

Joint Evaluation Report

ESR-2909

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DIVISION: 06 00 00—WOOD, PLASTICS, AND COMPOSITES

Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

PACIFIC WOODTECH CORPORATION

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EVALUATION SUBJECT:

PACIFIC WOODTECH® LAMINATED VENEER LUMBER (LVL), AND PACIFIC WOODTECH® 1.5E RIM BOARDS

ADDITIONAL LISTEES:

ALLIANCE LUMBER

1800 WEST BROADWAY ROAD, SUITE 1

TEMPE, ARIZONA 85282

BLUELINX CORPORATION

4300 WILDWOOD PARKWAY

ATLANTA, GEORGIA 30339

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Fireblocking

2.0 USES

Pacific Woodtech® laminated veneer lumber (LVL) is used in structural applications such as beams, headers, joists, rafters, columns, and truss chords. Pacific Woodtech® 1.5E Rim Boards are used in rim board applications as described in this report.

3.0 DESCRIPTION

Pacific Woodtech Corporation manufactures and private-labels the LVL products described in this report. Private-label products are produced for the additional listees in this report, and also for others. The company names and associated product trade names for LVL and rim board products are as follows:

COMPANY	PRODUCT TRADE NAME
Pacific Woodtech Corporation	Pacific Woodtech®
Alliance Lumber	Integri-Lam™
BlueLinx Corporation	onCENTER®

Pacific Woodtech LVL and Pacific Woodtech 1.5E Rim Boards are structural composite lumber products complying with ASTM D5456 and additional performance requirements specified in the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47) and the Acceptance Criteria for Rim Board Products (AC124). Qualified adhesives, veneer species and veneer grades are as specified in the approved quality control manual. The veneers are laminated with the grain parallel to the length of the LVL member. Pacific Woodtech LVL is available in thicknesses from 3/4 inch (19.1 mm) to 7 inches (178 mm) and depths from 1 3/4 inches (44.5 mm) to 48 inches (1219 mm). Products thicker than 3 1/2 inches (89 mm) are fabricated by means of a secondary face-bonding process. Pacific Woodtech 1.5E Rim Boards are manufactured from 1.5E grade Pacific Woodtech LVL in thicknesses of 1 1/4, 1 1/2 and 1 3/4 inches (32 mm, 38 mm and 44 mm), a maximum depth of 16 inches (406 mm), and a minimum length of 8 feet (2438 mm).

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The design provisions for structural composite lumber in the ANSI/AWC *National Design Specification*® (NDS) for Wood Construction, as referenced in the applicable code, are applicable to Pacific Woodtech LVL, unless otherwise noted in this report. Reference design values for Pacific Woodtech LVL are provided in Table 1.

4.1.2 Connections: Reference lateral and withdrawal design values for nailed or bolted connections in Pacific Woodtech LVL are as specified in the NDS for structural composite lumber having equivalent specific gravities as given in Table 3 of this report. For fasteners installed perpendicular to the wide face of the veneers, spacing, edge distances and end distances must be as required in the NDS for sawn lumber. Minimum required spacing, edge distances and end distances for fasteners installed into the narrow face of the LVL (faces showing the narrow edge of all veneers) are as given in Table 4. Bolted connections are not permitted in member edges.

Connections, other than the nailed and bolted connections described herein, are outside the scope of this report.

Exception: Lag screw connections between Pacific Woodtech 1.5E Rim Boards and deck ledgers have an allowable lateral load of 350 pounds (1.56 kN) per lag screw, under the following conditions:

- Lag screws must have a minimum nominal diameter of $\frac{1}{2}$ inch (12.7 mm), and sufficient length so that the full diameter of the lag screw shank penetrates through the rim board (the tapered tip must pass completely through the rim board).
- Deck ledgers must consist of minimum 2-by-6 lumber having a minimum assigned specific gravity of 0.42.
- Sheathing between the rim board and the deck ledger must consist of wood structural panels meeting PS-1 or PS-2 and be attached to the rim board in accordance with the applicable code.
- One flat washer must be used between the deck ledger and the lag screw head.
- Edge distances from the center of the lag screw to the edges of the rim board and deck ledger must be 2 inches (51 mm) or greater. End distances must be 4 inches (102 mm) or greater.
- The lag screws must be installed, and adjustment factors must be applied as applicable, in accordance with the NDS.
- Rim boards and deck ledgers must be checked for load-carrying capacity at connections in accordance with Section 10.1.2 of the NDS.

4.1.3 Rim Boards: Allowable loads for Pacific Woodtech 1.5E Rim Boards are given in Table 2. Toe-nailed connections of rim boards are not limited by the 150 plf (2189 N/m) lateral load capacity noted for Seismic Design Categories D, E, and F in Section 4.1.7 of the ANSI/AWC Special Design Provisions for Wind and Seismic (SDPWS).

4.1.4 Fireblocking: Pacific Woodtech LVL may be used as fireblocking in lieu of the materials listed in Section 718.2.1 of the 2015 and 2012 IBC, Section 717.2.1 of the 2009 IBC, and Section R302.11.1 of the 2015, 2012 and 2009 IRC, as applicable. LVL used as fireblocking must have a minimum thickness of $1\frac{1}{2}$ inches (38 mm), with the exception that $\frac{3}{4}$ -inch-thick (19 mm) LVL may be used, provided the joints are backed by a second layer of $\frac{3}{4}$ -inch-thick (19 mm) LVL.

4.2 Installation:

4.2.1 General: Installation of Pacific Woodtech LVL and Pacific Woodtech 1.5E Rim Boards must comply with this report and with the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

4.2.2 Rim Boards: Pacific Woodtech 1.5E Rim Boards must be installed as a continuously supported structural element located at the joist elevation in an end bearing wall or parallel to the joist framing. It must be the full depth of the joist space and be used for any combination of the following: (1) transfer of vertical loads, from above to below, at the rim board location; (2) diaphragm attachment (e.g., sheathing to top edge of rim board); (3) transfer of in-

plane lateral loads from the diaphragm to the wall plate below; (4) to provide lateral support to the joist (i.e., resistance against rotation) through attachment to the joist; (5) to provide closure for ends of joists; or (6) as an attachment base for siding and/or exterior deck ledgers.

5.0 CONDITIONS OF USE

The Pacific Woodtech® LVL and Pacific Woodtech® 1.5E Rim Boards 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:

- Design and installation must comply with this report, the manufacturer's published installation instructions, and the applicable code. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- Design calculations and/or drawings, demonstrating compliance with this report, must be provided to the code official upon request. These documents must be sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- Plank compression perpendicular to grain, $F_{c\perp}$, values in Table 1 are allowed to be adjusted by the NDS specified bearing area factor, C_b .
- Applications in unprotected, wet service conditions, where the moisture content of the LVL will reach 16 percent or greater, are beyond the scope of this report.
- Pacific Woodtech® LVL products are produced at the Pacific Woodtech Corporation manufacturing plant located in Burlington, Washington, under a quality-control program with inspections by ICC-ES and APA—The Engineered Wood Association (AA-649).

6.0 EVIDENCE SUBMITTED

- Data in accordance with the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated June 2017.
- Data in accordance with the ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated October 2016.

7.0 IDENTIFICATION

Pacific Woodtech® LVL is identified by a stamp noting the manufacturer's name (Pacific Woodtech), product trade name, grade, production date, evaluation report number (ESR-2909), qualified inspection agency name or logo (APA), and manufacturer's APA mill number (1047).

Pacific Woodtech® 1.5E Rim Boards are identified by a stamp noting the manufacturer's name (Pacific Woodtech), product trade name, product name or registered trademark, grade, thickness, production date, evaluation report number (ESR-2909), name of the inspection agency (APA – The Engineered Wood Association) and manufacturer's APA mill number (1047).

TABLE 1—PACIFIC WOODTECH® LVL REFERENCE DESIGN VALUES (psi)^{1, 2}

Grade	Beam ³			Plank ⁴			Axial		E ⁸
	F _b ⁶	F _v	F _{c⊥}	F _b ⁶	F _v	F _{c⊥} ⁵	F _t ⁷	F _c	
1.5E	2,250	230	750	2,250	150	650	1,500	1,950	1.5x10 ⁶
1.8E	2,750	285	850	2,750	150	650	1,850	2,450	1.8x10 ⁶
2.0E	3,100	285	850	3,100	150	650	2,100	2,750	2.0x10 ⁶
2.2E	3,100	285	850	3,100	150	650	2,350	3,050	2.2x10 ⁶

For SI: 1 psi = 6.895 kPa, 1 inch = 25.4 mm.

¹Reference design values are based on dry conditions of use, in which the in-service moisture content of the LVL is less than 16 percent. Applications where the moisture content will equal or exceed 16 percent are outside the scope of this report.

²Reference design values must be adjusted, as applicable, in accordance with Section 8.3 of the NDS.

³Beam values apply to members loaded and supported on faces showing the narrow edge of all veneers, typically the narrow faces of the member.

⁴Plank values apply to members loaded and supported on faces showing the wide face of one veneer, typically the wide faces of the member.

⁵Plank compression perpendicular to grain, F_{c⊥}, values are allowed to be adjusted by the NDS specified bearing area factor, C_b.

⁶The volume factor, C_v, which is applicable to reference bending design values, F_b, in accordance with Section 8.3 of the NDS, must be calculated as follows: For beam orientation: $C_v = (12/d)^{0.20} \leq 1.47$; For plank orientation: $C_v = (1.75/d)^{0.33} \leq 1.00$, where d is the member depth in inches.

⁷Reference tension design values parallel to grain, F_t, apply to a 4-foot member length. For member lengths greater than 4 feet, F_t must be multiplied by a factor of $(4/L)^{0.10}$, where L is the length of the member, in feet.

⁸Tabulated values are the apparent modulus of elasticity. The reference modulus of elasticity for beam stability and column stability calculations, E_{min}, must be calculated in accordance with Appendix D of the NDS. When calculating E_{min}, the coefficient of variation of modulus of elasticity, COV_E, may be taken as 0.10.

TABLE 2—1¹/₄, 1¹/₂, 1³/₄- INCH x 1.5E RIM BOARD ALLOWABLE LOADS^{1, 2, 3, 4}

Lateral Load Capacity ⁵	200 plf
Vertical Load Capacity	2,900 plf
Deck Ledger Connection with 1/2-inch-Diameter Lag Screw - Lateral Load Capacity ⁶	350 lb ⁽⁶⁾

For SI: 1 plf = 14.59 N/m, 1 lb = 4.448 N.

¹The design loads given in this table are for rim boards installed in accordance with Section 4.2.2.

²Tabulated design values are based on dry conditions of use, in which the in-service moisture content of the LVL is less than 16 percent. Applications where the moisture content will equal or exceed 16 percent are outside the scope of this report.

³Tabulated design values may be adjusted for duration of load in accordance with Section 2.3.2 of the NDS, except where otherwise noted.

⁴Other design values are as provided for 1.5E grade Pacific Woodtech LVL in Table 1.

⁵The tabulated lateral load capacity applies to a ten-minute wind or earthquake load duration (C_D = 1.60). No further increase is permitted for duration of load.

⁶Lag screw connections between rim boards and deck ledgers have an allowable lateral load of 350 pounds per lag screw, provided the conditions in the exception to Section 4.1.2 are met.

TABLE 3—EQUIVALENT SPECIFIC GRAVITY FOR CONNECTION DESIGN^{1, 2}

Connection Type – Load Direction	FASTENER ORIENTATION	
	Face ³	Edge ⁴
Nail – Withdrawal	0.50	0.47
Nail – Lateral	0.50	0.50
Bolt – Lateral	0.50	N.A.

¹Reference lateral and withdrawal design values for bolted and nailed connections in Pacific Woodtech LVL are as specified in the NDS for structural composite lumber having equivalent specific gravities as indicated in the table above.

²Connections in which fasteners are installed into the end grain of the LVL are outside the scope of this report.

³Values given under the heading 'Face' apply to connections in which the fastener axis is installed perpendicular to the faces showing the wide face of one veneer.

⁴Values given under the heading 'Edge' apply to connections in which the fastener axis is installed perpendicular to the faces showing the narrow edge of all veneers.

TABLE 4—MINIMUM FASTENER SPACING^{1, 2}

LVL DIMENSIONS	FASTENER	MAXIMUM FASTENER PENETRATION INTO LVL ³ (inches)	MINIMUM FASTENER SPACING (inches)
Minimum 1 ¹ / ₄ inches thick and 3 ¹ / ₂ inches deep	8d Nail	2 ¹ / ₈	3
	10d Nail	2 ⁹ / ₁₆	4
	12d Nail	2 ⁹ / ₁₆	4
	16d Nail	2	6
		1 ³ / ₈	4

For SI: 1 inch = 25.4 mm.

¹Minimum fastener spacing values apply to a single row of nails driven into the edge of LVL.

²Minimum edge and end distances for nails driven into the edge of the LVL (i.e., into the faces showing the narrow edge of all veneers) have not been evaluated. Edge and end distances must be sufficient to prevent splitting of the LVL.

³Penetration length includes nail tip.

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