APA PRODUCT REPORT®

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Rosboro Structural Glued Laminated Timber PR-L251
Rosboro

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Products: Rosboro Structural Glued Laminated Timber
Rosboro, P.O. Box 20, 2509 Main Street, Springfield, OR 97477
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www.rosboro.com

1. Basis of the product report:
   - 2018, 2015, and 2012 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.3 Structural glued laminated timber
   - 2018 and 2015 International Residential Code (IRC): Sections R104.11 Alternative materials, and R502.1.3, R602.1.3, and R802.1.2 Structural glued laminated timber
   - 2012 IRC: Sections R104.11 Alternative materials, and R502.1.5, R602.1.2, and R802.1.4 Structural glued laminated timber
   - ASTM D3737-12 and D3737-08 recognized by the 2018 and 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - ANSI A190.1-2017, ANSI A190.1-2012, and ANSI/AITC A190.1-2007 recognized by the 2018 IBC and IRC, 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - APA Report T2017P-36 and other qualification data

2. Product description:
   Rosboro glulam products are used as beams, headers, rafters, purlins, and columns, and are manufactured with the conventional layup combinations with the exception that the tension and compression laminations of 24F-V8M4/DF, 30F-E2M3/SP, and 30F-E/DF2 are substituted by laminated veneer lumber (LVL) in accordance with ANSI A190.1. The LVL laminations are supplied by manufacturers recognized by APA and identified in Rosboro's in-plant manufacturing standard approved by APA. The LVL complies with the control values listed in the manufacturing standard and is manufactured in full length and width laminations, and in thicknesses up to 2 inches from wood veneers. All veneer grain is parallel to the length of the billets. The veneers are bonded with exterior-type adhesives, which comply with ASTM D2559 and ANSI 405.

3. Design properties:
   Allowable design properties for Rosboro glulam beams and columns are listed in Tables 1 and 2. The allowable spans for Rosboro glulam beams shall be in accordance with the recommendations provided by the manufacturer (www.rosboro.com/resource-library) and APA *Glued Laminated Beam Design Tables*, Form S475 (www.apawood.org/resource-library), as applicable. The allowable loads for Rosboro glulam columns shall be in accordance with the recommendations provided by the manufacturer (see link above), and APA Data File: *Design of Structural Glued Laminated Timber Columns*, Form Y240 (see link above), as applicable.

4. Product installation:
   Rosboro glulam beams and columns shall be installed in accordance with the recommendations provided by the manufacturer and APA Construction Guide*: Glulam Connection Details*, Form T300 (see link above). Permissible field notching and drilling shall be in accordance with the recommendations provided by the manufacturer and APA Technical Note*: Field Notching and Drilling of Glued Laminated Timber Beams*, Form S560 (see link above).

5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer and APA Design/Construction Guide*: Fire-Rated Systems*, Form W305 (see link above). For one- or two-hour rated glulam beams, the Rosboro glulam products shall be constructed in accordance with ANSI A190.1 and designed in accordance with the recommendations provided by the manufacturer and APA Technical Note*: Calculating Fire Resistance of Glulam Beams and Columns*, Form Y245 (see link above) or Chapter 16 of the 2018 National Design Specification for Wood Construction (NDS).

6. Limitations:
   a) Rosboro glulam beams and columns listed in this report shall be designed in accordance with the code using the design properties specified in this report.
   b) Rosboro 24F-V8M4/DF glulam beams shall have a minimum depth of 9-1/2 inches, 30F-E2M3/SP glulam beams shall have a minimum depth of 7-1/4 inches and a maximum depth of 48 inches, and 30F-E/DF2 glulam beams shall have a minimum depth of 7-1/4 inches and a maximum depth of 26 inches.
   c) Rosboro glulam beams and columns listed in this report are produced at Rosboro, Springfield, OR and Veneta, OR facilities under a quality assurance program audited by APA.
   d) This report is subject to re-examination in one year.

7. Identification:
   Rosboro glulam beams and columns listed in this report are identified by a label bearing the manufacturer's name (Rosboro) and/or trademark, the APA assigned plant number (1001 for Springfield or 1078 for Veneta), the product standard (ANSI A190.1), the APA logo, the combination symbol, the report number PR-L251, and a means of identifying the date of manufacture.

Table 1. Allowable Design Values for Rosboro Glulam Beams for Normal Duration of Load (1,2)

Symbol	Species Outer/ Core(3) (Bal or Unbal(4))	**Bending About X-X Axis** (Loaded Perpendicular to Wide Faces of Laminations)								**Bending About Y-Y Axis** (Loaded Parallel to Wide Faces of Laminations)						**Axially Loaded**		**Fasteners**	
		Extreme Fiber in Bending(5)		Compression Perpendicular to Grain		Shear Parallel to Grain(6)	Modulus of Elasticity(7)			Extreme Fiber in Bending(8)	Comp. Perpen-dicular to Grain	Shear Parallel to Grain(6)	Modulus of Elasticity(7)			Tension Parallel to Grain	Comp. Parallel to Grain	Specific Gravity for Dowel-Type Fastener Design	
		Bottom of Beam Stressed in Tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Ten. Face	Comp. Face		True	App-arent	Beam Stabi-lity				True	App-arent	Beam Stabi-lity			Top or Bottom Face	Side Face
		F_{bx}^{+} (psi)	F_{bx}^{-} (psi)	$F_{c\perp x}$ (psi)		F_{vx} (psi)	$E_{x\ true}$ (10^6 psi)	$E_{x\ app}$ (10^6 psi)	$E_{x\ min}$ (10^6 psi)	F_{by} (psi)	$F_{c\perp y}$ (psi)	F_{vy} (psi)	$E_{y\ true}$ (10^6 psi)	$E_{y\ app}$ (10^6 psi)	$E_{y\ min}$ (10^6 psi)	F_t (psi)	F_c (psi)	SG	
Rosboro 20F-V7/DF	DF/DF (B)	2,000	2,000	650	650	265	1.7	1.6	0.85	1,450	560	230	1.7	1.6	0.85	1,050	1,600	0.50	0.50
Rosboro 20F-V12	AC/AC (U)	2,000	1,400	560	560	265	1.6	1.5	0.79	1,250	470	230	1.5	1.4	0.74	925	1,500	0.46	0.46
Rosboro 20F-V13	AC/AC (B)	2,000	2,000	560	560	265	1.6	1.5	0.79	1,250	470	230	1.5	1.4	0.74	950	1,550	0.46	0.46
Rosboro 24F-V4/DF(9)	DF/DF (U)	2,400	1,850	650	650	265	1.9	1.8	0.95	1,450	560	230	1.7	1.6	0.85	1,100	1,650	0.50	0.50
Rosboro 24F-V8/DF(9)	DF/DF (B)	2,400	2,400	650	650	265	1.9	1.8	0.95	1,550	560	230	1.7	1.6	0.85	1,100	1,650	0.50	0.50
Rosboro 24F-V8M4/DF(9)	LVL/DF (B)	2,400	2,400	510(10)	510(10)	265	1.9	1.8	0.95	1,550	560	230	1.7	1.6	0.85	1,100	1,650	0.50	0.50
Rosboro 30F-E2M3/SP(9)	LVL/SP (B)	3,000	3,000	650(10)	650(10)	300	2.2	2.1	1.11	1,750	650	260	1.8	1.7	0.90	1,350	1,750	0.50	0.50
Rosboro 30F-E/DF2(9)	LVL/DF (B)	3,000	3,000	650(10)	650(10)	265(11)	2.2	2.1	1.11	1,550	560	230	1.8	1.7	0.90	1,100	1,650	0.50	0.50
Wet-use factor		0.8		0.53		0.875	0.833			0.8	0.53	0.875	0.833			0.8	0.73	see NDS	

(1) The combinations in this table are intended primarily for members stressed in bending due to loads applied perpendicular to the wide faces of the laminations. Allowable design values are tabulated, however, for loading both perpendicular and parallel to the wide faces of the laminations.

(2) The tabulated allowable design values are for normal duration of loading. For other durations of loading, see the applicable building code. The tabulated allowable design values are for dry conditions of use. For wet conditions of use, multiply the tabulated values by the wet-use factors shown at the bottom of the table.

(3) AC = Alaska cedar, DF = Douglas fir-Larch, SP = Southern pine, and LVL = Laminated veneer lumber in accordance with the manufacturing standard.

(4) The unbalanced (U) layup is intended primarily for simple-span applications and the balanced (B) layup is intended primarily for continuous or cantilevered applications.

(5) The values of F_{bx} are based on members 5-1/8 inches in width by 12 inches in depth by 21 feet in length. For members with a larger volume, F_{bx} shall be multiplied by a volume factor, $C_v = (5.125/b)^{1/10}\ (12/d)^{1/10}\ (21/L)^{1/10}$, where b is the beam width (in.), d is the beam depth (in.), and L is the beam length between the points of zero moment (ft).

(6) For non-prismatic members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS 3.4.3.3), the F_{vx} and F_{vy} values shall be multiplied by a factor of 0.72. The tabulated F_{vy} values are for timbers with laminations made from a single piece of lumber across the width or multiple pieces that have been edge bonded. For timber manufactured from multiple piece laminations (across width) that are not edge bonded, value shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members.

(7) The tabulated E values include true E (also known as "shear-free E"), apparent E, and E for beam stability calculation (NDS 3.3.3.8). For calculating beam deflections, the tabulated E_{app} values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated E_{true}. The axial modulus of elasticity, E_{axial} and $E_{axial\ min}$, shall be equal to the tabulated $E_{y\ true}$ and $E_{y\ min}$ values.

(8) The values of F_{by} are based on members 12 inches in depth. For depths less than 12 inches, F_{by} shall be permitted to be increased by multiplying by the flat use factor, $(12/d)^{1/9}$, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

(9) The beam depths for 24F-V4/DF and 24F-V8/DF are limited to 4 or more laminations. The beam depths for 24F-V8M4/DF are limited to 9-1/2 inches minimum. The beam depths for 30F-E2M3/SP are limited to 7-1/4 to 48 inches. The beam depths for 30F-E/DF2 are limited to 7-1/4 to 26 inches. 24F-V8M4/DF, 30F-E2M3/SP, and 30F-E/DF2 are limited to dry-use only due to the use of LVL tension laminations.

(10) The value of $F_{c\perp}$ shall be permitted to be increased to the published value of the outermost LVL in the plank orientation.

(11) The allowable shear stress shall be reduced to 255 psi, 215 psi, and 210 psi, respectively, for 9-1/4-inch, 7-1/2-inch, and 7-1/4-inch deep beams.

Table 2. Allowable Design Values for Rosboro Glulam Columns for Normal Duration of Load (1)

Combination Symbol	Species(2)	Grade	All Loading				Axially Loaded			Bending about Y-Y Axis				Bending about X-X Axis		Fasteners
			Modulus of Elasticity(3)			Compression Perpendicular to Grain	Tension Parallel to Grain	Compression Parallel to Grain		Loaded Parallel to Wide Faces of Laminations				Loaded Perpendicular to Wide Faces of Laminations		Specific Gravity for Dowel-Type Fastener Design
										Bending(4)			Shear Parallel to Grain(5,6)	Bending(7)	Shear Parallel to Grain(5)	
							2 or More Lams	4 or More Lams	2 or 3 Lams	4 or More Lams	3 Lams	2 Lams		2 Lams to 15 in. Deep(8)		
			E_{axial} (10^6 psi)	0.95 E_{axial} (10^6 psi)	$E_{axial\ min}$ (10^6 psi)	$F_{c\perp}$ (psi)	F_t (psi)	F_c (psi)	F_c (psi)	F_{by} (psi)	F_{by} (psi)	F_{by} (psi)	F_{vy} (psi)	F_{bx} (psi)	F_{vx} (psi)	SG
1	DF	L3	1.6	1.5	0.79	560	950	1,550	1,250	1,450	1,250	1,000	230	1,250	265	0.50
2	DF	L2	1.7	1.6	0.85	560	1,250	1,950	1,600	1,800	1,600	1,300	230	1,700	265	0.50
3	DF	L2D	2.0	1.9	1.00	650	1,450	2,300	1,900	2,100	1,850	1,550	230	2,000	265	0.50
5	DF	L1	2.1	2.0	1.06	650	1,650	2,400	2,100	2,400	2,100	1,800	230	2,200	265	0.50
69	AC	L3	1.3	1.2	0.63	470	725	1,150	1,100	1,100	975	775	230	1,000	265	0.46
70	AC	L2	1.4	1.3	0.69	470	975	1,450	1,450	1,400	1,250	1,000	230	1,350	265	0.46
Wet-use factors			0.833			0.53	0.8	0.73		0.8			0.875	0.8	0.875	see NDS

(1) The tabulated allowable design values are for normal duration of loading. For other durations of loading, see applicable building code. The tabulated allowable design values are for dry conditions of use. For wet conditions of use, multiply the tabulated values by the factors shown at the bottom of the table.

(2) AC = Alaska cedar and DF = Douglas fir-Larch.

(3) The tabulated E values include axial modulus of elasticity (E_{axial}), 0.95 E_{axial}, and E for column stability calculation ($E_{axial\ min}$, NDS 3.7.1). For calculating column deflections due to lateral loads, the tabulated 0.95 E_{axial} values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated E_{axial}.

(4) The values of F_{by} are based on members 12 inches in depth. For depths less than 12 inches, F_{by} shall be permitted to be increased by multiplying by the flat use factor, $(12/d)^{1/9}$, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

(5) For non-prismatic members, notched members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS 3.4.3.3), the tabulated F_{vx} and F_{vy} values shall be multiplied by 0.72.

(6) The tabulated F_{vy} values are for members of 4 or more lams. The tabulated F_{vy} values shall be multiplied by a factor of 0.95 for 3 lams and 0.84 for 2 lams. For members with 5, 7, or 9 lams manufactured from multiple-piece lams with unbonded edge joints, the tabulated F_{vy} values shall be multiplied by a factor of 0.4. For all other members manufactured from multiple-piece lams with unbonded edge joints, the tabulated F_{vy} values shall be multiplied by a factor of 0.5. This adjustment shall be cumulative with the adjustment specified in Footnote 5.

(7) The values of F_{bx} are based on members 5-1/8 inches in width by 12 inches in depth by 21 feet in length. For members with a larger volume, F_{bx} shall be multiplied by a volume factor, $C_v = (5.125/b)^{1/10}\ (12/d)^{1/10}\ (21/L)^{1/10}$, where b is the beam width (in.), d is the beam depth (in.), and L is the beam length between the points of zero moment (ft).

(8) The tabulated F_{bx} values are for members without special tension lams up to 15 inches in depth. If the member depth is greater than 15 inches without special tension lams, the tabulated F_{bx} values must be multiplied by a factor of 0.88. If special tension lams are used, the tabulated F_{bx} values are permitted to be increased by a factor of 1.18 regardless of the member depth provided that the increased F_{bx} value does not exceed 2,400 psi. This factor shall be cumulative with the volume factor, C_v, specified in Footnote 7.

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