QB Structural Glued Laminated Timber

QB Corporation

Products: QB 30F-E3 2.1E 650F<sub>c</sub> Glulam
QB Corporation, 1420 Highway 28, Salmon, ID 83467
(208) 756-4248
www.qbcorp.com

1. Basis of the product report:
   - 2012 IRC: Sections R104.11 Alternative materials, and R502.1.5, R602.1.2, and R802.1.4 Structural glued laminated timber
   - ASTM D3737-12 and D3737-08 recognized by the 2018 and 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - APA Report T2011P-72 and other qualification data

2. Product description:
   QB 30F-E3 2.1E 650F<sub>c</sub> glulam beams are used as beams, headers, rafters, or purlins, and are manufactured with a proprietary balanced layup combination documented in the in-plant manufacturing standard. QB 30F-E3 glulam beams use conventional laminating lumber grades of Douglas fir-Larch in the tension and compression zones, and Southern pine in the core with the exception that the outermost tension and outermost compression laminations are made of laminated veneer lumber (LVL), as permitted by ANSI A190.1. The LVL laminations are supplied by manufacturers recognized by APA and identified in QB’s in-plant manufacturing standard approved by APA. The LVL complies with the control values listed in the manufacturing standard and is manufactured in full length and width laminations, and in net thicknesses of 1-1/2 inches from wood veneers. All veneer grain is parallel to the length of the billets. The LVL are bonded with another LVL or lumber laminations using exterior-type adhesives in compliance with ANSI 405. QB 30F-E3 glulam beams have a minimum depth of 7-1/4 inches and a maximum depth of 48 inches.

3. Design properties:
   Table 1 lists the allowable design properties for QB 30F-E3 glulam beams. The allowable spans for QB 30F-E3 glulam beams shall be in accordance with the recommendations provided by the manufacturer (www.qbcorp.com), and APA Glued Laminated Beam Design Tables, Form S475 (www.apawood.org/resource-library), as applicable.

4. Product installation:
   QB 30F-E3 glulam beams shall be installed in accordance with the recommendations provided by the manufacturer and APA Glulam Connection Details, Form T300 (see link above). Permissible field notching and drilling shall be in accordance with the recommendations provided by the manufacturer, and with APA Field Notching and Drilling of Glued Laminated Timber Beams, Form S560 (see link above).

5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer, and APA Design/Construction Guide: Fire-Rated Systems,
Form W305 (see link above). For one- or two-hour rated glulam beams, the QB 30F-E3 glulam beams shall be constructed in accordance with ANSI A190.1 and designed in accordance with the recommendations provided by the manufacturer and APA Technical Note: *Calculating Fire Resistance of Glulam Beams and Columns*, Form Y245 (see link above) or Chapter 16 of the 2018 National Design Specification (NDS), available from American Wood Council (www.awc.org/codes-standards/publications/nds-2018).

6. Limitations:
   a) QB 30F-E3 glulam beams shall be designed in accordance with the code using the design properties specified in this report.
   b) QB 30F-E3 glulam beams shall have a minimum depth of 7-1/4 inches and a maximum depth of 48 inches.
   c) QB 30F-E3 glulam beams are produced at QB’s Salmon, Idaho facilities under a quality assurance program audited by APA.
   d) This report is subject to re-examination in one year.

7. Identification:
   QB 30F-E3 glulam beams described in this report are identified by a label bearing the manufacturer’s name (QB) and/or trademark, the APA assigned plant number (1102), the product standard (ANSI A190.1), the APA logo, the combination symbol, the report number PR-L305, and a means of identifying the date of manufacture.
Table 1. Allowable Design Values for QB 30F-E3 Glulam Beams for Normal Duration of Load\(^{(1,2)}\)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Species Outer/ Core(^{(3)})</th>
<th>Outer Laminations (Positive Bending)</th>
<th>Inner Laminations (Negative Bending)</th>
<th>Axially Loaded</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Extreme Fiber in Bending(^{(4)})</td>
<td>Compression Perpendicular to Grain</td>
<td>Extremity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Botom of Beam in Tension</td>
<td>Top of Beam in Tension</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ten. Face</td>
<td>Comp. Face</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>True</td>
<td>Apparent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shear Parallel to Grain(^{(5)})</td>
<td>True</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F(_{\alpha})(x)</td>
<td>F(_{\alpha})(y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E(_{\alpha})(x)(10^6) psi</td>
<td>E(_{\alpha})(y)(10^6) psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E(_{\alpha})(xy)(10^6) psi</td>
<td>F(_{\alpha})(y) psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QB 30F-E3</td>
<td>LVL/DF(^{(6)})</td>
<td>3,000</td>
<td>650(^{(10)})</td>
<td>1,700</td>
<td>1,350</td>
</tr>
<tr>
<td></td>
<td>2.1E</td>
<td>3,000</td>
<td>650(^{(10)})</td>
<td>650</td>
<td>1,750</td>
</tr>
<tr>
<td></td>
<td>650F(_{(r)})</td>
<td></td>
<td>650(^{(10)})</td>
<td>230</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>(B)</td>
<td></td>
<td></td>
<td>0.8</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.833</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Wet-use factor</td>
<td>0.8</td>
<td>0.53</td>
<td>0.833</td>
<td>0.73</td>
</tr>
</tbody>
</table>

**Notes:**
1. The combinations in this table are intended primarily for members stressed in bending due to loads applied perpendicular to the wide faces of the laminations. Allowable design values are tabulated, however, for loading both perpendicular and parallel to the wide faces of the laminations.
2. The combinations in this table are intended primarily for members stressed in bending due to loads applied perpendicular to the wide faces of the laminations. Allowable design values are tabulated, however, for loading both perpendicular and parallel to the wide faces of the laminations.
3. DF = Douglas fir-Larch, SP = Southern pine, and LVL = Laminated veneer lumber in accordance with the manufacturing standard.
4. The unbalanced (U) layup is intended primarily for simple-span applications and the balanced (B) layup is intended primarily for continuous or cantilevered applications.
5. The values of F\(_{\alpha}\) are based on members 5-1/8 inches in width by 12 inches in depth by 21 feet in length. For members with a larger volume, F\(_{\alpha}\) shall be multiplied by a volume factor, C\(_v\) = (5.125b)\(^{(10)}\) (12d)\(^{(9)}\) (21L)\(^{(10)}\), where b is the beam width (in.), d is the beam depth (in.), and L is the beam length between the points of zero moment (ft).
6. For non-prismatic members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS 3.4.3.3), the F\(_{\alpha}\) and F\(_{\alpha}\) values shall be multiplied by a factor of 0.72. The tabulated E\(_{\alpha}\) values are for timbers with laminations made from a single piece of lumber across the width or multiple pieces that have been edge bonded. For timber manufactured from multiple piece laminations (across width) that are not edge bonded, value shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members.
7. The values of E\(_{\alpha}\) shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated E\(_{\alpha}\). The axial modulus of elasticity, E\(_{\alpha}\), shall be equal to the tabulated E\(_{\alpha}\) values.
8. The values of F\(_{\alpha}\) are based on members 5 inches in depth. For depths less than 12 inches, F\(_{\alpha}\) shall be permitted to be increased by multiplying by the size factor, (d/12)\(^{(10)}\), where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.
9. The beam widths are limited to 1-1/8 through 48 inches.
10. The value of F\(_{\alpha}\) shall be permitted to be increased to the published value of the outermost LVL in the plank orientation if provided by the manufacturer.

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