

ICC-ES Evaluation Report

ESR-1937

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 18 00—Glued-Laminated Construction

REPORT HOLDER:

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EVALUATION SUBJECT:**ROSBORO BIGBEAM GLUED-LAMINATED BEAMS****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The Rosboro BigBeam 2.2E and BigBeam 2.4E are glued-laminated beams for use as structural components in buildings where combustible construction is permitted.

3.0 DESCRIPTION**3.1 General:**

The BigBeam 2.2E and BigBeam 2.4E glued-laminated beams are fabricated with layup combinations identified as 30F-2.2E and 33F-2.4E, respectively. The combinations are balanced and consist of E-rated southern pine (SP) lumber; with laminated veneer lumber (LVL) used as outer laminations. Individual beam laminations are 2 inches (51 mm) or less in net thickness. Beam widths are between 2½ and 10 inches (64 and 254 mm) and beam depths are between 9¼ and 30 inches (235 to 762 mm).

3.2 Materials:

3.2.1 Adhesives: The face and end joint bonding adhesives comply with ASTM D 2559 for exterior wet use.

3.2.2 End Joints: The end joints comply with quality control requirements of ANSI/AITC A190.1.

3.2.3 Laminating Stock: The beams are manufactured using E-rated lumber laminations having known ultimate tensile strength and plank MOE values, and with LVL outer laminations specifically manufactured by the qualified LVL

supplier (Pacific Woodtech Corporation) and tested by Rosboro under a quality control program outlined in the glued-laminated beam manufacturer's approved quality control manual.

3.3 Layup:

Manufacturing grade, layup requirements and design for the grade combinations of lumber/LVL described in this report comply with the design parameters specified in the ICC-ES evaluation report addressing the APA—The Engineered Wood Association's "GAP2006" software ([ESR-1940](#)), and are included in the plant production procedures specified in the approved quality control manual.

4.0 DESIGN

Design stress values are listed in Table 1, and are for beams having six or more laminations stressed primarily in bending due to loads applied perpendicular to the wide faces of the laminations. Design and installation requirements for structural glued-laminated beams and connections shall comply with the applicable code.

5.0 CONDITIONS OF USE

The BigBeam 2.4E and BigBeam 2.2E glued-laminated beams described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The allowable design stresses determined from the GAP2006 computer program are limited to those layup combinations shown in Table 1. Design stresses for normal conditions of loading must not exceed those set forth in Table 1.
- 5.2** The design stresses for combinations, as noted in Table 1, are for members with six or more laminations stressed primarily in bending due to loads applied perpendicular to the wide faces of the laminations.
- 5.3** Design calculations, signed and sealed by a registered design professional, verifying compliance with this report and the design requirements of the applicable code must be submitted to the code official for approval.
- 5.4** The effects of checking of the wood members are outside the scope of this report.
- 5.5** The BigBeam 2.2E glued-laminated beams are manufactured at Rosboro manufacturing plants in Springfield, Oregon, and Veneta, Oregon; and BigBeam 2.4E Glued-laminated Beams are manufactured at the Rosboro manufacturing plant in

Springfield, Oregon, under a quality control program with inspections by APA—The Engineered Wood Association (AA-649).

6.0 EVIDENCE SUBMITTED

- 6.1 Design calculations of allowable stresses as determined by the GAP2006 computer program in accordance with ASTM D 3737.
- 6.2 Qualification testing data in accordance with ANSI/AITC A190.1.
- 6.3 A Quality control manuals, dated November 2010.

7.0 IDENTIFICATION

The BigBeam 2.2E and BigBeam 2.4E glued-laminated beams are identified by a stamp bearing the name of Rosboro LLC; the manufacturing plant number (#1001 for Springfield or #1078 for Veneta) or address; the glulam combination identification; the evaluation report number (ESR-1937); and the name of the inspection agency (APA—The Engineered Wood Association).

Table 1—Design Values for Rosboro BigBeam™ Structural Glued Laminated Timber for Normal Duration of Load and Dry Conditions of Use ⁽¹⁾

Symbol	Species ⁽²⁾ Outer/Core	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 ⁽³⁾		Compression Perpendicular to Grain ⁽⁴⁾		Shear Parallel to Grain ⁽⁵⁾	Modulus of Elasticity ⁽⁶⁾	Extreme Fiber in Bending ⁽⁷⁾	Compr. Perpendicular to Grain	Shear Parallel to Grain ⁽⁵⁾	Modulus of Elasticity ⁽⁶⁾	Tension Parallel to Grain	Compr. Parallel to Grain	Modulus of Elasticity	Specific Gravity for Dowel-Type Fastener Design	
		Tension Zone Stressed in Tension	Compr. Zone Stressed in Tension	Tension Face	Compr. Face										Top or Bottom Face	Side Face
		F _{bx} ⁺ (psi)	F _{bx} ⁻ (psi)	F _{cLx} (psi)		F _{vx} (psi)	E _x (10 ⁶ psi)	F _{by} (psi)	F _{cLy} (psi)	F _{vy} (psi)	E _y (10 ⁶ psi)	F _t (psi)	F _c (psi)	E _{axial} (10 ⁶ psi)	SG	
Rosboro BigBeam™ 2.4E	LVL/SP	3300	3300	650	650	300	2.4	1900	650	265	1.7	1300	1850	1.8	0.50	0.50
Rosboro BigBeam™ 2.2E	LVL/SP	3000	3000	650	650	300	2.2	1750	650	265	1.7	1250	1750	1.8	0.50	0.50

Footnotes to Table 1:

- 1. The tabulated design values are for normal duration of loading. For other durations of loading, see the applicable building code.
- 2. SP = Southern pine; LVL = laminated veneer lumber per the manufacturing standard.
- 3. 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, determined in accordance with applicable building code using 1/10 as the exponent. The beam depths are limited to 9 1/4 to 30 inches.
- 4. The values of F_{cLx} shall be permitted to be increased to the published allowable compressive stress perpendicular to grain of the outermost laminated veneer lumber in the plank (flatwise) orientation.
- 5. For non-prismatic members, members subject to impact or cyclic loading, or shear design of bending members at connections, the F_{vx} and F_{vy} values shall be multiplied by a factor of 0.72.
- 6. For uniformly loaded simple-span beams, deflection is calculated as follows:

$$\delta = \frac{270 wL^4}{Eb^3} + \frac{28.8 wL^2}{Eb}$$

where δ = deflection (in.),
 w = applied uniform loads (lb/ft),
 L = design span (ft),
 E = tabulated modulus of elasticity (lb/in.²),
 b = beam width (in.), and
 h = beam depth (in.)

- 7. The values of F_{by} are based on members 12 inches in depth. For depths other than 12 inches, F_{by} shall be permitted to be increased by multiplying by the size 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.