

Roseburg RIGIDLAM[®] LVL
Roseburg Forest Products Company

PR-L289
Revised August 16, 2011

Products: 1.3E, 1.5E, 2.0E and 2.2E Laminated Veneer Lumber
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1. Basis of the product report:
 - 2012 and 2009 International Building Code (IBC): Sections 104.11 Alternative Materials and 2303.1.9 Structural composite lumber
 - 2012 and 2009 International Residential Code (IRC): Section R104.11 Alternative Materials, and 2012 IRC Sections R502.1.7, R602.1.4, and R802.1.6 Structural composite lumber
 - ASTM D5456-09 and D5456-05a recognized by the 2012 IBC and IRC, and 2009 IBC, respectively
 - APA Reports T2000P-19, T2000P-30, T2001P-11, T2001P-15, T2001P-22, T2001M-81, T2001M-87, T2002P-1A, T2003P-16, T2003P-33, T2003P-34, T2003P-49A, T2004P-8, T2004P-23, T2004P-42, T2005P-24, T2005P-50, T2007P-24, T2007P-25A, T2007P-26A, T2007P-30, T2007P-32, T2007P-101, T2010P-27, T2011P-34A, T2011P-35, and other qualification data
2. Product description:

Roseburg RIGIDLAM[®] laminated veneer lumber (LVL) is a structural composite lumber product consisting of veneers laminated with grain parallel to the length of the member in accordance with the in-plant manufacturing standard approved by APA. Roseburg RIGIDLAM[®] LVL is available in thicknesses of 1-1/4 to 1-3/4 inches, depths of 3-1/2 to 24 inches and lengths up to 66 feet. Additionally, the 1-3/4-inch-thick members are face-bonded together to make 3-1/2-, 5-1/4-, and 7-inch-wide built-up LVL headers and beams.
3. Design properties:

The structural design provisions for wood construction provided in the building code are applicable to Roseburg RIGIDLAM[®] LVL products unless noted otherwise in this report. Table 1 lists the design properties, Table 2 lists the equivalent specific gravities for connection design, and Table 3 shows the minimum on-center spacing for nails installed in the narrow face of Roseburg RIGIDLAM[®] LVL. The minimum on-center spacing for nails installed in the wide face of RIGIDLAM[®] LVL is 2 inches for nails up to 12d box (0.128 in. x 3-1/2 in.) or 8d common (0.131 in. x 2-1/2 in.), and 3 inches for nails up to 16d common (0.162 in. x 3-1/2 in.). The allowable spans for Roseburg RIGIDLAM LVL shall be in accordance with the recommendations provided by the manufacturer (www.roseburg.com/products/EWP%20Design%20Guide%20PDF_AR.pdf).
4. Product installation:

Roseburg RIGIDLAM[®] LVL shall be installed in accordance with the recommendations provided by the manufacturer (see link above).
5. Fire-rated assemblies:

The provisions of Section 722.6.3 of the 2012 IBC or Section 721.6.3 of the 2009 IBC, design of fire-resistant exposed wood members, shall be applicable to Roseburg RIGIDLAM[®] LVL. Fire-rated assemblies shall be constructed in accordance with the recommendations provided by APA Design/Construction Guide: *Fire-Rated Systems*, Form W305 (www.apawood.org/publications) and the manufacturer (see link above).

6. Limitations:
- Roseburg RIGIDLAM® LVL shall be designed in accordance with the code using the design properties specified in this report.
 - Roseburg RIGIDLAM® LVL is limited to dry service conditions where the average moisture content of sawn lumber is less than 16 percent.
 - Roseburg RIGIDLAM® LVL is produced at the Roseburg Forest Products facility in Riddle, Oregon under a quality assurance program audited by APA.
 - This report is subject to re-examination in one year.
7. Identification:
 The Roseburg RIGIDLAM® LVL described in this report is identified by a label bearing the manufacturer's name (Roseburg Forest Products) and/or trademark, the APA assigned plant number (1055), the product type, the species (for 1.5E with hemlock), the APA logo, the report number PR-L289, and a means of identifying the date of manufacture.

TABLE 1. ALLOWABLE DESIGN STRESSES FOR ROSEBURG RIGIDLAM® LVL^(a,b)

Design Property		1.3E Grade	1.5E Grade	2.0E Grade	2.2E Grade
Flexural Stress, $F_b^{(c)}$ (psi)	beam ^(d)	2,250	2,250	2,900	3,400
	plank ^(e)	2,250	2,250	2,900	3,400
Modulus of Elasticity, E (psi)	beam	1,300,000	1,500,000	2,000,000	2,200,000
	plank	1,300,000	1,500,000	2,000,000	2,200,000
Horizontal Shear, F_v (psi)	beam	200	220	285	325
	plank	130	130	130	130
Compression Perpendicular to Grain, $F_{c\perp}$ (psi)	beam	560	575	750	850
	plank	500	500	500	500
Tension Parallel to Grain, $F_t^{(f)}$ (psi)		1,500	1,500	1,900	2,425
Compression Parallel to Grain, F_c (psi)		1,950	1,950	2,750	3,200

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf = 4.448 N, 1 psi = 6.9 kPa

- Design values provided in this table are based on covered, dry conditions of use. Dry conditions of use are those environmental conditions represented by solid sawn lumber in which the moisture content is less than 16 percent. All values, except for E and $F_{c\perp}$, are permitted to be adjusted for other load durations as permitted by the code.
- Beam = load parallel to glue-line; plank = load perpendicular to glue-line.
- The tabulated F_b values are permitted to be increased by 4 percent for repetitive members as provided in the code.
- The tabulated values are based on a reference depth of 12 inches. For other depths, when loaded edgewise, the allowable bending stress (F_b) shall be modified by a depth factor, $K_d = (12/d)^{(1/8)}$, where d is the LVL depth in inches. The maximum permitted depth factor is 1.17. The size factor is cumulative with other adjustment factors including duration of load and repetitive member factors.

Depth (inches)	3-1/2	5-1/2	9-1/2	11-7/8	14	16	18	24
Multiply by	1.17	1.10	1.03	1.00	0.98	0.96	0.95	0.92

Use the factor for 3.5 inches for shallower depths.

- The tabulated values are based on a reference depth of 1-3/4 inches. For other depths, when loaded flatwise, the allowable bending stress (F_b) shall be modified by a depth factor, $K_d = (1.75/d)^{(1/5)}$, where d is the LVL depth in inches. For depths less than 1-3/4 inches, the factor for the 1-3/4-inch depth shall be used.
- Tabulated tensile stresses are for a 4-foot LVL length. For greater lengths, the value shall be adjusted by multiplying the tabulated value by $(4.0/\text{LVL length in feet})^{1/9}$. For lengths less than 4 feet, use the tabulated value unadjusted.

TABLE 2. EQUIVALENT SPECIFIC GRAVITY FOR CONNECTION DESIGN^(a)

Connection Type	LVL Grade	Face ^(b)	Edge ^(c)
Nail – Withdrawal	1.3E	0.50	0.47 ^(e)
	1.5E		
	2.0E		0.50
	2.2E		
Nail – Lateral	1.3E	0.50	0.47 ^(e)
	1.5E		
	2.0E		0.50
	2.2E		
Bolt – Lateral ^(d)	1.3E	0.47	N. A.
	1.5E	0.50	
	2.0E		
	2.2E		

- (a) Similar to those values provided in the applicable code for solid sawn lumber having a minimum specific gravity shown.
 (b) Installed perpendicular to the wide face of the LVL.
 (c) Installed parallel to the wide face of the LVL.
 (d) For 1/2- or 3/4-inch-diameter bolts.
 (e) The equivalent specific gravity of 0.47 is applicable to 1.5E LVL made with Hemlock veneers as labeled by the product stamp. The value may be increased to 0.50 when Hemlock veneers are not used.

TABLE 3. NAIL SPACING^(a,b) – INSTALLED PARALLEL TO GLUELINE

Dimension	Fastener	Minimum Spacing ^(c,d) (in.)	Nail End Distance ^(c)
Less than 1-1/2-inch-thick	8d box (0.113" x 2-1/2")	3	1-1/2
	8d common (0.131" x 2-1/2")	3	2
	10d (0.128" x 3") and 12d box (0.128" x 3-1/4")	3	2
	10d (0.148" x 3") and 12d common (0.148" x 3-1/4")	4	3
	16d sinker (0.148" x 3-1/4")	4	3
	16d common (0.162" x 3-1/2")	6	4
1-1/2-inch and thicker	8d box (0.113" x 2-1/2")	2	1
	8d common (0.131" x 2-1/2")	3	2
	10d (0.128" x 3") and 12d box (0.128" x 3-1/4")	3	2
	10d (0.148" x 3") and 12d common (0.148" x 3-1/4")	4	3
	16d sinker (0.148" x 3-1/4")	4	3
	16d common (0.162" x 3-1/2")	6	3

For SI: 1 inch = 25.4 mm

- (a) Based on the minimum member depth of 3-1/2 inches when nailing into the narrow face of the material, parallel to the gluelines.
 (b) Allowable lateral and withdrawal nail load capacities are as specified in the NDS for lumber having a specific gravity as indicated in Table 2 of this report.
 (c) Spacing and end distance apply to a single row of nails.
 (d) The minimum allowable edge distance is 1/4 inch.

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