



● Compliance with International Codes  
● Compliance to State/Regional Codes

# ICC-ES Evaluation Report

## ESR-2993

Reissued January 2023

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This report is subject to renewal January 2025.

**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:**

- 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2021, 2018, 2015 and 2012 *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. 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. The RedLam LVL and RedLam LVL rim board products may be used in structures regulated under the IRC, when addressed in an engineered design in accordance with IRC R301.1.3.

### 3.0 DESCRIPTION

RedLam LVL is structural composite lumber (SCL) complying with ASTM D5456 and is manufactured from veneers of a single wood species or a 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 (24380 mm). 1.4E RedLam LVL can be produced in depths up to 48 inches (1219 mm).

RedLam LVL evaluated as rim board is described in Table 3. 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 IBC Section 2302.1(1) [2015 and 2012 IBC Section 2301.2(1)] for Allowable Stress Design (ASD) 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 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.

**4.2.3 Calculated Fire Resistance:** 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, 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:

- To transfer, from above to below, all vertical loads at the rim board location. Allowable vertical loads are noted in Table 3.
- To provide diaphragm attachment (sheathing to top edge of rim board).
- To transfer in-plane lateral loads from the diaphragm to the wall plate below. 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 4.1.10 of the AWC Special Design Provisions for Wind and Seismic (SDPWS) (Section 4.1.7 of SDPWS for the 2018, 2015 and 2012 IBC). The ability of RedLam LVL to transfer shear is described in Footnote 1 to Table 3 of this report.
- To provide lateral support to the joists or rafters (resistance against rotation) through attachment to the end of the joists or rafters.
- To provide closure for ends of joists or rafters.
- 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:

- Design stresses must comply with the values noted in this report.
- 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.
- RedLam LVL products described in this report have only been evaluated for use in 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.

- 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, except where specifically prohibited by this report. See footnote 8 to Table 1.
- 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.
- Concentrated vertical load capacity for RedBuilt LVL used as rim board has not been evaluated. Concentrated vertical loads being transmitted through the rim board assembly require squash blocking or other load transfer means.
- RedLam LVL may be cut to length for required application. Depth must not be cut to less than 3 1/2 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.
- Installation, fabrication, identification, and connection details must be in accordance with this report, the manufacturer's published installation instructions and the applicable code.
- 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.
- 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.

#### 6.0 EVIDENCE SUBMITTED

- Data in accordance with the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated June 2017 (editorially revised February 2021).
- Data in accordance with the ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated June 2019 (editorially revised February 2021).
- Reports of fire tests conducted in accordance with ASTM E119.

#### 7.0 IDENTIFICATION

- RedLam LVL is identified with a stamp bearing the manufacturer's name (RedBuilt™), logo (see Figure 1) and/or registered trademark (RedLam™), the evaluation report number (ESR-2993), the plant number, the production date, the grade, and the species or species group designation if other than Douglas Fir (DF).
- The report holder's contact information is the following:

**REDBUILT LLC**  
**200 EAST MALLARD DRIVE**  
**BOISE, IDAHO 83706**  
**(866) 859-6757**  
[www.redbuilt.com](http://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)<sup>1,2</sup> (psi)**

BILLET MATERIAL THICKNESS	GRADE SPECIES <sup>3</sup>	AXIAL		JOIST/BEAM				PLANK			
		F <sub>t</sub> <sup>4</sup>	F <sub>c</sub>	F <sub>b</sub> <sup>5,6</sup>	F <sub>v</sub> <sup>7</sup>	E (x10 <sup>6</sup> )	E <sub>min</sub> <sup>11</sup> (x10 <sup>6</sup> )	F <sub>cL</sub> <sup>8</sup>	F <sub>b</sub> <sup>9,10</sup>	F <sub>v</sub> <sup>9</sup>	F <sub>cL</sub> <sup>8</sup>
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 <sub>b</sub> 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.

<sup>1</sup>Reference 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%.

<sup>2</sup>For 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

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

<sup>4</sup>The F<sub>t</sub> values in the table account for the volume effects of length, width and thickness for a range of common application conditions. Therefore the F<sub>t</sub> 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.

<sup>5</sup>F<sub>b</sub> 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)<sup>0.136</sup>. 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

<sup>6</sup>When 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-ply beams.

<sup>7</sup>For 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<sub>v</sub> = 285 (12/d)<sup>0.065</sup> psi.

<sup>8</sup>Compression perpendicular to grain values (F<sub>cL</sub>) may not be increased for duration of load and are allowed to be adjusted by the NDS specified bearing area factor, C<sub>b</sub>.

<sup>9</sup>Values shown are for thicknesses up to 3.5 inches (in the direction perpendicular to the veneer faces). Tabulated plankwise bending, F<sub>b</sub>, and shear, F<sub>v</sub>, do not apply to LVL thicker than 3.5 inches.

<sup>10</sup>Tabulated plankwise bending, F<sub>b</sub>, may be multiplied by C<sub>v</sub> = (3.5 / t)<sup>0.136</sup> < 1.1 for thicknesses less than 3.5 inches.

<sup>11</sup>E<sub>min</sub> 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<sup>1,2,3</sup>  
(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 <sup>4,5</sup>	1 Row	4 Rows <sup>4,5</sup>
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 <sup>6</sup>	8 <sup>6</sup>	8 <sup>6</sup>	8 <sup>6</sup>
No. 14 gage staple	--	4	4	--	4	--

For SI: 1 inch = 25.4 mm.

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

<sup>2</sup>Minimum edge distance must be ¾ inch.

<sup>3</sup>Minimum 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.

<sup>4</sup>Multiple 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.

<sup>5</sup>Multiple rows must be equally spaced about the centerline.

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

**TABLE 3—ALLOWABLE LOADS FOR REDLAM LVL USED AS RIM BOARD<sup>1,2,3,4,6</sup>**

GRADE	MINIMUM THICKNESS (inches)	DEPTH RANGE (inches)	CONTAINS CROSS PLIES <sup>7</sup>	ALLOWABLE VERTICAL LOAD (plf) <sup>4</sup>
1.6E and Higher <sup>5</sup>	1.25	$d \leq 11\frac{7}{8}$	No	4250
	1.50	$d \leq 16$	No	4160
1.4E	1.50	$d \leq 16$	Yes	6480
	1.50	$d \leq 24$	Yes	5600

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

<sup>1</sup>Allowable Shear: The 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)(2021, 2018 and 2015 IBC) and Table 2306.2(1) of the 2012 IBC are applicable to: (1) 1.25-inch-thick RedLam LVL rim board for unblocked diaphragms only, and (2) minimum 1.50-inch-thick 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.

<sup>2</sup>RedLam 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, unless otherwise designed by a registered design professional.

<sup>3</sup>Fastener capacities for RedLam LVL rim board are as described in Section 4.2.1 of this report, except as provided in footnote 5, below.

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

<sup>5</sup>The 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 lbf.

<sup>6</sup>Toe-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 4.1.10 of AWC SDPWS (Section 4.1.7 of AWC SDPWS for the 2018, 2015 and 2012 IBC).

<sup>7</sup>LVL 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:**

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

## 2.0 CONCLUSIONS

The RedBuilt LLC RedLam 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 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 2021 *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 2023 and revised March 2023.