APA PRODUCT REPORT®

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Power Preserved Glulam® Beams and Columns PR-L282
Anthony Forest Products Company, LLC (DBA Canfor) Revised November 26, 2024

Products: Power Preserved Glulam® Beams and Columns
Anthony Forest Products Company, LLC (DBA Canfor), 295 Cooper Drive, El Dorado, AR 71730
(800) 221-2326
www.anthonyforest.com

1. Basis of the product report:
   - 2024 International Building Code (IBC): Sections 104.2.3 Alternative materials and 2303.1.3 Structural glued-laminated timber
   - 2021, 2018, and 2015 IBC: Sections 104.11 Alternative materials and 2303.1.3 Structural glued laminated timber
   - 2024 International Residential Code (IRC): Sections R104.2.2 Alternative materials, and R502.1.3, R602.1.3, and R802.1.2 Structural glued-laminated timbers
   - 2021, 2018, and 2015 IRC: Sections R104.11 Alternative materials, and R502.1.3, R602.1.3, and R802.1.2 Structural glued laminated timber
   - ANSI 117-2020 and ANSI 117-2015 recognized in the 2024 and 2021 IBC and IRC, and 2018 IBC and IRC, respectively
   - ANSI A190.1-2022, ANSI A190.1-2017, and ANSI A190.1-2012 recognized in the 2024 IBC and IRC, 2021 and 2018 IBC and IRC, and 2015 IBC and IRC, respectively
   - ASTM D3737-18e1 and D3737-12 recognized in the 2024 and 2021 IBC and IRC, and 2018 and 2015 IBC and IRC, respectively
   - AWPA U1-20, U1-16, U1-14, and U1-11 recognized in the 2021, 2018, 2015, and 2012 IBC and IRC, respectively

2. Product description:
   Power Preserved Glulam® Beams are used as beams, headers, rafters, or purlins, and are manufactured with 24F-V5M1/SP balanced layup combination in accordance with ANSI A190.1. Power Preserved Glulam Columns are manufactured with Combination #50 layup in accordance with ANSI A190.1. Power Preserved Glulam Beams are treated with Copper Naphthenate (CuN) at 0.04 pcf or Permethrin (insecticide) and IPBC (fungicide) (IPBC/PER) at 0.055 pcf for above-ground use. Power Preserved Glulam Columns are treated with Copper Naphthenate at 0.075 pcf. The efficacy of the preservative treatment, and post-treatment inspection and quality assurance of the treatment are outside the scope of this report and the APA certification program. The adhesive used in Power Preserved Glulam Beams and Columns, as trademarked by APA, conforms to wet-use requirements of ASTM D2559.

3. Design properties:
   Table 1 lists the design properties for Power Preserved Glulam Beams. The allowable spans for Power Preserved Glulam Beams shall be in accordance with the recommendations provided by the manufacturer (www.anthonyforest.com/assets/pdf/power-preserved-glulam-load-and-design-tables.pdf) and APA Data File*: Glued Laminated Beam Design Tables,* Form S475 (www.apawood.org/resource-library), as applicable. Table 2 lists the design properties for Power Preserved Glulam Columns. The allowable loads for Power Preserved Glulam Columns shall be in accordance with the recommendations provided by the manufacturer (www.anthonyforest.com/assets/pdf/power-column-flyer.pdf), and APA Data File*: Design of Structural Glued Laminated Timber Columns*, Form Y240 (see link above), as applicable.

4. Product installation:
   Power Preserved 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, and APA Technical Note: *Preservative Treatment of Glued Laminated Timber*, Form S580 (see link above). Permissible field notching and drilling shall be in accordance with the recommendations provided by the manufacturer and APA Technical Notes*: Field Notching and Drilling of Glued Laminated Timber Beams*, Form S560 and *Effect of Large Diameter Horizontal Holes on the Bending and Shear Properties of Structural Glued Laminated Timber*, Form V700 (see link above).

   The American Wood Protection Association (AWPA) U1 Standard Specification F permits glulam members treated with Copper Naphthenate (CuN) at a retention level of 0.04 pcf and IPBC/Permethrin (IPBC/PER) at 0.055 pcf for use in AWPA use categories UC3A and UC3B for above-ground applications. AWPA U1 Standard Specification F permits glulam members treated with Copper Naphthenate (CuN) at a retention level of 0.075 pcf to be used in AWPA use categories UC4B and UC4C for ground contact applications.

5. Fire-rated assemblies:
   Design of fire-resistant exposed wood members in accordance with Chapter 16 of the National Design Specification for Wood Construction (NDS), or Section 722.1 of the 2024, 2021, 2018, and 2015 IBC shall be applicable to Power Preserved Glulam Beams and Columns. Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer and APA Design and Construction Guide: *Fire-Rated Systems*, Form W305 (see link above).

6. Limitations:
   a) Power Preserved Glulam Beams and Columns shall be designed in accordance with the code using the design properties specified in this report.
   b) Power Preserved Glulam Beams and Columns shall have a minimum depth of 4 and 2 laminations, respectively.
   c) Power Preserved Glulam Beams treated with Copper Naphthenate at 0.04 pcf and IPBC/Permethrin at 0.055 pcf retention are permitted for above-ground use and shall not be used in direct ground contact, water, or marine applications. Power Preserved Glulam Beams treated with IPBC/Permethrin shall not be installed in interior applications until the preservative solvents have been completely volatilized. Power Preserved Glulam beams treated with Copper Naphthenate shall not be installed in interior applications.
   d) Power Preserved Glulam Columns treated with Copper Naphthenate at 0.075 pcf retention are permitted for use in ground contact but shall not be used in direct water or marine applications. Power Preserved Glulam Columns treated with Copper Naphthenate shall not be installed in interior applications.
   e) Power Preserved Glulam Beams and Columns are produced at Anthony Forest Products Company, LLC (DBA Canfor), El Dorado, AR, and Washington, GA, under a quality assurance program audited by APA prior to treatment. The efficacy of the treatment and overall post-treatment inspection and quality assurance program is certified by the treating company and third-party inspection.
   f) This report is subject to re-examination in one year.

7. Identification:
   Power Preserved Glulam Beams and Columns described in this report are identified by a label bearing the manufacturer's name (Anthony Forest Products Company, LLC) and/or trademark, the APA assigned plant number (1079 for El Dorado, AR, and 1080 for Washington, GA), the product standard (ANSI A190.1), the APA logo, the report number PR-L282, the preservative treatment, the retention level in pcf, the AWPA use category and a means of identifying the date of manufacture.

Table 1. Allowable Design Values for Power Preserved 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	
Power Preserved Glulam 24F-V5M1/SP	SP/SP (B)	2,400	2,400	740	740	300	1.9	1.8	0.95	1,700	650	260	1.7	1.6	0.85	1,150	1,600	0.55	0.55
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) SP = Southern pine.

(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, $C_v = (5.125/b)^{1/20}\ (12/d)^{1/20}\ (21/L)^{1/20}$, 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 (2024 NDS 3.4.3.1 or 2018 and 2015 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.

Table 2. Allowable Design Values for Power Preserved 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]		
			$E_{x\,true}$, $E_{y\,true}$ or E_{axial} (10^6 psi)	$E_{x\,app}$ or $E_{y\,app}$ (10^6 psi)	$E_{x\,min}$, $E_{y\,min}$ or $E_{axial\,min}$ (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
Power Preserved Glulam Combination No. 50	SP	N1D14	2.0	1.9	1.00	740	1,550	2,300	1,700	2,300	2,100	1,750	260	2,100	300	0.55
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) SP = Southern pine.

(3) The tabulated E values include shear-free (true) modulus of elasticity ($E_{x\,true}$, $E_{y\,true}$, and E_{axial}), apparent modulus of elasticity ($E_{x\,app}$ and $E_{y\,app}$), and 5th percentile modulus of elasticity ($E_{x\,min}$, $E_{y\,min}$, and $E_{axial\,min}$). For column stability calculation (NDS 3.7.1), $E_{axial\,min}$ shall be used. For calculating the total deflection due to bending, the tabulated $E_{x\,app}$ or $E_{y\,app}$ values shall be used, or as an alternative, the true (shear-free) bending deflection shall be calculated using the tabulated $E_{x\,true}$ or $E_{y\,true}$, which shall be added to the calculated shear deflection to determine the total deflection due to bending.

(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 (2024 NDS 3.4.3.1 or 2018 and 2015 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, $C_v = (5.125/b)^{1/20}\,(12/d)^{1/20}\,(21/L)^{1/20}$, 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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APA – THE ENGINEERED WOOD ASSOCIATION
HEADQUARTERS
7011 So. 19th St. ▪ Tacoma, Washington 98466
Phone: (253) 565-6600 ▪ Fax: (253) 565-7265 ▪ Internet Address: www.apawood.org

PRODUCT SUPPORT HELP DESK
(253) 620-7400 ▪ *E-mail Address*: help@apawood.org

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