

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

REDBUILT LLC

ADDITIONAL LISTEE:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

REDLAM™ LAMINATED VENEER LUMBER (LVL) AND REDLAM™ LVL RIM BOARD

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-2993 LABC and LARC Supplement](#).

Properties evaluated:

- Structural
- Fire resistance
- Fire blocking

2.0 USES

The RedLam Laminated Veneer Lumber (LVL) and RedLam LVL rim board products described in this evaluation report are used as alternatives to sawn lumber for floor and roof structural members, and are as defined in Chapter 2 of the 2018, 2015 and 2012 IBC; Chapter 23 of the 2009 IBC; and Chapter 2 of the 2018, 2015 and 2012 IRC. These structural applications include use as beams, headers, joists, rafters, columns, and rim boards. The products are also used as components of built-up structural members, such as flanges for I-joists and chords for trusses, as detailed in a current ICC-ES evaluation report.

3.0 DESCRIPTION

The RedLam LVL is structural composite lumber (SCL) complying with ASTM D5456 and is manufactured from veneers of single wood species or species group that are laminated together using an exterior-type structural adhesive complying with ASTM D2559, Section 4.3.4 of

ASTM D5456 and the requirements noted in the approved quality documentation and manufacturing standard prepared by RedBuilt™. During manufacture, the veneers are oriented with the wood grain parallel to the length of the member and placed in a continuous-feed press. RedLam LVL can be produced in thicknesses from 3/4 inch (19.1 mm) to 7 inches (178 mm), depths from 2 1/2 inches (63.5 mm) to 24 inches (610 mm), and lengths up to 80 feet (24 380 mm). 1.4E RedLam LVL can be produced in depths up to 48 inches (1219 mm).

The RedLam LVL rim board described in this evaluation report has been evaluated in accordance with ASTM D7672 and ICC-ES Acceptance Criteria for Rim Board Products (AC124). The rim board properties, wood species or species group, adhesives, manufacturing parameters, and finished product tolerances meet the requirements noted in the approved quality control documentation and manufacturing standard prepared by RedBuilt™.

4.0 DESIGN AND INSTALLATION

4.1 Installation: Installation of RedBuilt™ RedLam LVL and RedLam LVL Rim Board must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation. If there are conflicts between the manufacturer's published installation instructions and this report, this report governs.

4.2 Design:

4.2.1 General: Reference design values, sizes and veneer species for RedLam LVL for dry conditions of use are specified in Table 1 of this report. The design provisions for structural composite lumber in the American Wood Council (AWC) *National Design Specification*® for Wood Construction (NDS), as noted in Section 2301.2(1) of the IBC for Allowable Stress Design (ASD) and Section R301.1.3 of the IRC, are applicable to RedLam LVL. Unless otherwise noted in this report, the reference design values in Table 1 must be adjusted by applicable adjustment factors in accordance with the NDS.

4.2.2 Connections: Reference to lateral and withdrawal design values for fasteners in RedLam LVL are as specified in the NDS for structural composite lumber having equivalent specific gravity of 0.50. Minimum spacing, end distance and edge distance of fasteners installed perpendicular to the glue lines on the wide face of the RedLam LVL must be as prescribed in the NDS for sawn lumber. Minimum spacing, end distance and edge distance of fasteners installed parallel to the glue lines on the narrow face of the RedLam LVL must be as prescribed in Table 2 of this evaluation report. Other fastener spacings for specific applications, such as prefabricated steel components or

hangers, may be used as detailed for RedLam LVL in a current ICC-ES evaluation report.

For RedLam LVL rim board, toenailed connections 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) and Section 2305.1.4 of the 2006 IBC. The ability of RedLam LVL to transfer shear is as described in Footnote 1 to Table 3 of this report.

4.2.3 Calculated Fire Resistance: For applications under the 2018, 2015, and 2012 IBC, the fire-resistance of exposed RedLam LVL members may be calculated in accordance with Chapter 16 of the NDS.

4.2.4 Fire-Blocking: RedLam LVL Rim Board, having a minimum thickness of 1.25 inches (32 mm), may be used in lieu of sawn lumber for fire blocking.

4.3 RedLam LVL Rim Board:

The RedLam LVL rim board described in this evaluation report is a continuously supported structural element located at the joist elevation in an end bearing wall or parallel to the joist framing that is the full depth of the joist space. The rim board is manufactured in minimum continuous 8-foot-long (2.44 m) segments for the length of the wall. The rim board is allowed to be used for any combination of the following:

- a. To transfer, from above to below, all vertical loads at the rim board location. Allowable vertical loads are noted in Table 3.
- b. To provide diaphragm attachment (sheathing to top edge of rim board).
- c. To transfer in-plane lateral loads from the diaphragm to the wall plate below.
- d. To provide lateral support to the joist or rafter (resistance against rotation) through attachment to the end of the joist or rafter.
- e. To provide closure for ends of joists or rafters.
- f. To provide an attachment base for siding or an exterior deck ledger.

5.0 CONDITIONS OF USE

The RedLam LVL Structural Composite Lumber products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0, subject to the following conditions:

- 5.1 Design stresses must comply with the values noted in this report.
- 5.2 Design calculations and details must be furnished to the code official, verifying that the material is used in compliance with this report. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 RedLam LVL products described in this report must be limited to covered end-use installations with dry conditions of use. Dry conditions of use are those environmental conditions represented by sawn lumber in which the equilibrium moisture content is equal to or less than 16 percent. The use of these products in covered installations, where the moisture content exceeds 16 percent, has not been reviewed and is beyond the scope of this evaluation report.

5.4 Increases for duration of load, as provided for wood members and their connections, must be in accordance with the limitations specified in the applicable code and as set forth in this report, unless specifically prohibited by this report.

5.5 Where flexural bending members qualify as repetitive members, as defined in the NDS, an increase of 4 percent is permitted in reference bending design values.

5.6 Concentrated vertical load capacity for RedBuilt LVL rim board has not been evaluated. Concentrated vertical loads being transmitted through the rim board assembly require squash blocking or other load transfer means of evaluation.

5.7 Length dimensions of RedLam LVL may be cut to size for required application. Depth must not be cut to less than 3¹/₂ inches (89 mm). For all material used in structural applications, the product identification described in Section 7.0 must be maintained on all material, or the material must be re-stamped with the appropriate identification. Additionally, RedLam LVL may be notched, drilled, or tapered-end cut provided the design for such is by a registered design professional.

5.8 Installation, fabrication, identification, and connection details must be in accordance with this report, the manufacturer's published installation instructions and the applicable code.

5.9 1.6E through 2.6E RedLam LVL is produced at the RedBuilt™ plant in Stayton, Oregon, under a quality control program with inspections by ICC-ES and PFS Corporation (AA-652).

5.10 1.4E RedLam LVL is produced at the Boise Cascade Wood Products plant in White City, Oregon, under a quality control program with inspections by ICC-ES and PFS Corporation (AA-652).

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated June 2017 (editorially revised March 2018).
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated June 2019 (editorially revised February 2020).
- 6.3 Reports of fire tests conducted in accordance with ASTM E119.

7.0 IDENTIFICATION

7.1 RedLam LVL is identified with a stamp bearing the manufacturer's name (RedBuilt™) and/or logo (see Figure 1), the name or logo of the inspection agency (PFS Corporation), as applicable, the evaluation report number (ESR-2993), the plant number, the product designation or type, the production date, the grade, and the species or species group designation. The product designation may be either RedLam LVL or RedBoard™. RedLam LVL is also identified with the marking "AGS" following the grade designation, if the advanced grading system specified in the approved quality control manual was used in the manufacturing process.

7.2 The report holder's contact information is the following:

REDBUILT LLC
200 EAST MALLARD DRIVE
BOISE, IDAHO 83706
(866) 859-6757
www.redbuilt.com

7.3 The Additional Listee's contact information is the following:

BOISE CASCADE WOOD PRODUCTS, LLC
POST OFFICE BOX 2400
WHITE CITY, OREGON 97503-0400

TABLE 1—REFERENCE DESIGN VALUES FOR REDLAM™ LVL (ALLOWABLE STRESS DESIGN)^{1,2} (pounds per square inch)

BILLET MATERIAL THICKNESS	GRADE SPECIES ³	AXIAL		JOIST/BEAM					PLANK		
		F _t ⁴	F _c	F _b ^{5,6}	F _v ⁷	E (x10 ⁶)	E _{min} ¹¹ (x10 ⁶)	F _{c⊥} ⁸	F _b ^{9,10}	F _v ⁹	F _{c⊥} ⁸
3/4 inch to 7 inches	1.4E DF/LP/WH	935	2500	1800	225	1.4	0.8	525	1800	150	450
	1.6E DF/LP/WH	1240	2100	2140	285	1.6	0.9	750	2210	190	650
	1.8E DF/LP/WH	1450	2375	2445	285	1.8	0.9	750	2455	190	650
	1.9E DF/LP/WH	1555	2510	2600	285	1.9	1.0	750	2580	190	650
	2.0E DF/LP/WH	1660	2635	2750	285	2.0	1.0	750	2700	190	650
	2.0E-2900F _b DF/LP/WH	1660	2635	2900	285	2.0	1.0	750	2845	190	650
	2.1E DF/LP/WH	1760	2755	2980	285	2.1	1.1	750	2820	190	650
	2.2E DF/LP/WH	1865	2870	3060	285	2.2	1.1	750	2945	190	650
	2.3E DF/LP/WH	1970	2975	3215	285	2.3	1.2	750	3065	190	650
	2.4E DF/LP/WH	2075	3080	3365	285	2.4	1.2	750	3190	190	650
2.6E DF/LP/WH	2285	3270	3675	285	2.6	1.3	750	3435	190	650	

For SI: 1 psi = 0.00689 MPa, 1 inch = 25.4 mm.

¹Reference design values are based on covered, dry conditions of use and normal load duration. Dry conditions of use are those environmental conditions represented by sawn lumber at which the moisture content is less than or equal to 16%.

²For uniformly loaded simple span beams, deflection is calculated as follows:

$$\Delta = \frac{270WL^4}{Ebd^3} + \frac{28.8WL^2}{Ebd}$$

where: W = Uniform load, plf b = Beam width, inches
 Δ = Deflection, inches d = Beam depth, inches
 L = Span, feet E = Modulus of Elasticity, psi

³DF = Douglas fir-larch; LP = lodgepole pine; WH = Western hemlock; DF, LP and WH are permitted to be combined as Western Species (WS).

⁴The F_t values in the table are reduced to reflect the volume effects of length, width and thickness for a range of common application conditions. Therefore the F_t values in the Table do not apply to RedLam LVL when used as a component of engineered products manufactured by RedBuilt™ which are listed in ICC-ES evaluation reports.

⁵F_b includes allowances for variations in span to depth ratio and method of loading and must be used without further adjustment except as noted below. For depths other than 12 inches, regardless of thickness, table values must be multiplied by (12/d)^{0.136}. Adjustments for common depths are shown below. For depths less than 3.5 inches, the factor for the 3.5-inch depth must be used.

Depth	3.5	5.5	7.25	9.25	12	16	20	24
Multiplier	1.18	1.11	1.07	1.04	1.00	0.96	0.93	0.91

⁶When structural members qualify as repetitive members in accordance with the applicable code, a 4 percent increase in accordance with NDS is permitted, in addition to the increases permitted in Footnote 5, above. This increase does not apply to field assembled multi-member beams.

⁷For simplicity, use 285 psi for depths up to 24 inches and 260 psi for depths greater than 24 inches. When a more accurate analysis is desired, the reference horizontal shear design value for all depths greater than 12 inches is F_v = 285 (12/d)^{0.065} psi.

⁸Compression perpendicular to grain values (F_{c⊥}) may not be increased for duration of load and are allowed to be adjusted by the NDS specified bearing area factor, C_b.

⁹Values shown are for thicknesses up to 3.5 inches (in the direction perpendicular to the veneer faces). Tabulated plankwise bending, F_b, and shear, F_v, do not apply to LVL thicker than 3.5 inches.

¹⁰Tabulated plankwise bending, F_b, may be multiplied by C_v = (3.5 / t)^{0.136} < 1.1 for thicknesses less than 3.5 inches.

¹¹E_{min} is the reference modulus of elasticity for beam stability and column stability calculations.

**TABLE 2—MINIMUM ON-CENTER SPACING OF NAILS AND STAPLES DRIVEN INTO THE EDGE OF REDLAM LVL^{1,2,3}
(For Fasteners Oriented Parallel to the Gluelines)**

FASTENER TYPE AND SIZE		MINIMUM SPACING (inches)				
		RedLam LVL Thickness, t (inches)				
Penny Weight	Diameter x Length (in.)	$\frac{3}{4} \leq t < 1\frac{1}{2}$	$1\frac{1}{2} \leq t < 2\frac{1}{2}$		$2\frac{1}{2} \leq t \leq 3\frac{1}{2}$	
		1 Row	1 Row	2 Rows ^{4,5}	1 Row	4 Rows ^{4,5}
8d Common	0.131 x 2.5	3	3	3	3	3
10d Common	0.148 x 3	4	4	4	4	5
12d Common	0.148 x 3.25	4	4	4	4	5
16d Common	0.162 x 3.5	--	8 ⁶	8 ⁶	8 ⁶	(⁶)
No. 14 gage staple	--	4	4	--	4	--

For SI: 1 inch = 25.4 mm.

¹Minimum end distances must be 2½ inches for 8d common nails, and 3 inches for all other sizes.

²Minimum edge distance must be ¾ inch.

³Minimum spacings apply to LVL members having a minimum depth (dimension parallel to fastener axis) of 3½ inches for one fastener row and 5½ inches for multiple fastener rows.

⁴Multiple rows of fasteners must be staggered by half the distance between fasteners in a row, and the minimum spacing between rows must be ½ inch.

⁵Multiple rows must be equally spaced about the centerline.

⁶Spacing may be reduced to 5 inches on center where nail penetration does not exceed 1⅜ inches into the edge of the LVL.

TABLE 3—REDLAM LVL RIM BOARD^{1,2,3,4,6}

GRADE	MINIMUM THICKNESS (inches)	DEPTH RANGE (inches)	CONTAINS CROSS PLIES ⁷	ALLOWABLE VERTICAL LOAD (plf) ⁴
1.6E and Higher ⁵	1.25	≤ 11⅞	No	4250
	1.50	d ≤ 16	No	4160
1.4E	1.50	d ≤ 16	Yes	6480
	1.50	d ≤ 24	Yes	5600

For SI: 1 inch = 25.4 mm; 1 plf + 14.59 N/m.

¹The allowable shear values in pounds per foot for horizontal wood structural panel diaphragms with framing of nominally 2-inch-thick Douglas fir–larch or Southern pine sawn lumber noted in Table 4.2A and Table 4.2C of the AWC Special Design Provisions for Wind and Seismic (SPDWS) for the 2015 IBC, Table 2306.2(1) of the 2012 IBC and Table 2306.2.1(1) of the 2009 IBC are applicable to: (1) 1.25-inch-thick RedLam LVL rim board for unblocked diaphragms only, and (2) 1.50-inch-thick and thicker RedLam LVL rim board for unblocked and blocked diaphragms. Nail spacing must be sufficient to prevent splitting, or as specified in Table 2, whichever is more restrictive.

²RedLam LVL rim board must be laterally supported at the top and continuously supported at the bottom, and the gravity loads must be uniformly applied along the top, in lieu of design by a design professional or other conditions

³Fastener capacities for RedLam LVL rim board are as recognized in Section 4.2.1 of this report, except as provided in footnote 5, below.

⁴Compression perpendicular to grain capacities of the sill plate and floor sheathing must be checked.

⁵The allowable perpendicular-to-grain lateral load capacity of a ½-inch-diameter lag screw connection installed perpendicular to the veneers, with full penetration through RedLam LVL having a grade of 1.6E or higher, and supporting a 1½-inch-thick deck ledger having a minimum specific gravity of 0.50, is 350 lbs.

⁶Toe-nailed connections between the rim board and supporting member are not limited by the 150 plf lateral load capacity noted for Seismic Design Categories D, E and F in Section 4.1.7 of the ANSI/AWC/AF&PA SDPWS.

⁷LVL members with cross plies consist of veneers oriented 90 degrees from the main orientation of veneers.



FIGURE 1—MANUFACTURER LOGO

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

REDBUILT LLC

EVALUATION SUBJECT:

REDLAM™ LAMINATED VENEER LUMBER (LVL) AND REDLAM™ LVL RIM BOARD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that RedBuilt LLC RedLam Laminated Veneer Lumber (LVL) and RedLam LVL rim board products, described in ICC-ES evaluation report [ESR-2993](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The RedBuilt LLC RedLam Laminated Veneer Lumber (LVL) and RedLam LVL rim board products, described in Sections 2.0 through 7.0 of the evaluation report [ESR-2993](#), comply with the LABC Chapter 23, and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The RedBuilt LLC RedLam Laminated Veneer Lumber (LVL) and RedLam LVL rim board products described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-2993](#).
- The design, installation, conditions of use and identification are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-2993](#).

The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.

This supplement expires concurrently with the evaluation report ESR-2993, reissued January 2021.