

**Pacific Woodtech Preservative-Treated
Laminated Veer Lumber
Pacific Woodtech Corporation**

PR-L329(C)

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Products: Preservative-Treated Laminated Veneer Lumber
Pacific Woodtech Corporation, 1850 Park Lane, Burlington, Washington 98233
(360) 707-2200
www.pacificwoodtech.com

1. Basis of the product report:
 - 2015 National Building Code of Canada (NBC): Clause 1.2.1.1 of Division A and Clauses 4.1, 4.3.1.1, and 9.23 of Division B
 - CSA O86-14 (Reprinted May 2016) Engineering Design in Wood recognized in the 2015 NBC
 - ASTM D5456-14b recognized in CSA O86-14 (Reprint 2016)
 - ASTM D7672-19 Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies
 - APA Reports T99P-18, T99P-19, T99P-20, T2001P-52, T2001P-76, T2002P-31, T2003P-50, T2004P-1, T2006P-10, T2006P-88, T2008P-47, T2009P-45, T2011P-48, T2012P-32, T2015P-23, T2018P-07, T2019P-43, T2019P-52, T2020P-04, and T2020P-06, and other qualification data

2. Product description:

Pacific Woodtech preservative-treated laminated veneer lumber (LVL), designated as PWT TREATED LVL, is an LVL product pressed into billets that are approximately 1,219 mm (48 inches) in width, 19 to 89 mm (3/4 to 3-1/2 inches) in thickness, and up to approximately 20 m (66 feet) in length. LVL billets are ripped into products that are 44 to 1,219 mm (1-3/4 to 48 inches) in depth. Products up to 178 mm (7 inches) in thickness are fabricated by means of a secondary face-bonding process.

PWT TREATED LVL is treated with a proprietary preservative blend as part of the in-glueline treatment during the LVL manufacturing process for fungal decay and resistance to wood destroying insects, including Formosan termites. PWT TREATED LVL shall be limited to interior or exterior construction above-ground applications without ground contact (UC3B in accordance with CAN/CSA O80). The efficacy of the preservative treatment is outside the scope of this report and the APA certification program.

3. Design properties:

The structural design provisions for wood construction provided in the building code are applicable to PWT TREATED LVL unless noted otherwise in this report. Table 1 lists Limit States Design (LSD) properties. Minimum fastener spacings when installed in the edge of a member are provided in Table 2. Table 3 lists the equivalent relative density (G) for connection design.

Service conditions are considered dry use where the average equilibrium moisture content of solid-sawn lumber is 15% or less and does not exceed 19%, as defined in CSA O86. When the environmental conditions exceed the dry use conditions, the wet use properties specified in Table 1 shall be applied.

4. Product installation:

PWT TREATED LVL shall be installed in accordance with the recommendations provided by the manufacturer (www.pacificwoodtech.com/treated).

5. Fire-rated assemblies:
Design of fire-resistant exposed wood members in accordance with Annex B of CSA O86-19 is applicable to PWT TREATED LVL. Fire-rated assemblies for PWT TREATED LVL shall be constructed in accordance with the recommendations provided by the manufacturer and approved by the authority having jurisdiction (AHJ).
6. Limitations:
 - a) PWT TREATED LVL shall be designed in accordance with the code using the design properties specified in this report.
 - b) PWT TREATED LVL shall be limited to interior or exterior construction above-ground applications without ground contact (UC3B in accordance with CAN/CSA O80).
 - c) The efficacy of the preservative treatment of the PWT TREATED LVL is outside the scope of this report and the APA certification program.
 - d) PWT TREATED LVL is produced at the Pacific Woodtech Corporation manufacturing plant located in Burlington, Washington, under a quality control program audited by APA.
 - e) This report is subject to re-examination in one year.
7. Identification:
PWT TREATED LVL is sold under the Pacific Woodtech brand. All products are identified by a label bearing the manufacturer's name (Pacific Woodtech) and/or trademark, the APA assigned plant number (1047), the LVL grade, the APA logo, this report number (PR-L329 or PR-L329C), and a means of identifying the date of manufacture.

Table 1. LSD Specified Strengths and MOE for PWT TREATED LVL^(a)

Grade	Service Conditions	E _{true} , MPa (10 ⁶ psi) ^(b)	Beam ^(c)			Plank ^(d)			Axial	
			F _b , MPa (psi) ^(e,g)	F _v , MPa (psi)	F _{c⊥} , MPa (psi)	F _b , MPa (psi) ^(f,g)	F _v , MPa (psi)	F _{c⊥} , MPa (psi)	F _t , MPa (psi) ^(h)	F _c , MPa (psi) ⁽ⁱ⁾
2.0E _{true}	Dry Use	13,790 (2.0)	35.7 (5,174)	3.65 (0,530)	10.7 ^(j) (1,547)	35.7 (5,174)	1.76 (255)	8.11 ^(k) (1,177)	24.4 (3,541)	27.5 (3,990)
2.0E _{true}	Wet Use	9,650 (1.4)	21.4 (3,105)	2.05 (297)	10.7 ^(l) (1,547)	21.4 (3,105)	1.17 (170)	8.11 ^(l) (1,177)	19.3 (2,800)	9.6 (1,397)

(a) The tabulated values apply to service conditions as specified, as defined in CSA O86, for the standard-term load duration. All values, except for E and (F_{c⊥}), are permitted to be adjusted for other load durations as permitted by the code.

(b) The tabulated MOE values are the shear-free modulus of elasticity. Coefficient of variation of modulus of elasticity, COV_E = 0.10. When calculating deflection, both bending and shear deflections must be included. The deflection equation for a simple-span beam under uniform load is:

$$\text{In SI Units: } \delta = \frac{156.3wL^4}{Ebd^3} \times 10^6 + \frac{2400wL^2}{Ebd}$$

Where: δ = estimated deflection, mm w = uniform load, N/m
 L = span, m E = modulus of elasticity, MPa
 b = beam width, mm d = beam depth, mm

or

$$\text{In imperial Units: } \delta = \frac{270wL^4}{Ebd^3} + \frac{28.8wL^2}{Ebd}$$

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

(c) Beam values apply to members loaded and supported on faces showing the narrow edge of all veneers, typically the narrow faces of the member.

(d) Plank values apply to members loaded and supported on faces showing the face of one veneer, typically the wide faces of the member.

(e) Flexural stress, F_b, for the beam orientation is based on a reference depth of 305 mm (12 inches). For other depths, multiply by a size factor of (305/d)^{1/5}, where d is the depth in mm. For depths less than 44 mm (1-3/4 in.), multiply by 1.47.

(f) Flexural stress, F_b, for the plank orientation is based on a reference depth of 44 mm (1-3/4 in.). For other depths, multiply by a size factor of (44/d)^{1/3}, where d is the depth in mm. For depths less than 44 mm (1-3/4 in.), multiply by 1.00.

(g) Flexural stress, F_b, values are permitted to be increased by 4% for repetitive members as provided by the code.

(h) Tension parallel to grain, F_t, is based on a reference gage length of 6.1 m (20 feet). For longer lengths, multiply by a length factor of (6.1/L)^{1/10}, where L is the length in meters.

(i) Compression parallel to grain, F_c.

(j) Tabulated F_{c⊥} value in the beam orientation is based on the average stress at 1 mm (0.04-in.) deformation.

(k) Tabulated F_{c⊥} value in the plank orientation is based on the average stress at the proportional limit or 1 mm (0.04-in.) deformation, whichever is less, in accordance with ASTM D5456.

(l) Deformation up to 3.2 mm (1/8 inch) could occur at the tabulated compressive stress perpendicular to grain in the wet service conditions.

Table 2. Minimum Spacing and Distance for Fasteners Installed into Edge of PWT TREATED LVL

Nominal LVL Thickness	Orientation	Nail Size ^(b)	Nail Diameter, mm (in.)	Nail Length, mm (in.)	Minimum End Distance, mm (in.)	Minimum Nail Spacing ^(b) , mm (in.)		Maximum Nail Penetration ^(c) , mm (in.)
						Single Row	Double Row	
Less than 38 mm (1-1/2 in.)	Edge	8d & smaller	3.32 (0.131)	63.5 (2.5)	63.5 (2-1/2)	76.2 (3)	NA	57.2 (2.25)
		10d & 12d	3.76 (0.148)	82.6 (3.25)	63.5 (2-1/2)	102 (4)		63.5 (2.5)
		16d	4.11 (0.162)	88.9 (3.5)	88.9 (3-1/2)	127 (5)		50.8 (2)
	Face ^(d)	12d & smaller	3.76 (0.148)	82.6 (3.25)	38.1 (1-1/2)	76.2 (3)	76.2 (3)	
		16d	3.76 (0.148)	88.9 (3.5)	38.1 (1-1/2)	127 (5)	127 (5)	
38 mm (1-1/2 in.) and thicker	Edge	8d & smaller	3.32 (0.131)	63.5 (2.5)	63.5 (2-1/2)	76.2 (3)	102 (4)	57.2 (2.25)
		10d & 12d	3.76 (0.148)	82.6 (3.25)	88.9 ^(e) (3-1/2)	102 (4)	127 (5)	63.5 (2.5)
		16d	3.76 (0.148)	88.9 (3.5)	88.9 (3-1/2)	127 (5)	152 ^(f) (6)	50.8 (2)
	Face ^(d)	12d & smaller	3.76 (0.148)	82.6 (3.25)	38.1 (1-1/2)	76.2 (3)	76.2 (3)	
		16d	3.76 (0.148)	88.9 (3.5)	38.1 (1-1/2)	127 (5)	127 (5)	

- (a) Edge distance shall be sufficient to prevent splitting.
- (b) Nail sizes and closest on-center spacing not specifically described in this table are outside the scope of this report.
- (c) Penetration length includes the nail tip.
- (d) Tabulated closest on-center spacing for face orientation is applicable to nails that are installed in rows parallel to the grain (length) of the LVL. For nails installed in rows perpendicular to the direction of grain (width/depth) of the LVL, the closest on-center spacing for face orientation shall be sufficient to prevent splitting of the LVL.
- (e) Minimum end distance is permitted to be reduced to 63.5 mm (2-1/2 in.) for single row nailing.
- (f) Minimum nail spacing may be reduced to 127 mm (5 in.) when LVL is 44.5 mm (1-3/4 in.) or thicker.

Table 2. Equivalent Relative Density for Connection Design^(a)

Connection Type	Face ^(b)	Edge ^(c)
Nails or Wood Screws – Withdrawal	0.50	0.47
Nails or Wood Screws – Lateral	0.50	0.50
Bolts or Lag Screws – Lateral	0.50	N. A.

(a) Similar to those values provided in the applicable code for solid sawn lumber having a minimum relative density shown.

(b) Installed perpendicular to the wide face of the LVL.

(c) Installed parallel to the wide face of the LVL.

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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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