3.2 Tests shall be conducted in accordance with the procedures provided in Section 6.6.

5.3.3 The mean edge nailing durability shall be at least 75% of the mean lateral load transfer capacity determined from Section 6.2.

5.4 Physical Properties Criteria

5.4.1 Requirements specified in this section do not apply to plywood panels, laminated veneer lumber, or glulam materials.

5.4.2 Samples used for establishing the physical properties of engineered wood rim boards shall be prepared from those panels required in Section 5.1.2.

5.4.3 Thickness swell – The rim board thickness swell shall be evaluated based on the 24-hour water soak method of *ASTM D 1037* using 5 specimens (6 inches by 6 inches or 152.4 mm by 152.4 mm) from each of 5 panels (25 specimens in total) tested for structural performance (Section 5.2). The mean thickness swell for the whole sample population shall not exceed 10% and no individual value shall exceed 12%.

5.4.4 Density – The rim board density shall be determined in accordance with *ASTM D 2395* using the same panels tested for structural performance (Section 5.2) ~~using the same panels tested for structural performance (Section 5.2)~~. One specimen with a dimension of 6 inches (152.4 mm) by 6 inches (152.4 mm) shall be prepared from each panel (20 specimens in total) for the density determination based on oven-dry weight and as-tested volume. Data obtained from this evaluation shall be used to establish the control values for the quality assurance use.

5.4.5 Internal bond - The rim board internal bond shall be determined based on *ASTM D 1037* using 5 specimens (2 inches by 2 inches or 50.8 mm by 50.8 mm) from each panel (100 specimens in total) tested for structural performance (Section 5.2) except that the rim boards manufactured from SCL (excluding LVL) shall be evaluated based on ASTM D 5456. Data obtained from this evaluation shall be used to establish the control values for the quality assurance use.

6. Test Methods

6.1 General

6.1.1 Test methods provided in this section shall be used to establish the structural capacities of engineered wood rim boards.

6.2 Test Method RB-1, Horizontal (Shear) Load Transfer Capacity

6.2.1 Specimen preparation

6.2.1.1 Horizontal (shear) load transfer capacity of engineered wood rim boards shall be determined using the assembly consisting of rim board, sheathing, I-joists, and sill plate shown in Figure 1 for use in the U.S. and Figure 1A for use in Canada.

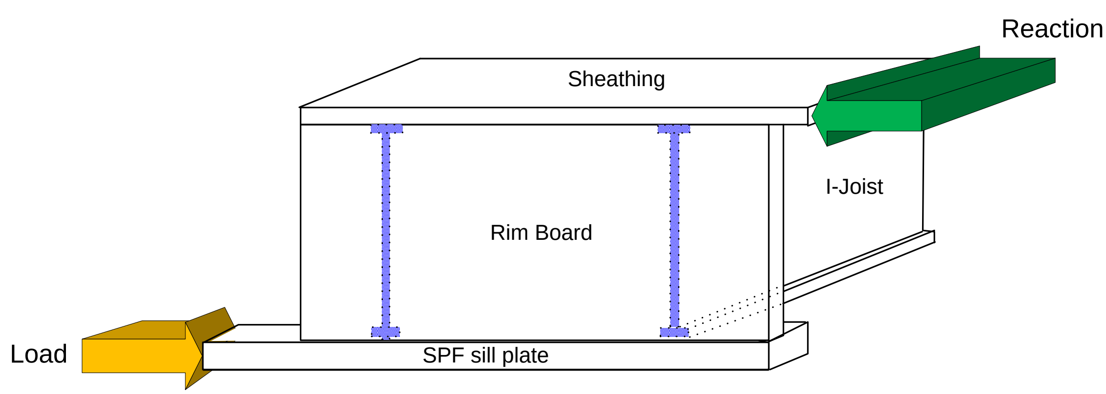


Figure 1. Test assembly for determining the horizontal load transfer capacity for use in the U.S.

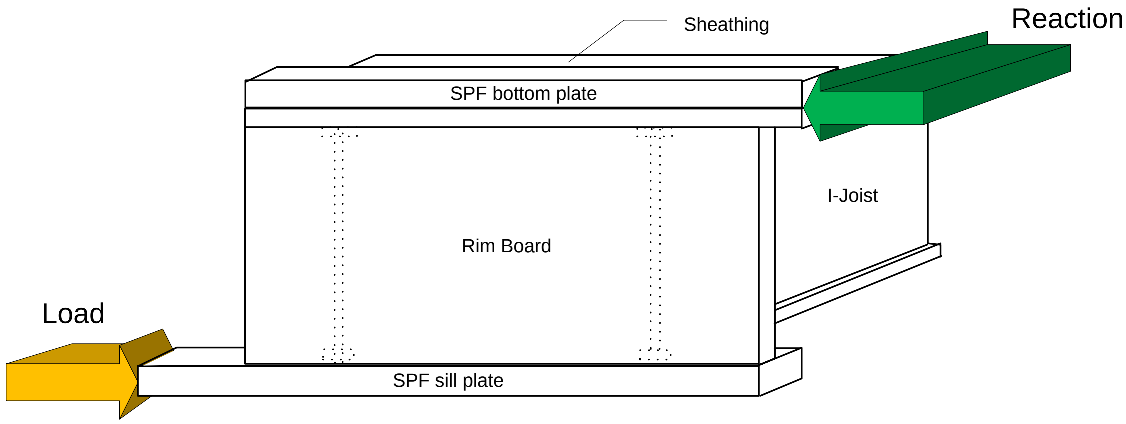


Figure 1A. Test assembly for determining the horizontal load transfer capacity for use in Canada

6.2.1.2 Dimensions for each component of the assembly shall meet the requirements given in Table 3 for use in the U.S and Canada. The sill plate shall be 2x4 spruce-pine-fir (SPF) with a specific gravity of no greater than 0.45 (i.e., 0.42 + 0.03) and complying ~~ing~~ with grading standards referenced in the applicable building code. The specific gravity of the SPF should be reported.

Table 3. Material dimensions

Material	Thickness (in.)	Depth or Width (in.)	Length (in.)
Rim Board	1 minimum	24 maximum	36
I-Joist	1-3/4 maximum	24 maximum	12
Sheathing (OSB)	23/32 maximum	12	39 minimum
Sill Plate[a] (SPF)	Nominal 2	Nominal 4	39 minimum

For SI: 1 in. = 25.4 mm

[a] Including the bottom plate for the Canadian assemblies.

6.2.1.3 Nailing schedules for the assembly shall follow the requirements provided in Table 4 for use in the US and Table 4A for use in Canada. The first and last nails between sheathing and rim board (edge nails) shall be 3 inches (76.2 mm) from each rim board end. Nails between sheathing and I-joist shall be 3 inches (76.2 mm) from each I-joist end. The first and last toe nails between rim board and sill plate shall be 3 inches (76.2 mm) from each rim board end. Nails used for the assembly shall be in conformance with the sizes specified in *ASTM F 1667* for the U.S. and *CSA B111* for Canada.

Table 4. Nailing schedule for use in the U.S.

Nailing			
Sheathing to Rim Board or Joist	Rim Board to Sill Plates (Toe Nail)	Joist to Sill Plate (Slanted)	Rim Board to Joist
6 - 8d common (0.131 in. x 2-1/2 in.) @ 6 in. o.c.	6 - 8d box (0.113 in. x 2-1/2 in.) @ 6 in. o.c.	2 - 8d box (0.113 in. x 2-1/2 in.)	2 - 8d box (0.113 in. x 2-1/2 in.)

For SI: 1 in. = 25.4 mm

Table 4A. Nailing schedule for use in Canada

Nailing				
Sheathing to Rim Board or Joist	Bottom Plate through Sheathing to Rim Board[a]	Rim Board to Sill Plates (Toe Nail)	Joist to Sill Plate (Slanted)	Rim Board to Joist
6 - 6d common (0.113 in. x 2 in.) @ 6 in. o.c.	3 - 12d common (0.148 in. x 3-1/4 in.) @ 15.7 in. o.c. or 6 – 12d common (0.148 in. x 3-1/4 in.) @ 6 in. o.c.[b]	6 - ~~8d common (0.131 in. x 2-1/2 in.)~~ 12d common (0.148 in. x 3-1/4 in.) @ 6 in. o.c.	2 - 8d common (0.131 in. x 2-1/2 in.)	2 - 8d common (0.131 in. x 2-1/2 in.)

For SI: 1 in. = 25.4 mm

[a] 1/2 of the assemblies shall be prepared with a 3-1/4-in. (82-mm) nail installed between the 2-in (51-mm) nails and the other 1/2 of the assemblies shall be prepared with a 3-1/4-in. (82-mm) nail installed within 0.4 inch (10 mm) of a 2-in (51-mm) nail.

[b] For braced walls in high wind and seismic areas.

6.2.1.4 Joist spacing for the assembly shall be 24 inches (610 mm) on center.

6.2.1.5 The assembly shall be fabricated at least 12 hours prior to mechanical testing.

6.2.2 Test procedures

6.2.2.1 Horizontal loads shall be applied through the sill plate while the sheathing reacts through full-width bearing, or vice versa. Vertical tie-rods or other similar devices shall be used to provide vertical restraints to avoid overturning the assembly. These restraints, however, shall not interfere with the lateral displacement of the assembly in the direction parallel to the loading.

6.2.2.2 Assembly displacements shall be measured based on the relative lateral displacements between the sill plate and sheathing along the entire length of the rim board. Vertical displacements caused by overturning forces, if any, shall be isolated from the measurements of lateral displacements.

6.2.2.3 The loading rate shall not exceed 450 lbf (2.0 kN) per minute.

6.2.2.4 The assembly shall be tested to the ultimate load or 0.4-inch (10.2 mm) lateral displacement, whichever occurs first. No preload shall be applied. Load and displacement readings shall be taken at approximately equal load increments.

Note: Testing beyond the 0.4-inch (10.2-mm) lateral displacement may provide additional information for some rim board materials

6.2.3 The maximum lateral load transfer capacity (test value) for each assembly is equal to the maximum load determined from Section 6.2.2.4 divided by the rim board length.

6.2.4 The lateral load transfer capacity determined from Section 6.2.3 is applicable to a shallower rim board of the same thickness and species combination.

6.3 Test Method RB-2, Vertical (Compression) Load Capacity

6.3.1 Specimen preparation

6.3.1.1 Specimens used for this test method shall be at least 12 inches (305 mm) in length and tested as a stand-alone column. Specimens shall be tested after reaching an equilibrium moisture content at 65 ± 5% RH and 68 ± 11ºF (20 ± 6°C).

6.3.2 Test procedures

6.3.2.1 Vertical loads shall be applied uniformly over the entire length and thickness of the stand-alone rim board. No lateral supports shall be used for testing. The loading direction shall be consistent with the intended application of the rim board.

6.3.2.2 Vertical load deformations shall be measured based on the displacements over the entire depth (crosshead movement).

6.3.2.3 The average time to failure shall be approximately two minutes.

6.3.2.4 A preload of no more than 10% of the estimated ultimate load is permitted to be applied and the deformation reading zeroed. After that, the load and deformation readings shall be taken at approximately equal load increments until the ultimate load is reached.

6.3.2.5 The ultimate load and the load at 0.06-inch (1.5-mm) vertical deformation shall be recorded.

6.3.3 The maximum vertical load capacity (test value) for each assembly is equal to the ultimate load determined from Section 6.3.2 divided by the rim board length, or 3 times the load at 0.06-inch (1.5-mm) vertical displacement divided by the rim board length, whichever is less.

6.3.4 The buckling capacity for rim boards made with SCL and glulam shall be calculated in accordance with the National Design Specification for Wood construction (NDS) using the appropriate axial compressive stress and bending modulus of elasticity in the perpendicular to the rim board length direction, as tested in accordance with ASTM D 3501 and D 198, respectively. The buckling length coefficient, K_e, shall not be less than 0.90. The maximum vertical load capacity for the rim board shall be equal to the calculated buckling capacity or the maximum vertical load capacity determined from 6.3.3, whichever is less. The vertical load capacity cannot exceed the compression perpendicular-to-grain capacity of the sheathing and plate materials.

Note: The calculated buckling load capacity for structural-use panels is equal to or greater than the allowable value shown in Table A1 based on the properties published in the Panel Design Specification and the allowable compressive stress perpendicular to the grain of 360 psi for floor sheathing.

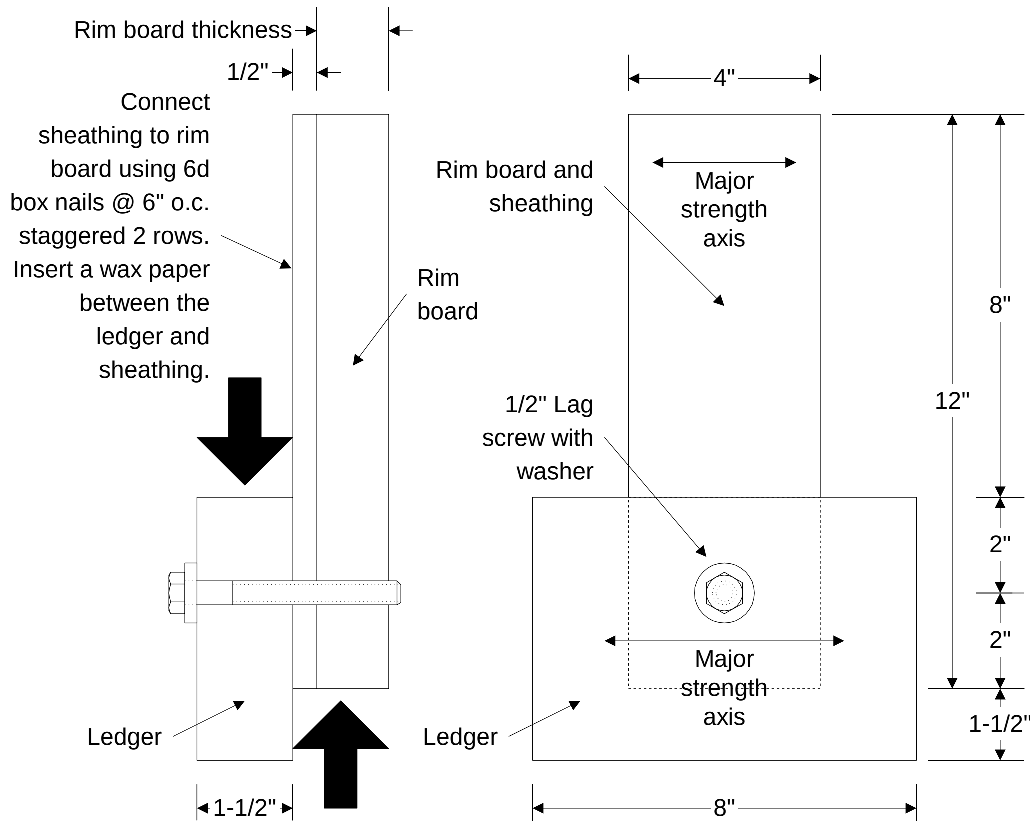
6.3.5 The vertical load capacity determined from Section 6.3.4 is applicable to a shallower rim board of the same thickness and species combination.

6.4 Test Method RB-3, Lag Screw Lateral Resistance

6.4.1 Specimen preparation

6.4.1.1 Specimens used for determining the lag screw lateral load resistance of engineered wood rim boards shall be prepared in accordance with Figure 2. Dimensions for each component of the assembly shall meet the requirements given in Figure 2. A wax paper shall be inserted between the ledger and sheathing to minimize friction.

Note: This test method is not intended for bolt or lag screw installation with multiple washer spacers between the head of the lag screw and the ledger.



For SI: 1 in. = 25.4 mm

(a) The dimension may be increased to avoid splitting provided the deviation is reported and noted in the specific Mill Specification.

Figure 2. Assembly for determining the lag screw lateral resistance

6.4.1.2 A 1/2-inch (12.7-mm) diameter lag screw with washer shall be used for testing. The lag screw used for the assembly shall be in conformance with ANSI/ASME B18.2.1.

6.4.1.3 The ledger shall be 2x6 spruce-pine-fir (SPF) with a specific gravity of no greater than 0.45 (i.e., 0.42 + 0.03) and complying ~~ing~~ with grading standards referenced in the applicable building code. The specific gravity of the SPF should be reported.

6.4.1.4 A clearance hole and lead hole shall be bored in accordance with the guidelines provided in the 2005 NDS. The diameter for the lead hole shall be 5/16 inch (7.9 mm).

6.4.1.5 The assembly shall be fabricated at as-received conditions and conditioned at 65 ± 5% RH and 68 ± 11ºF (20 ± 6°C) until reaching moisture equilibrium before mechanical testing.

6.4.2 Test procedures

6.4.2.1 Loads shall be applied through the ledger while the rim board and sheathing react through full-width bearing, or vice versa.

6.4.2.2 Assembly displacements shall be measured based on the movement of the machine cross head.

6.4.2.3 The loading rate shall not exceed 0.1 inch (0.25 mm) per minute.

6.4.2.4 The assembly shall be tested up to the ultimate load or 0.6-inch (15-mm) displacement, whichever occurs first. No preload shall be applied. Load and displacement readings shall be taken at approximately equal load increments.

6.4.3 The maximum lag screw lateral resistance (test value) for each assembly is equal to the maximum load determined from Section 6.4.2.4.

6.4.4 The lag screw lateral resistance determined from Section 6.4.3 is applicable to all rim boards of the same thickness and species combination.

6.5 Test Method RB-4, Concentrated Load Capacity

6.5.1 Specimen preparation

6.5.1.1 Specimens used for this test method shall be at least 16 inches (406 mm) in length and tested as a stand-alone column. Specimens shall be tested after reaching an equilibrium moisture content at 65 ± 5% RH and 68 ± 11ºF (20 ± 6°C).

6.5.2 Test procedures

6.5.2.1 Test procedures shall follow Section 6.3.2 except that the concentrated load shall be applied through a 4-1/2-inch (114-mm) long steel bar with a minimum thickness of 1/2 inch (12.7 mm) and a width of not less than the rim board thickness. The steel bar shall be centered on the 16-inch (406-mm) specimen length.

6.5.3 The maximum concentrated load capacity (test value) for each assembly is equal to the ultimate load determined from Section 6.5.2, or 3 times the load at 0.06-inch (1.5-mm) vertical deformation, whichever is less.

6.5.4 The concentrated load capacity determined from Section 6.5.3 is applicable to a shallower rim board of the same thickness and species combination.

6.6 Test Method RB-5, Edge Nailing Durability

6.6.1 Specimen preparation

6.6.1.1 Specimens used for this test method shall be prepared in accordance with Section 6.2.1. A minimum of 3 assemblies shall be tested for each rim board species, depth, and thickness combination.

6.6.1.2 The 24-hour water soak method of *ASTM D 1037* shall be applied to each rim board specimen before the test assembly is fabricated. The test assembly shall be fabricated while the rim board specimen is still wet.

6.6.1.3 The assembly shall be redried to a moisture content comparable to the moisture content of the assemblies tested in Section 6.2 before mechanical testing.

6.6.2 Test procedures

6.6.2.1 Test procedures shall follow Section 6.2.2.

6.6.3 The maximum edge nailing durability (test value) for each assembly is equal to the maximum load determined from Section 6.6.2 divided by the rim board length.

6.6.4 The edge nailing durability determined from Section 6.6.3 is applicable to a shallower rim board of the same thickness and species combination.

7. Product Evaluation

7.1 Qualification Tests

Required qualification tests and criteria are detailed in Section 5 of this standard. Retesting shall be conducted using a new independent sample set.

7.2 Mill Specification

Upon conformance with the requirements specified in this standard, a manufacturing specification unique to the product and mill shall be written based on product evaluation. This specification shall be used for quality assurance purposes by the manufacturer and the qualified agency. Product evaluation will be accomplished on the same lot supplied by the manufacturer for qualification testing. Reference values shall be established during product evaluation or from applicable performance requirements in this standard, as specified in Section 8.

7.3 Trademarking and Certification

7.3.1 Certification

All engineered wood rim boards represented as being in conformance with this standard shall bear the stamp of a qualified agency which (1) either inspects the manufacture or (2) has tested a random sampling of the finished products in the shipment being certified for conformance with this standard.

7.3.2 Qualified Agency

A qualified agency is defined to be one that:

a) has the facilities and trained technical personnel to verify that the grading, measuring, and other characteristics of the products as determined by inspection, sampling and testing conform to all of the applicable requirements specified herein;
b) has developed procedures to be followed by agency personnel in performance of the inspection and testing;
c) has no financial interest in, or is not financially dependent upon, any single company manufacturing the product being inspected or tested; and
d) is not owned, operated or controlled by any such company.

7.3.3 Product Marking

All engineered wood rim board products represented as conforming to this standard shall be identified with marks giving the following information:

a) *Rim Board Grade* qualified in accordance with this standard.
b) The *Performance Category*
c) The labeled *rim board thickness*
d) The *mill name or identification number*
e) The *qualified agency name or logo*
f) The symbol of "*ANSI/APA PRR-410*" signifying conformance with this standard.
g) Any manufacturer's designations which shall be separated from the grade-marks or trademarks of the qualified agency by not less than 6 inches (152 mm).

7.3.4 Voiding Marks

Engineered wood rim boards originally marked as conforming to this standard but subsequently rejected as not conforming thereto shall have any reference to the standard obliterated or voided by the manufacturer.

Note: This can be performed by blocking out the stamp with permanent black ink or light sanding.

8. Quality Assurance

8.1 Purpose

This section is intended for use with an engineered wood rim board product that has qualified for trademarking under this standard. The purpose of this section is to assure product quality by detecting changes in properties which may adversely affect rim board performance. In all cases, the criteria to which the engineered wood rim Board is tested will be provided in the Mill Specification.

8.2 Referenced Standards

8.2.1 Engineered wood rim boards can be made from a variety of wood-based products, each with unique test requirements. Quality assurance requirements exist in different forms for many of these products, as listed in Section 2.

8.2.2 Engineered wood rim board quality assurance requirements may be considered satisfied when the requirements for the referenced standards in Section 2 and any additional requirements listed in Section 8.3 are met.

8.2.3 Referenced standards shall be specified by product type to define appropriate procedures and/or guidelines for quality assurance. If a product trademarked under this standard is trademarked under another standard, samples shall be taken for both standards.

8.3 Mechanical and Physical Property Quality Assurance

8.3.1 Mat-formed and composite panels

8.3.1.1 Mechanical properties – Dry bending strength and stiffness in both the along and across directions, and redry (cycled in accordance with Section 7.16, *Single Cycle Test*, of *PS 2*) bending strength in the along direction (Section 7.6, *Small Static Bending Test*, of *PS 2*), of the product qualified under structural performance (Section 5.2 of this standard) shall be established in accordance with *PS 2 or CSA O325*.

8.3.1.2 Glue bond durability shall be established based on tests conducted in accordance with Section 6.2.4.1 of *PS 2 or CSA O325*.

8.3.1.3 Thickness swell shall be tested for quality assurance. The mean thickness swell for the quality assurance sample shall not exceed 10% and no individual value shall exceed 12%.

8.3.1.4 Density control value shall be established from qualification, as specified in Section 5.4.4. The minimum control value shall be established as follows:

$$\text{Minimum density} = \text{Mean density} - 2.1 \times \text{standard deviation}$$

For quality control purposes, the density based on weight and volume at typical environmental conditions of the manufacturing facility shall be established.

8.3.1.5 Internal bond control value shall be established based on *ASTM D 1037* from qualification, as specified in Section 5.4.5. The minimum control value shall be established as follows:

$$\text{Minimum internal bond} = \text{Mean internal bond} - 2.1 \times \text{standard deviation}$$

8.3.2 Plywood panels

8.3.2.1 Specification for species, thickness, and grade shall be established in accordance with *PS 1, CSA O121, or CSA O151*.

8.3.2.2 Glue bond durability shall be conducted in accordance with Section 6.1.3 of *PS 1* or equivalent sections in *CSA O121* or *CSA O151*.

8.3.3 Glulam

8.3.3.1 Specification for mechanical properties shall be established based on *ANSI/AITC A190.1* and the principles set forth in *ASTM D 3737*.

8.3.3.2 Glue bond durability shall be conducted in accordance with Section 5.6.2 of *ANSI/AITC A190.1*.

8.3.4 Structural composite lumber

8.3.4.1 Control values for mechanical properties shall be established based on the principles set forth in *ASTM D 5456*.

8.3.4.2 Glue bond durability shall be conducted in accordance with Section 10.4 of *ASTM D 5456*.

Annex A. Design Properties for ANSI/APA PRR-410 Engineered Wood Rim Boards

Table A1. **Allowable Design** Values[a] for Engineered Wood Rim Boards

Rim Board Grade	Performance Category[b]	H[c] (lbf/ft)	V[d] (lbf/ft)		Z[e] (lbf)	P[f] (lbf)
		Depth (d) Limitation (in.)				
		$d \leq 24$	$d \leq 16$	$16 < d \leq 24$	$d \leq 24$	$16 < d \leq 24$
A	1-1/4 or higher	240	5,150	3,200	350	3,500
B1	1-1/4 or higher	200	5,150	3,200	350	3,500
B2	1-1/8 or higher	200	4,850	3,200	350	3,500
C1	1-1/8 or higher	180	4,400	3,000	350	3,500
C2	1 or higher	180	3,300	1,650	300	3,500

For SI: 1 in. = 25.4 mm, 1 lbf/ft = 0.0146 N/mm, 1 lbf = 4.448 N

(a) The allowable values are the mean test values specified in Table 2 of this standard multiplied by the adjustment factor given below:

Horizontal load transfer capacity (H): 1/2.8
Vertical load capacity (V) and concentrated load capacity (P): 1/3
Lag screw lateral resistance (Z): 1/5

These design values are applicable only to rim board applications in compliance with the connection requirements tested in this standard. All design values are applicable to the normal load duration (10 years) for wood products, except for the horizontal load transfer capacity (H), which is based on the short-term load duration (10 minutes). Design values shall be adjusted for other load durations in accordance with the applicable building code except that the vertical (compression) load capacity (V) and concentrated vertical load capacity (P) are not permitted to be increased for any load durations shorter than the normal load duration (10 years). Toe-nailed connections are not limited by the 150 lbf/ft lateral load capacity noted for Seismic Design Categories D, E and F in Section 4.1.7 of the SDPWS.

(b) Performance categories listed in this standard.

(c) H = The horizontal (shear) load transfer capacity based on the attachment schedule specified in this standard. This capacity represents the total of the lateral loads transferred through the rim board by both the floor sheathing and wall plate above the floor sheathing. H is based on qualification tests and is not subject to the limitations per Section 4.1.7 of the SDPWS. H is permitted to be increased by a factor of 1.4 when subjecting to wind loads.

(d) V = The vertical (compression) load capacity, which shall be simultaneously satisfied along with the concentrated load capacity.

(e) Z = The lateral resistance of a 1/2-inch (12.7-mm) diameter lag screw in compliance with the connection requirements tested in this standard.

(f) P = The concentrated vertical load capacity based on 4-1/2-inch (114-mm) bearing length.

Table A1A. **Limit States Design** Values[a] for Engineered Wood Rim Boards

Rim Board Grade	Performance Category[b]	ϕH[c] (lbf/ft)	ϕV[d] (lbf/ft)		ϕZ[e] (lbf)	ϕP[f] (lbf)
		Depth (d) Limitation (in.)				
		$d \leq 24$	$d \leq 16$	$16 < d \leq 24$	$d \leq 24$	$16 < d \leq 24$
A	1-1/4 or higher	313	8,590	5,338	584	5,838
B1	1-1/4 or higher	261	8,590	5,338	584	5,838
B2	1-1/8 or higher	261	8,090	5,338	584	5,838
C1	1-1/8 or higher	235	7,739	5,004	584	5,838
C2	1 or higher	235	5,504	2,752	500	5,838

For SI: 1 in. = 25.4 mm, 1 lbf/ft = 0.0146 N/mm, 1 lbf = 4.448 N

(a) These design values are applicable standard-term load duration and permitted to be adjusted for other load durations in accordance with the applicable building code. Factors for ASD to LSD conversion are shown in Appendix B.

(b) Performance categories listed in this standard.

(c) H = The factored horizontal (shear) load transfer resistance based on the attachment schedule specified in this standard. This capacity represents the total of the lateral loads transferred through the rim board by both the floor sheathing and wall plate above the floor sheathing.

(d) V = The factored uniform vertical (compression) load resistance.

(e) Z = The factored lateral resistance of a 1/2-inch (12.7-mm) diameter lag screw in compliance with the connection requirements tested in this standard.

(f) P = The factored concentrated vertical load resistance based on 4-1/2-inch (114-mm) bearing length.

Appendix A. History of Standard (Non-Mandatory)

In May 2009, the APA Standards Committee on Standard for Performance-Rated Engineered Wood Rim Boards was formed to develop a national standard under the consensus processes accredited by the American National Standards Institute (ANSI). This national consensus standard, designated as ANSI/APA PRR-410, is developed based on the *Performance Standard for APA EWS Rim Boards*, APA PRR-401, which has been in use by the engineered woods industry in North America since 1994.

The names of the ANSI/APA PRR-410 Committee members when the standard is published are as follows. The current list of the committee membership is available from the committee secretariat upon request.

Name	Affiliation	
Mark Aucoin	Hexion Specialty Chemicals, Inc.	
Zhaozhen Bao	TECO	
Kevin Blau	Tolko Industries, Inc.	
Zhiyong Cai	USDA Forest Products Lab	Vice Chair
Dan Cheney	iLevel by Weyerhaeuser	
Bruno Di Lenardo	Canadian Construction Materials Centre	
Gary Ehrlich	NAHB	
Bill Gareis	Ashland Chemical	
Mark Hutnik	Huntsman	
Joe Kaiserlik	Georgia-Pacific Corporation	Chair
Meho Karalic	K1 Engineering, Ltd.	
Ken Lau	Ainsworth Lumber Company	
Stuart Lewis	ITW Building Components Group, Inc.	
John Marson	Norbord	
Edward Pacylowski	Pro-Built Construction, Inc.	
Sheldon Shi	Mississippi State Univ.	
Kurt Stochlia	ICC Evaluation Service, Inc	
Darin Thompson	Timber Products Inspection, Inc.	
Phil Vacca	Louisiana-Pacific Corporation	
Randy Webb	PSI	
Blair Wilding	Arclin	
B.J. Yeh	APA – The Engineered Wood Association	Secretariat

Inquiries or suggestions for improvement of this standard should be directed to:
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Appendix B. ASD-to-LSD Conversion Factors (Non-Mandatory)

B1. Horizontal Load Capacities (H)

Note: The conversion factor for rim board horizontal load capacities follows the same procedures used to convert the shearwall values published in Clause 9 of CSA O86.

LSD: $\phi K_{D,LSD} H_{LSD,standard\text{-}term} \geq \alpha_Q Q$ [B1-1]

ASD: $H_{ASD,short\text{-}term} \geq Q$ [B1-2]

where

- ϕ = resistance factor = 0.7 for nailed shearwalls and rim boards
- $K_{D,LSD}$ = LSD load duration factor = 1.15 for LSD short-term loading
- α_Q = LSD load factor = 1.5 for wind
- Q = applied load
- $H_{LSD,standard\text{-}term}$ = LSD specified horizontal load capacity for LSD standard-term load duration
- $H_{ASD,short\text{-}term}$ = ASD allowable horizontal load capacity for ASD short-term load duration

From Equations B1-1 and B1-2,

$$\phi H_{LSD,standard\text{-}term} = \frac{\alpha_Q}{K_{D,LSD}} H_{ASD,short-term}$$

$$= \frac{1.5}{1.15} H_{ASD,short-term}$$

$$= 1.304\ H_{ASD,short\text{-}term} \quad [B1\text{-}3]$$

As a result, the conversion factor for the factored horizontal load capacities, ϕH_{LSD}, is 1.304. Note that the converted ϕH_{LSD} is based on LSD standard-term but not short-term load duration.

B2. Uniform Vertical Load Capacities (V)

LSD: $\phi K_{D,LSD} V_{LSD} \geq \alpha_D Q_D + \alpha_L Q_L$ [B2-1]

ASD: $K_{D,ASD} V_{ASD} \geq Q_D + Q_L$ [B2-2]

where

- ϕ = resistance factor = 0.95 for compression member
- $K_{D,LSD}$ = LSD load duration factor = 1.0 for LSD standard-term loading
- V_{LSD} = LSD specified uniform vertical load capacity for standard-term load duration
- α_D = LSD dead load factor = 1.25
- Q_D = applied dead load
- α_L = LSD live load factor = 1.5
- Q_L = applied live load

$K_{D,ASD}$ = ASD load duration factor = 1.15 under roof snow load
V_{ASD} = ASD allowable uniform vertical load capacity for ASD normal load duration

Assuming $Q_L/Q_D = \gamma$, from Equations B2-1 and B2-2,

$$\phi V_{LSD} = \frac{\alpha_D + \gamma\alpha_L}{K_{D,LSD}(1+\gamma)} K_{D,ASD} V_{ASD} \quad [B2\text{-}3]$$

When calibrated to $Q_L/Q_D = \gamma = 4.0$ in accordance with the practice adopted by CSA O86,

$$\phi V_{LSD} = \frac{1.25 + 4\times 1.5}{1.0\times(1+4)} \times 1.15 \times V_{ASD}$$

$$= 1.668\ V_{ASD} \quad [B2\text{-}4]$$

For uniform vertical load capacities, a relative humidity effect factor of 0.85 that is applied to sheathing panels to account for the difference in the relative humidity of 80% (the basis for CSA O86) and 65% (the standard relative humidity for ASD) for structural-use panels given in CSA O86 is not required for rimboards due to the location of the rimboard within the wall assembly. Therefore, the conversion factor for the factored uniform vertical load capacities, ϕV_{LSD}, is 1.668.

B3. Concentrated Vertical Load Capacities (P)

The conversion factor for the factored concentrated vertical load capacities, ϕP_{LSD}, is the same as the factored uniform vertical load capacities: 1.668.

B4. Lag Screw Capacities (Z)

The derivation of lag screw conversion factor follows the same procedures as the factored uniform vertical load capacities, as shown in Equation B2-4. Therefore, the LSD factored lag screw capacities, ϕZ_{LSD}, are equal to 1.668 times the ASD lag screw capacities.