1. Basis of the product report:
     Structural glued laminated timber
   - 2012 IRC: Sections R502.1.5, R602.1.2, and R802.1.4 Structural glued laminated timber
   - ANSI 117-2020 and ANSI 117-2015 recognized in the 2021 IBC and IRC, and 2018 IBC and IRC, respectively
   - ASTM D3737-18e1, D3737-12, and D3737-08 recognized in the 2021 IBC and IRC, 2018 and 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - Qualification data

2. Product description:
   IB MAX-CORE® Glulam Beams and Columns are structural glued laminated timber made of southern pine lumber laminations. IB MAX-CORE Glulam Beams and Columns are manufactured in Dothan, Alabama in accordance with ANSI A190.1 using layup combinations recognized in ANSI 117 or National Design Specification (NDS) Supplement. IB MAX-CORE Glulam Beams and Columns are used as beams, headers, rafters, purlins, or columns. The layup combinations of 28F-E1 and 28F-E2 are manufactured in nominal width of 7 inches, depths ranging from 5-1/2 to 24-3/4 inches, and lengths up to 60 feet, while layup combinations of 30F-E1 and 30F-E2 are manufactured in nominal widths of 3-1/2 to 5-1/2 inches, depths ranging from 5-1/2 to 24-3/4 inches, and lengths up to 60 feet.

3. Design properties:
   Table 1 lists the allowable design properties for IB MAX-CORE Glulam Beams. The allowable spans for IB MAX-CORE Glulam Beams shall be in accordance with the recommendations provided by the manufacturer and APA Glued Laminated Beam Design Tables, Form S475 (www.apawood.org/resource-library), as applicable. Table 2 lists the allowable design properties for IB MAX-CORE Glulam Columns. The allowable loads for IB MAX-CORE Glulam Columns shall be in accordance with the recommendations provided by the manufacturer and APA Data File: Design of Structural Glued Laminated Timber Columns, Form Y240 (see link above), as applicable.

4. Product installation:
   IB MAX-CORE Glulam Beams and Columns shall be installed in accordance with the recommendations provided by the manufacturer and APA Construction Guide: 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 APA Technical Note: Field Notching and Drilling of Glued Laminated Timber Beams, Form S560 (see link above).
5. Fire-rated assemblies:
   Design of fire-resistant exposed wood members in accordance with Chapter 16 of the National Design Specification for Wood Construction (NDS), Section 722.1 of the 2021, 2018, and 2015 IBC, or Section 722.6.3 of the 2012 IBC shall be applicable to IB MAX-CORE Glulam Beams and Columns. 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).

6. Limitations:
   a) IB MAX-CORE Glulam Beams and Columns shall be designed in accordance with the code using the design properties specified in this report.
   b) IB MAX-CORE Glulam Beams shall have a maximum net width of 5-1/2 inches for 30F-E1 and 30F-E2 layup combinations.
   c) IB MAX-CORE Glulam Beams and Columns are produced at the Dothan, AL facility under a quality assurance program audited by APA.
   d) This report is subject to re-examination in one year.

7. Identification:
   IB MAX-CORE Glulam Beams and Columns described in this report are identified by a label bearing the manufacturer's name (IB X-Lam USA, LLC) and/or trademark, the APA assigned plant number (1137), the product standard (ANSI A190.1), the APA logo, the layup combination symbol, the report number PR-L326, and a means of identifying the date of manufacture.
The unbalanced (U) layup is intended primarily for simple-span applications and the balanced (B) layup is intended primarily for continuous or cantilevered applications.

SP = Southern pine.

The tabulated allowable design values are for normal duration of loading. For other durations of loading, see the applicable building code. The tabulated allowable design values are for dry conditions of use. For wet conditions of use, 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.

The values of Fc, Fg, Etrue, Ec, Eapp, and E for beam stability calculation (NDS 3.3.3.8). For calculating beam deflections, the tabulated Ec values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated Ec.ax. The axial modulus of elasticity, Ec, shall be equal to the tabulated Ec.true and Ec.app values.

The values of Fc are based on members 12 inches in depth. For depths less than 12 inches, Fc shall be permitted to be increased by multiplying by the flat use factor, (12/d)0.72, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

For prismatic members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS 3.4.3.3), the Fc and Fg values shall be multiplied by a factor of 0.72. The tabulated Ec values are for timber manufactured from single piece laminations (across width) that are not edge bonded, values shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members.

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 Fc and Fg values shall be multiplied by a factor of 0.72. The tabulated Ec values are for timber manufactured from single piece laminations (across width) that are not edge bonded, values shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members.

The values of Ec are based on members 12 inches in depth. For depths less than 12 inches, Ec shall be permitted to be increased by multiplying by the flat use factor, (12/d)0.72, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

This layup combination is limited to nominal 6 inches or less in width.

For more of members than 15 laminations, Ec.true = 2.1 x 10^6 psi, Ec.app = 2.0 x 10^6 psi, and Ec = 1.06 x 10^6 psi.

This combination may contain lumber with wane. If lumber with wane is used, the design value for shear parallel to grain, Fw, shall be multiplied by 0.67 if wane is allowed on both sides. If wane is limited to one side, Fw shall be multiplied by 0.83. This reduction shall be cumulative with the adjustment in footnote (6).

### Table 1. Allowable Design Values for IB MAX-CORE Glulam Beams for Normal Duration of Load1,2

| Symbol | Species | Outer/ Core (Bal or Unbal3) | Extreme Fiber in Bending (psi) | Compression Perpendicular to Grain (psi) | Shear Parallel to Grain (psi) | Modulus of Elasticity (psi) | Extreme Fiber in Bending (psi) | Compression Perpendicular to Grain (psi) | Shear Parallel to Grain (psi) | Modulus of Elasticity (psi) | Extreme Fiber in Bending (psi) | Compression Perpendicular to Grain (psi) | Shear Parallel to Grain (psi) | Modulus of Elasticity (psi) |
|--------|---------|-----------------------------|-------------------------------|------------------------------------------|-------------------------------|-----------------------------|-------------------------------|------------------------------------------|-------------------------------|-----------------------------|-------------------------------|------------------------------------------|-------------------------------|-----------------------------|------------------------------------------|
| Axially Loaded | Fasteners | | Bottom of Beam Stressed in Tension (Prismatic Bending) | Top of Beam Stressed in Tension (Negative Bending) | Face | Comp. Face | True | Apparent | Beam Stability | True | Apparent | Beam Stability | True | Apparent | Beam Stability | True | Apparent | Beam Stability | True | Apparent | Beam Stability |
| MAX-CORE® 24F-V3 (U) | SP/SP | 2.400 | 2.000 | 740 | 740 | 300 | 1.9 | 1.8 | 0.95 | 1.700 | 650 | 260 | 1.7 | 1.6 | 0.85 | 1.150 | 1,650 | 0.55 | 0.55 |
| MAX-CORE® 24F-V4 (U) | SP/SP | 2.400 | 1.650 | 740 | 650 | 210 | 1.8 | 1.7 | 0.90 | 1.350 | 470 | 230 | 1.6 | 1.5 | 0.79 | 0.975 | 1,350 | 0.55 | 0.43 |
| MAX-CORE® 24F-VSM1 (B) | SP/SP | 2.400 | 2.400 | 740 | 740 | 300 | 1.9 | 1.8 | 0.95 | 1.800 | 650 | 260 | 1.7 | 1.6 | 0.85 | 1.150 | 1,650 | 0.55 | 0.55 |
| MAX-CORE® 28F-E1 (U) | SP/SP | 2.800 | 2.300 | 805 | 805 | 300 | 2.2 | 2.1 | 1.20 | 2.100 | 650 | 260 | 1.8 | 1.7 | 0.90 | 1.300 | 1,850 | 0.55 | 0.55 |
| MAX-CORE® 28F-E2 (B) | SP/SP | 2.800 | 2.800 | 805 | 805 | 300 | 2.2 | 2.1 | 1.20 | 2.100 | 650 | 260 | 1.8 | 1.7 | 0.90 | 1.300 | 1,850 | 0.55 | 0.55 |
| MAX-CORE® 30F-E1 (U) | SP/SP | 3.000 | 2.400 | 805 | 805 | 300 | 2.2 | 2.1 | 1.20 | 2.100 | 750 | 260 | 1.8 | 1.7 | 0.90 | 1.250 | 1,750 | 0.55 | 0.55 |
| MAX-CORE® 30F-E2 (B) | SP/SP | 3.000 | 3.000 | 805 | 805 | 300 | 2.2 | 2.1 | 1.20 | 2.100 | 750 | 260 | 1.8 | 1.7 | 0.90 | 1.350 | 1,750 | 0.55 | 0.55 |

**Wet-use factor** | 0.8 | 0.53 | 0.875 | 0.833 | 0.8 | 0.53 | 0.875 | 0.833 | 0.8 | 0.73 | see NDS

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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 tabulated allowable design values are for normal duration of loading. For other durations of loading, see the applicable building code. The tabulated allowable design values are for dry conditions of use. For wet conditions of use, 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. SP = Southern pine. The unbalanced (U) layup is intended primarily for simple-span applications and the balanced (B) layup is intended primarily for continuous or cantilevered applications.
4. The values of Fc, Fg, and Ec 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, Fc shall be multiplied by a volume factor, Cv = (5.125b/120) (12/d)1/2 (21/L)1/2, 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).
5. 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 Fc and Fg values shall be multiplied by a factor of 0.72. The tabulated Ec values are for timber manufactured from single piece laminations (across width) that are not edge bonded, values shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members.
6. The tabulated Ec values include true Ec (also known as “shear-free Ec”), apparent Ec, and Ec for beam stability calculation (NDS 3.3.3.8). For calculating beam deflections, the tabulated Ec values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated Ec. The axial modulus of elasticity, Ec, shall be equal to the tabulated Ec.true and Ec.app values.
7. The values of Fc are based on members 12 inches in depth. For depths less than 12 inches, Fc shall be permitted to be increased by multiplying by the flat use factor, (12/d)1/3, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.
8. This layup combination is limited to nominal 6 inches or less in width.
9. For members of more than 15 laminations, Ec.true = 2.1 x 10^6 psi, Ec.app = 2.0 x 10^6 psi, and Ec = 1.06 x 10^6 psi.
10. This combination may contain lumber with wane. If lumber with wane is used, the design value for shear parallel to grain, Fw, shall be multiplied by 0.67 if wane is allowed on both sides. If wane is limited to one side, Fw shall be multiplied by 0.83. This reduction shall be cumulative with the adjustment in footnote (6).
Table 2. Allowable Design Values for IB MAX-CORE Glulam Columns for Normal Duration of Load(1)

<table>
<thead>
<tr>
<th>Combination Symbol</th>
<th>Species(2)</th>
<th>Grade</th>
<th>Modulus of Elasticity(3)</th>
<th>All Loading Axially Loaded</th>
<th>Bending about Y-Y Axis</th>
<th>Bending about X-X Axis</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>E_x true, E_y true, E_axial(10^6 psi)</td>
<td>F_c(ψi)</td>
<td>F_t(ψi)</td>
<td>F_c(ψi)</td>
<td>F_c(ψi)</td>
</tr>
<tr>
<td>MAX-CORE® Combination No. 50</td>
<td>SP N1D14</td>
<td>2.0</td>
<td>1.9</td>
<td>1.00</td>
<td>740</td>
<td>1,550</td>
<td>2,300</td>
</tr>
<tr>
<td>Wet use factors</td>
<td></td>
<td></td>
<td>0.833</td>
<td>0.53</td>
<td>0.8</td>
<td>0.73</td>
<td>0.8</td>
</tr>
</tbody>
</table>

(1) The tabulated allowable design values are for normal duration of loading. For other durations of loading, see applicable building code. The tabulated allowable design values are for dry conditions of use. For wet conditions of use, multiply the tabulated values by the factors shown at the bottom of the table.

(2) SP = South pine.

(3) The tabulated E values include shear-free (true) modulus of elasticity (E_x true, E_y true, and E_axial), apparent modulus of elasticity (E_x app and E_y app), and 5th percentile modulus of elasticity (E_x min, E_y min, and E_axial min). For column stability calculation (NDS 3.7.1), E_axial shall be used. For calculating the total deflection due to bending, the tabulated E_x app or E_y app values shall be used, or as an alternative, the true (shear-free) bending deflection shall be calculated using the tabulated E_x true or E_y true, which shall be added to the calculated shear deflection to determine the total deflection due to bending.

(4) The values of F_c are based on members 12 inches in depth. For depths less than 12 inches, F_c shall be permitted to be increased by multiplying by the size factor, (12/d)^1/9, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

(5) For non-prismatic members, notched members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS 3.4.3.3), the tabulated F_c values shall be multiplied by 0.72.

(6) For members with 5, 7, or 9 lams manufactured from multiple-piece lams with unbonded edge joints, the tabulated F_c values shall be multiplied by a factor of 0.4. For all other members manufactured from multiple-piece lams with unbonded edge joints, the tabulated F_c values shall be multiplied by a factor of 0.5.

(7) The values of F_c 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_c shall be multiplied by a volume factor, C_v = (5.125/b)^1/20 (12/d)^1/20 (21/L)^1/20, 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).

(8) The tabulated F_c values are permitted to be increased by a factor of 1.18, regardless of the member depth, provided that the increased F_c values do not exceed 2,400 psi. This factor shall be cumulative with the volume factor, C_v, specified in Footnote (7).
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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

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