VERSALAM® LVL
Boise Cascade Wood Products, LLC

Product: 1.8E 2650/1650, 1.9E 2750/1825, and 2.1E 3100/2150 VERSA-LAM® LVL
Boise Cascade Wood Products, LLC, 19953 Highway 31, Thorsby, Alabama 35171
(205) 646-1056
www.bcewp.com

1. Basis of the product report:
   - 2021, 2018, and 2015 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.10 Structural composite lumber
   - 2012 IBC: Sections 104.11 Alternative materials and 2303.1.9 Structural composite lumber
   - 2012 IRC: Sections R104.11 Alternative materials, and R502.1.7, R602.1.4, and R802.1.6 Structural composite lumber
   - ASTM D5456-18, ASTM D5456-14b, ASTM D5456-13, and D5456-09 recognized by the 2021 IB and IRC, 2018 IBC and IRC, 2015 IBC and IRC, and 2012 IBC and IRC, respectively

2. Product description:
VERSALAM® LVL is made with veneer sheets of various species and grades in accordance with the in-plant manufacturing standards approved by APA. VERSALAM LVL is available in thicknesses from 3/4 inch to 3-1/2 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, and Table 3 lists the allowable fastener spacing for VERSALAM LVL. The allowable loads for VERSALAM LVL shall be in accordance with the recommendations provided by the manufacturer (www.bcewp.com).

4. Product installation:
VERSALAM 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 2021, 2018, and 2015 IBC Section 722 Calculated fire resistance, and 2012 IBC Section 722.6.3 Design of fire-resistant exposed wood members shall be applicable to VERSALAM 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/resource-library), and the manufacturer.

6. Limitations:
   a) VERSALAM LVL shall be designed in accordance with the code using the design properties specified in this report.
b) VERSA-LAM LVL is limited to dry service conditions where the average equilibrium moisture content of solid-sawn lumber is less than 16 percent.
c) The VERSA-LAM LVL grades are produced at Boise Cascade’s facility in Thorsby, Alabama under a quality assurance program audited by APA.
d) This report is subject to re-examination in one year.

7. Identification:
VERSA-LAM LVL described in this report is identified by a label bearing the manufacturer’s name and/or trademark, the APA assigned plant number (1086), the LVL grade, the APA logo, the report number PR-L266, and a means of identifying the date of manufacture.

Identification may include one or more of the following:

VERSA-LAM® LVL, Boise-Cascade, or Boise Cascade Wood Products, LLC.
Table 1. Design Properties (Allowable Stress Design) for VERSA-LAM LVL (psi)(a,b)

<table>
<thead>
<tr>
<th>True E</th>
<th>Apparent E</th>
<th>Flexural Stress, $F_e^{(c,d)}$</th>
<th>Tension Parallel to Grain, $F_t^{(e)}$</th>
<th>Comp. Parallel to Grain, $F_c$</th>
<th>Compression Perpendicular to Grain, $F_y$</th>
<th>Horizontal Shear, $F_s$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Grade</td>
<td>E ($10^6$ psi)(g)</td>
<td>Product Grade</td>
<td>E ($x10^6$ psi)(f)</td>
<td>Joist</td>
<td>Plank</td>
<td>Perp. to Narrow Face (Plank)</td>
</tr>
<tr>
<td>1.8E 2650/1650</td>
<td>1.8</td>
<td>1.7 2650</td>
<td>1.7</td>
<td>2,650</td>
<td>2,400</td>
<td>1,650</td>
</tr>
<tr>
<td>1.9E 2750/1825</td>
<td>1.9</td>
<td>1.8 2750</td>
<td>1.8</td>
<td>2,750</td>
<td>2,500</td>
<td>1,825</td>
</tr>
<tr>
<td>2.1E 3100/2150</td>
<td>2.1</td>
<td>2.0 3100</td>
<td>2.0</td>
<td>3,100</td>
<td>2,800</td>
<td>2,150</td>
</tr>
</tbody>
</table>

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; Plank = load perpendicular to glueline.

(c) Tabulated flexural stress ($F_e$) may be increased by 4 percent when the member qualifies as a repetitive member as defined in the NDS.

(d) The tabulated plank values require no depth modification. The tabulated joist 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 $(12/d)^{0.5}$ for 1.8E, 1.9E, and 2.1E VERSA-LAM, 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.

<table>
<thead>
<tr>
<th>Depth (in.)</th>
<th>3-1/2</th>
<th>5-1/2</th>
<th>7-1/4</th>
<th>9-1/4</th>
<th>11-1/4</th>
<th>12</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8E, 1.9E, and 2.1E VERSA-LAM</td>
<td>Multiply by</td>
<td>1.15</td>
<td>1.09</td>
<td>1.06</td>
<td>1.03</td>
<td>1.01</td>
<td>1.0</td>
<td>0.97</td>
<td>0.96</td>
<td>0.94</td>
</tr>
</tbody>
</table>

(e) The tabulated values are based on a reference length of 4 feet. For other lengths, the allowable tensile stress shall be modified by $(4/L)^{0.5}$ for all grades of VERSA-LAM LVL, where $L$ = length in feet. For lengths less than 4 feet, use the allowable tension stresses in Table 1 unadjusted.

(f) 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 (g) may be ignored.

(g) The MOE values given are the true (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:

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

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

Table 2. Fastener Details for VERSA-LAM LVL

<table>
<thead>
<tr>
<th>LVL Grade</th>
<th>Equivalent Specific Gravity (S.G.)</th>
<th>Nails</th>
<th>Bolts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Installed in Edge</td>
<td>Installed in Face</td>
</tr>
<tr>
<td>1.8E, 1.9E and 2.1E VERSA-LAM</td>
<td>Hemlock/ fir (0.43)</td>
<td>Douglas-fir/ larch (0.50)</td>
<td>Douglas-fir/ larch (0.50)</td>
</tr>
</tbody>
</table>
Table 3. Allowable Fastener Spacing for Installation Parallel to the Glue Line in VERSA-LAM LVL \(^{(a)}\)

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

For SI: 1 inch = 25.4 mm

\(^{(a)}\) The minimum on-center spacing permitted for nails installed in the wide face of VERSA-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 approved national standards developer accredited by American National Standards Institute (ANSI). APA publishes ANSI standards and Voluntary Product Standards for wood structural panels and engineered wood products. APA is an accredited certification body under ISO/IEC 17065 by Standards Council of Canada (SCC), an accredited inspection agency under ISO/IEC 17020 by International Code Council (ICC) International Accreditation Service (IAS), and an accredited testing organization under ISO/IEC 17025 by IAS. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, and Validation Entity by the State of Florida, and an approved testing laboratory by City of Los Angeles.

**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

**DISCLAIMER**

APA Product Report\(^{®}\) is a trademark of APA – The Engineered Wood Association, Tacoma, Washington. The information contained herein is based on the product evaluation in accordance with the references noted in this report. Neither APA, nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this report. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed.