

GP LAM[®] Laminated Veneer Lumber PR-L266
Georgia-Pacific Wood Products South LLC Revised January 27, 2011

Product: GP Lam[®] 1.3E, 1.5E, 1.5-ES, 1.7E, 2.0-ES and 2.0E-3000F_b LVL
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1. Basis of the product report:
 - 2009 and 2006 International Building Code (IBC): Sections 104.11 Alternative Materials and 2303.1.9 Structural composite lumber
 - 2009 and 2006 International Residential Code (IRC): Section R104.11 Alternative Materials
 - ASTM D 5456-05a and D 5456-03 recognized by the 2009 and 2006 IBC, respectively.
 - APA Reports T97P-26, T98P-10, T2000P-24, T2002P-12, T2002P-15, T2003P-81A, T2004P-09, T2004P-25, T2004P-26, T2004P-48, T2004M-80, T2005M-23, T2005P-25, T2005M-97, T2007P-08, T2007P-09, T2007P-10, T2007P-59, T2007P-98, and other qualification data
2. Product description:

GP Lam LVL is made with veneer sheets of various species and grades in accordance with the in-plant manufacturing standards approved by APA. GP Lam LVL is available in thicknesses from 3/4 inch to 3-1/2 inches, except for 2.0E-3000F_b which is available only at 1-1/2 inches, widths of 3-1/2 inches to 48 inches and lengths up to 80 feet.
3. Design properties:

Table 1 lists the design properties, Table 2 lists the equivalent specific gravities for connection design for GP Lam LVL, and Table 3 lists the allowable fastener spacing. The allowable loads for GP Lam LVL shall be in accordance with the recommendations provided by the manufacturer (<http://www.gp.com/build/product.aspx?pid=1392>).
4. Product installation:

GP Lam LVL shall be installed in accordance with the recommendations provided by the manufacturer. Permissible details and allowable hole sizes shall be in accordance with the recommendations provided by the manufacturer.
5. Fire-rated assemblies:

The provisions of IBC Section 721.6.3, design of fire-resistant exposed wood members, shall be applicable to GP Lam 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.
6. Limitations:
 - a) GP Lam LVL shall be designed in accordance with the code using the design properties specified in this report.
 - b) GP Lam LVL is limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent.
 - c) The GP Lam LVL grades are produced at the Georgia-Pacific Wood Products South LLC, Thorsby, Alabama facility. The 2.0-ES GP Lam LVL grade is also produced at the Georgia-Pacific Wood Products LLC facility in Roxboro, North Carolina, under a quality program audited by APA.

d) This report is subject to re-examination in one year.

7. Identification:

GP Lam LVL described in this report is identified by a label bearing the manufacturer's name (Georgia-Pacific, Georgia-Pacific Wood Products LLC or Georgia-Pacific Wood Products South LLC) and/or trademark, the APA assigned plant number (1028 for the Roxboro plant or 1086 for the Thorsby plant), the LVL grade, the APA logo, the report number PR-L266, and a means of identifying the date of manufacture.

Table 1. Design Properties (Allowable Stress Design) for GP Lam LVL (a,b,c)

Property		Design Stress (psi)					
		1.3E ^(g)	1.5E ^(g)	1.5-ES ^(h)	1.7E ^(g)	2.0-ES ^(h)	2.0E-3000F _b ^(h,i)
Bending (F _b) ^(d,e)	Joist	1,750	2,250	2,250	2,500	2,900	3,000
Tension parallel to grain (F _t) ^(f)		1,300	1,400	1,400	1,500	1,825	1,825
Longitudinal shear (F _v)	Joist	285	285	285	285	295	295
Compression parallel (F _c)		2,000	2,200	2,200	2,400	2,600	2,600
Compression perpendicular (F _{c⊥})	Joist	750	750	750	750	845	845
Modulus of Elasticity, E		1.3 x 10 ⁶	1.5 x 10 ⁶	1.5 x 10 ⁶	1.7 x 10 ⁶	2.0 x 10 ⁶	2.0 x 10 ⁶

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

- (a) The tabulated values are design values for normal duration of load. All values, except for E and F_{c⊥}, are permitted to be adjusted for other load durations as permitted by the code. The design stresses are limited to conditions in which the maximum moisture content is less than 16 percent.
- (b) Joist = load parallel to glueline.
- (c) ES = eastern species (any combination of southern pine, sweet gum and/or yellow poplar)
- (d) Tabulated flexural stress (F_b) may be increased by 4 percent when the member qualifies as a repetitive member as defined in the NDS.
- (e) 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 (12/d)^{1/9} for 2.0-ES LVL and 2.0E-3000F_b; and (12/d)^{1/6.5} for 1.3E, 1.5E, 1.5-ES, and 1.7E LVL, as shown in the following table. For depths less than 3-1/2 inches, the factor for the 3-1/2-inch depth shall be used.

GP Lam LVL	Depth (in.)	3-1/2	5-1/2	7-1/4	9-1/4	11-1/4	12	16	18	20	24
2.0-ES, 2.0E-3000F _b	Multiply by	1.15	1.09	1.06	1.03	1.01	1.0	0.97	0.96	0.94	0.93
1.3E, 1.5E, 1.5-ES, 1.7E		1.21	1.13	1.08	1.04	1.01	1.0	0.96	0.94	0.92	0.90

- (f) The tabulated values are based on a reference length of 4 feet. For other lengths, the allowable tensile stress shall be modified by (4/ℓ)^{1/10}, where ℓ = length in feet. For lengths less than 4 feet, use the allowable tension stresses in Table 1 unadjusted.
- (g) The MOE values given are the apparent modulus of elasticity and include the effects of shear deformations. When calculating deflection, only the bending deformations need be included and the second term of the equation in footnote (h) may be ignored.
- (h) The MOE values given are the shear-free modulus of elasticity. When calculating deflection, both bending and shear deformations must be included. The deflection equation for a simply-supported beam under uniform load is:

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

Where: δ = Estimated deflection, inches w = uniform load, plf
 L = span, feet E = tabulated modulus of elasticity, psi
 b = beam width, inches h = beam depth, inches

- (i) The 2.0E-3000F_b grade is only available in a 1-1/2-inch thickness.

Table 2. Fastener Details for GP Lam LVL

LVL Grade	Equivalent Specific Gravity (S.G.)					
	Nails				Bolts	
	Withdrawal Load		Lateral Load		Lateral Load	
	Installed in Edge	Installed in Face	Installed in Edge	Installed in Face	Installed in Face	
				Parallel to Grain	Perpendicular to Grain	
1.3E, 1.5E, 1.5-ES, 1.7E	Hemlock/ fir (0.43)	Hemlock/ fir (0.43)	Hemlock/ fir (0.43)	Western hemlock (0.47)	Hemlock/ fir (0.43)	Hemlock/ fir (0.43)
2.0-ES, 2.0E-3000F _b	Hemlock/ fir (0.43)	Douglas-fir/ larch (0.50)	Douglas-fir/ larch (0.50)	Douglas-fir/ larch (0.50)	Douglas-fir/ larch (0.50)	Douglas-fir/ larch (0.50)

Table 3. Allowable Fastener Spacing for Installation Parallel to the Glue Line in GP Lam LVL^(a)

Minimum Member Size (in.)	Connector Size	Nails Installed in the Narrow Face
		On-Center Spacing (in.)
3/4 x 3-1/2	10d box and common nails	6
	16d sinker and 12d common nails	6
	14 gage staples	6
1-3/4 x 5-1/2	10d box and common nails	4
	16d sinker and 12d common nails	4
	14 gage staples	4
	16d common nails	8

For SI: 1 inch = 25.4 mm.

^(a) The minimum on-center spacing permitted for nails installed in the wide face of GP Lam LVL, i.e., perpendicular to the glue line, is the same as that permitted by the applicable code for solid-sawn lumber.

APA – The Engineered Wood Association is an accredited certification body under ISO 65 by Standards Council of Canada (SCC) and an accredited inspection agency by the International Code Council (ICC) International Accreditation Service (IAS) under ISO/IEC 17020. APA is also an accredited testing organization recognized by IAS and SCC under ISO/IEC 17025. APA is a recognized testing laboratory by Miami-Dade County, and a Product Testing Laboratory, Product Quality Assurance Entity, and Product Validation Entity by the Florida Department of Community Affairs (DCA).

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