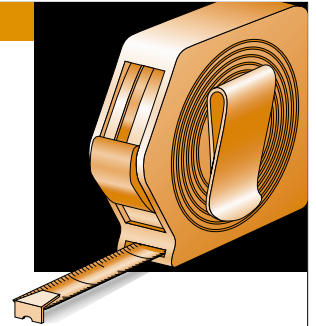


APA PERFORMANCE RATED RIM BOARDS



A rim board is the wood component that fills the space between the sill plate and bottom plate of a wall or, in second floor construction, between the top plate and bottom plate of two wall sections. The rim board must match the depth of the framing members between floors or between the floor and foundation to function properly. In addition to supporting the wall loads, the rim board ties the floor joists together. It is an integral component in an engineered wood system because it transfers both lateral and vertical bearing forces.

While lumber has been the traditional product used for rim boards, it is not compatible with the new generation of wood I-joists used in floor construction. With the increasing use of wood I-joists, a demand for compatible engineered wood rim boards has resulted.

APA Performance Rated Rim Boards can be manufactured using plywood, oriented strand board (OSB), glued laminated timber (glulam), or laminated veneer lumber (LVL). These engineered wood rim boards have less shrinkage than lumber and match the depth of wood I-joists and other engineered wood framing products. They are available in lengths up to 24 feet, depending on the product used. See Table 1.



In this application, an engineered wood rim board is installed between the foundation sill plate and the floor under a wall section. The rim board matches the depth of the I-joists used in the floor framing.

Most APA Performance Rated Rim Boards are structural-use panels that are manufactured in accordance with the *Performance Standard for APA EWS Rim Boards* and *Voluntary Product Standards PS 1 or PS 2*, or *APA Standard PRP-108*. Glulam rim boards are a resawn grade of glued laminated timber manufactured in accordance with the *Performance Standard for APA EWS Rim Boards* and ANSI A190.1. The *Performance Standard for APA EWS Rim Boards* meets or exceeds the requirements given in the *ICC-ES Acceptance Criteria for Wood-Based Rim Board Products, AC124*. A typical trademark for APA EWS Rim Boards is shown at right.

As glued engineered wood products, APA Rim Boards have greater dimensional stability, higher strength, increased structural reliability, more consistent quality and a lower tendency to check or split than sawn lumber.

TABLE 1

STANDARD SIZES FOR APA PERFORMANCE RATED RIM BOARDS

	Standard Sizes ^(a)
Thickness (inches)	1 ^(b) , 1-1/8 ^(b) , 1-1/4, and 1-1/2
Depth (inches)	9-1/2, 11-7/8, 14, 16, 18, 20, 22, 24
Length (feet)	8 to 24

(a) All sizes may not be available. Check suppliers for availability.

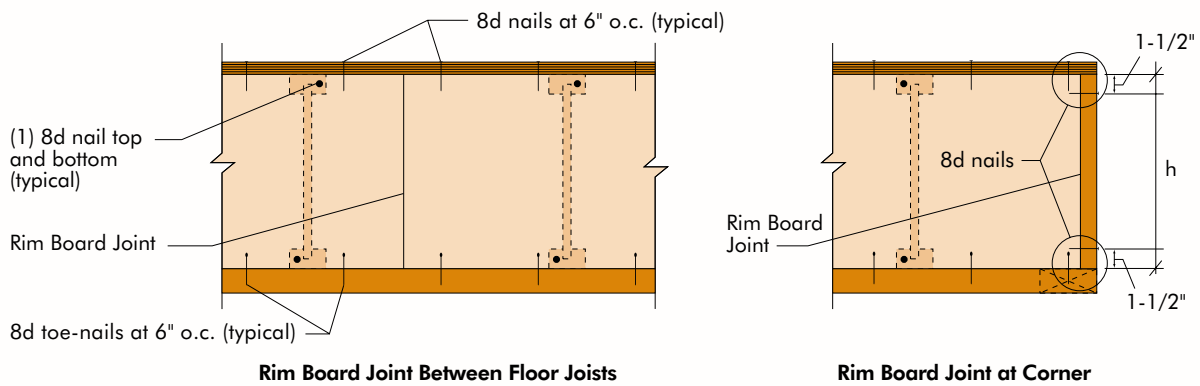
(b) Predominant thicknesses manufactured by APA members.



CONNECTION REQUIREMENTS (See Figure 1)

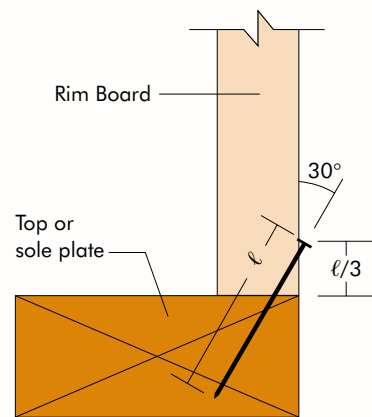
- 1. Floor sheathing to APA Performance Rated Rim Board** – Use 8d nails (box or common) at 6 inches o.c. **Caution:** *The horizontal load capacity is not necessarily increased with a decreased nail spacing. Under no circumstances should the nail spacing be less than 3 inches.* The 16d (box or common) nails used to connect the bottom plate of a wall to the rim board through the sheathing do not reduce the horizontal load capacity of the rim board provided that the 8d nail spacing (sheathing-rim board) is 6 inches o.c. and the 16d nail spacing (bottom plate-sheathing-rim board) is in accordance with the prescriptive requirements of the applicable code.
 APA recommends a minimum 3/8-inch panel edge distance be maintained when nailing. Calculations show that the tongue does not need to be removed for floor sheathing 7/8-inch thick or less when used in conjunction with rim boards of 1-1/8 inches or thicker.

**FIGURE 1
ATTACHMENT DETAILS WHERE RIM BOARDS ABUT**



- 2. APA Performance Rated Rim Board to I-Joist** – Use two 8d nails (box or common), one each into the top and bottom flanges. This is typical for rim board having a thickness up to 1-1/8 inches. A larger nail size may be required by the I-joist manufacturer or for thicker rim board products.
- 3. APA Performance Rated Rim Board to Sill Plate** – Toe-nail using 8d (box or common) at 6 inches o.c. (See Figure 2.)

**FIGURE 2
TOE-NAIL CONNECTION AT RIM BOARD**



4. Attachment of 2x lumber ledgers to APA Performance Rated Rim Board

– Use 1/2-inch-diameter lag screws with a minimum nominal length of 4 inches or 1/2-inch-diameter through-bolts with washers and nuts. In both cases, use a design value of 350 lbf per fastener if the rim board thickness is 1-1/8 inches or 300 lbf per fastener if the rim board thickness is 1 inch. (See Figure 3.)

Caution: The lag screw should be inserted in a lead hole by turning with a wrench, not by driving with a hammer. Over-torquing can significantly reduce the lateral resistance of the lag screw and should therefore be avoided. See the 2001 National Design Specification for Wood Construction (NDS) published by the American Forest & Paper Association for the appropriate size of clearance and lead holes.

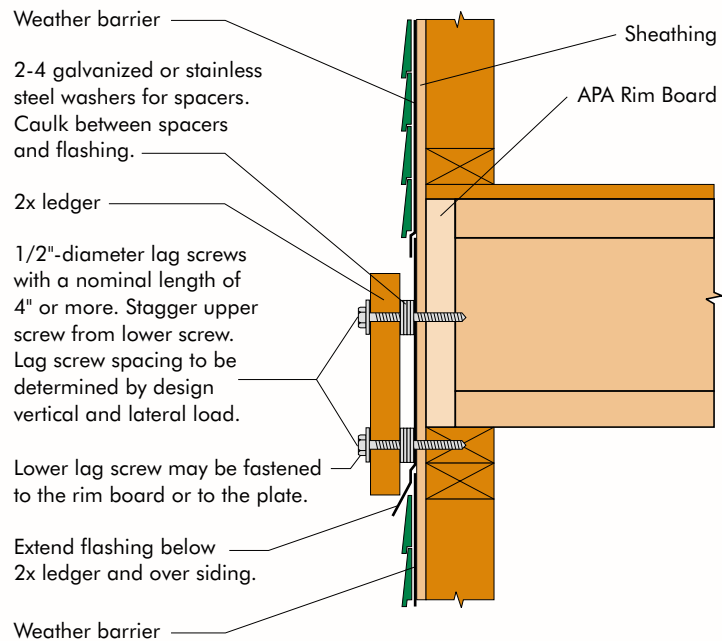
5. Lateral resistance of nails applied to the faces of APA Performance Rated Rim Board

– Calculate the lateral nail resistance based on the procedures given in the 2001 NDS and the following guidelines:

- a) If the APA Performance Rated Rim Board is made of OSB, use the bearing strength equivalent to Douglas fir-Larch.
- b) If the APA Performance Rated Rim Board is made of plywood, use the bearing strength equivalent to Douglas fir-Larch. The calculated lateral resistance should then be adjusted by a factor of 0.9.
- c) If the APA Performance Rated Rim Board is made of glulam, use the wood species of the layup combination.
- d) If the APA Performance Rated Rim Board is made of LVL, use the wood species of the veneer or use the equivalent species published in the manufacturer's code report.
- e) If the product information is unavailable, refer to the appropriate 2001 NDS design values applicable to Spruce-Pine-Fir.

FIGURE 3

2X LEDGER TO RIM BOARD ATTACHMENT DETAIL



Note 1: This schematic drawing is a construction detail recommended for attachment of a ledger in order to avoid potential decay problems on either the ledger or other building components. After placing flashing, temporarily hang 2x ledger. Drill clearance and lead holes, remove 2x ledger, caulk holes with high quality caulking, immediately reapply 2x ledger and install the lag screws.

Note 2: Lag screws or other fasteners in contact with pressure-treated wood shall be stainless steel or have a corrosion-resistant coating approved by the preservative manufacturer.

Application Notes

Standard sizes for APA Performance Rated Rim Boards are given in Table 1 and design capacities are given in Tables 2 and 3.

TABLE 2

DESIGN CAPACITIES FOR APA PERFORMANCE RATED RIM BOARDS

Grade	$t_{\min}^{(b)}$ (in.)	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	d ≤ 24
Rim Board	1	180	3,300	1,650	300	3,500	
	1-1/8	180	4,400	3,000	350	3,500	
Rim Board Plus	1	N/A ^(g)	N/A ^(g)	N/A ^(g)	N/A ^(g)	N/A ^(g)	
	1-1/8	200	4,850	3,200	350	3,500	

(a) These design values are applicable only to rim board applications in compliance with the connection requirements given in this document and should not be used in the design of a bending member, such as joist, header, rafter, or ledger. The design values are applicable to the normal load duration (10 years) for wood products, except for the horizontal load transfer capacity which is based on the short-term load duration (10 minutes). All values may be adjusted for other load durations in accordance with the applicable code.

(b) t_{\min} = Minimum thickness for design capacities listed.

(c) H = The horizontal (shear) load transfer capacity based on attachment schedule specified in this document. H is based on qualification tests and is not subject to the limitations per Section 2318.3.1 of the 1997 UBC and Section 2305.1.4 of the 2003 IBC.

(d) V = The bearing (vertical) load capacity.

(e) Z = The lateral resistance of a 1/2-inch-diameter lag screw.

(f) P = The concentrated vertical load capacity based on 4-1/2-inch bearing length. The maximum concentrated load acting along any area of the floor sheathing above the Rim Board. The bearing load must be simultaneously satisfied along with the concentrated load capacity. See Application Note 4 for additional information.

(g) The minimum thickness for APA Rim Board Plus is 1-1/8 inches.

TABLE 3

ALLOWABLE EDGEWISE BENDING PROPERTIES FOR APA PERFORMANCE RATED RIM BOARDS^(a)

Grade	$F_{be}^{(b)}$ (psi)	$E_a^{(c)}$ (psi)	$F_{ve}^{(d)}$ (psi)	$F_{cLe}^{(e)}$ (psi)
Rim Board and Rim Board Plus	600	550,000	270	550

(a) The tabulated values are applicable to the long-term load duration (10 years) and permitted to be adjusted for other load durations in accordance with the applicable code except for edgewise modulus of elasticity and compressive stress perpendicular to grain.

(b) Allowable edgewise bending stress is applicable only to a span of 4 feet or less. The adjustment for volume effect is already included. For applications requiring a longer span over an opening, use glulam, I-joists, or LVL headers.

(c) Allowable edgewise apparent modulus of elasticity.

(d) Allowable edgewise shear stress.

(e) Allowable compressive stress perpendicular to grain based on 0.04-in. deformation.

1. APA Performance Rated Rim Boards spanning over openings – Rim boards may be used to span openings up to 4 feet in length, depending on the applied loads on the opening. Table 4 gives the allowable load that can be carried by a single rim board used in this application. If other loads outside the scope of Table 4 are to be considered, the allowable edgewise bending values of Table 3 may be used for design. In some applications, a built-up (multiple pieces of) rim board may be required to provide adequate edgewise bending capacity.

TABLE 4

ALLOWABLE LOAD (plf) FOR APA RIM BOARD AND RIM BOARD PLUS USED AS HEADERS

Thickness (in.)	Depth (in.)	Rim Board Span (in.)				
		24	30	36	42	48
1	9-1/2	1,650	1,203	836	614	470
	11-7/8	1,650	1,556	1,306	959	734
	14	1,650	1,556	1,400	1,273	1,021
	16	1,650	1,556	1,400	1,273	1,167
1-1/8	9-1/2	2,115	1,354	940	691	529
	11-7/8	2,200	1,556	1,400	1,079	826
	14	2,200	1,556	1,400	1,273	1,148
	16	2,200	1,556	1,400	1,273	1,167

- (a) Span is distance measured between inside faces of opening.
- (b) Governed by worst case for bending, shear, deflection, and vertical bearing load limits. Designer is cautioned to insure sufficient bearing at ends of rim board to support applied load. Normal load duration is assumed.
- (c) Capacity shown per ply; multiple plies may be used by multiplying capacity by number of plies.
- (d) Joints in rim board shall not be located over opening or within 12" of the opening.
- (e) For larger openings, use glulam, LVL or other engineered wood products.
- (f) This table is for preliminary design use only. Final design should include a complete analysis, including bearing stresses and lateral stability.

When spanning openings, rim board end (butt) joints shall not occur over the opening or within 12 inches of the opening. Requirements for holes in rim board are detailed in APA Technical Topic TT-041, *Holes in Rim Board Used in Conventional Construction*.

2. APA Performance Rated Rim Boards used as fire blocking panels – The minimum thickness of 1 inch for APA Performance Rated Rim Boards exceeds the minimum requirement of 23/32 inch published in the model building codes as long as the joints are backed by another APA rim board or a 23/32-inch structural-use panel. For fire rated assemblies, please refer to APA Data File D350, *APA Rim Board in Fire Rated Assemblies*.

3. APA Performance Rated Rim Boards used in applications where a high lateral load transfer capacity is required – When the applied lateral loads exceed the published horizontal load capacities of APA rim boards, add a commercially available specialty connector made by connector manufacturers between the rim board and framing or sole plate. This type of connector is installed using face nailing into the rim board and has a typical lateral load capacity of 400 to 500 lbf per connector.

4. APA Performance Rated Rim Boards subjected to a combination of uniform and concentrated vertical loads –

First, the applied concentrated load shall not exceed the concentrated load capacity (P) of the rim board, based on a 4-1/2" bearing length over the floor sheathing attached to the top of the rim board. Second, the applied concentrated load shall be calculated as an equivalent uniform load based on the applied loading length increased by a 45° load distribution through decking and plate on both sides of the concentrated load, as applicable. The equivalent uniform load shall be added to the applied uniform load to determine the total applied uniform load, which shall not exceed the bearing load capacity (V) of the rim board. If the total applied uniform load exceeds the bearing load capacity (V), use appropriate squash blocks, double rim boards, or a higher grade of APA Performance Rated Rim Board to carry the concentrated vertical load.

Example: A mechanical device distributes a weight of 3,000 lbf for a distance of 12 inches along the top of a 1-1/8-inch x 16-inch APA Rim Board through 23/32-inch floor sheathing. In addition to the mechanical device the rim board carries a uniform load of 2,000 lbf/ft.

Check:

- a) Concentrated vertical load = 3,000 lbf < 3,500 lbf. OK.
- b) Equivalent uniform bearing load = $3,000 / [(12 + 2 * 23/32) / 12] = 2,680$ lbf/ft. Total equivalent uniform bearing load = $2,680 + 2,000 = 4,680$ lbf/ft > 4,400 lbf/ft. NG. Use APA Performance Rated Rim Board Plus that has an allowable bearing (vertical) load capacity of 4,850 lbf/ft, or use double rim boards under the concentrated load area.

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Revised December 2004

