# APA PRODUCT REPORT®

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## IB MAX-CORE® Glulam Beams and Columns
## IB X-LAM USA, LLC

**PR-L326**

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Products: IB MAX-CORE® Glulam Beams and Columns
IB X-Lam USA, LLC, 1371 Hodgesville Road, Dothan, AL 36301
(334) 661-4100
www.smartlam.com

1. Basis of the product report:
   - 2024, 2021, 2018, and 2015 International Building Code (IBC): Section 2303.1.3 Structural glued laminated timber
   - 2024, 2021, 2018, and 2015 International Residential Code (IRC): Sections R502.1.3, R602.1.3, and R802.1.2 Structural glued laminated timber
   - ANSI 117-2020 and ANSI 117-2015 recognized in the 2024 and 2021 IBC and IRC, and 2018 IBC and IRC, respectively
   - ANSI A190.1-2022, ANSI A190.1-2017, and ANSI A190.1-2012 recognized in the 2024 IBC and IRC, 2021 and 2018 IBC and IRC, and 2015 IBC and IRC, respectively
   - ASTM D3737-18e1 and D3737-12 recognized in the 2024 and 2021 IBC and IRC, and 2018 and 2015 IBC and IRC, respectively
   - Qualification data

2. Product description:
   IB MAX-CORE® Glulam Beams and Columns are structural glued laminated timber made of Douglas fir-Larch and 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/SP and 28F-E2/SP 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/SP and 30F-E2/SP 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 Notes: *Field Notching and Drilling of Glued Laminated Timber Beams*, Form S560, and *Effect of Large Diameter Horizontal Holes on the Bending and Shear Properties of Structural Glued Laminated Timber*, Form V700 (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), or Section 722.1 of the 2024, 2021, 2018, and 2015 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 and 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/SP and 30F-E2/SP 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.

 

Table 1. Allowable Design Values for IB MAX-CORE Glulam Beams for Normal Duration of Load[1,2]

| Symbol | Species Outer/ Core[3] (Bal or Unbal[4]) | Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations) | | | | | | | | Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations) | | | | | | Axially Loaded | | Fasteners | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Extreme Fiber in Bending[5] | | Compression Perpendicular to Grain | | Shear Parallel to Grain[6] | Modulus of Elasticity[7] | | | Extreme Fiber in Bending[8] | Comp. Perpen-dicular to Grain | Shear Parallel to Grain[6] | Modulus of Elasticity[7] | | | Tension Parallel to Grain | Comp. Parallel to Grain | Specific Gravity for Dowel-Type Fastener Design | |
| | | Bottom of Beam Stressed in Tension (Positive Bending) | Top of Beam Stressed in Tension (Negative Bending) | Ten. Face | Comp. Face | | True | App-arent | Beam Stabi-lity | | | | True | App-arent | Beam Stabi-lity | | | Top or Bottom Face | Side Face |
| | | $F_{bx}^{+}$ (psi) | $F_{bx}^{-}$ (psi) | $F_{c\perp x}$ (psi) | | $F_{vx}$ (psi) | $E_{x\,true}$ ($10^6$ psi) | $E_{x\,app}$ ($10^6$ psi) | $E_{x\,min}$ ($10^6$ psi) | $F_{by}$ (psi) | $F_{c\perp y}$ (psi) | $F_{vy}$ (psi) | $E_{y\,true}$ ($10^6$ psi) | $E_{y\,app}$ ($10^6$ psi) | $E_{y\,min}$ ($10^6$ psi) | $F_t$ (psi) | $F_c$ (psi) | SG | |
| MAX-CORE® 16F-V3 | DF/DF (U) | 1,600 | 1,250 | 560 | 560 | 265 | 1.6 | 1.5 | 0.79 | 1,450 | 560 | 230 | 1.6 | 1.5 | 0.79 | 975 | 1,500 | 0.50 | 0.50 |
| MAX-CORE® 16F-V6 | DF/DF (B) | 1,600 | 1,600 | 560 | 560 | 265 | 1.7 | 1.6 | 0.85 | 1,450 | 560 | 230 | 1.6 | 1.5 | 0.79 | 1,000 | 1,600 | 0.50 | 0.50 |
| MAX-CORE® 24F-V4 | DF/DF (U) | 2,400 | 1,850 | 650 | 650 | 265 | 1.9 | 1.8 | 0.95 | 1,450 | 560 | 230 | 1.7 | 1.6 | 0.85 | 1,100 | 1,650 | 0.50 | 0.50 |
| MAX-CORE® 24F-V8 | DF/DF (B) | 2,400 | 2,400 | 650 | 650 | 265 | 1.9 | 1.8 | 0.95 | 1,550 | 560 | 230 | 1.7 | 1.6 | 0.85 | 1,100 | 1,650 | 0.50 | 0.50 |
| MAX-CORE® 24F-V3 | SP/SP (U) | 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[11] | SP/SP (U) | 2,400 | 1,650 | 740 | 650 | 210 | 1.8 | 1.7 | 0.90 | 1,350 | 470 | 230 | 1.6 | 1.5 | 0.79 | 975 | 1,350 | 0.55 | 0.43 |
| MAX-CORE® 24F-V5 | SP/SP (B) | 2,400 | 2,400 | 740 | 740 | 300 | 1.8 | 1.7 | 0.90 | 1,700 | 650 | 260 | 1.7 | 1.6 | 0.85 | 1,150 | 1,600 | 0.55 | 0.55 |
| MAX-CORE® 24F-V5M1 | SP/SP (B) | 2,400 | 2,400 | 740 | 740 | 300 | 1.9 | 1.8 | 0.95 | 1,700 | 650 | 260 | 1.7 | 1.6 | 0.85 | 1,150 | 1,600 | 0.55 | 0.55 |
| MAX-CORE® 28F-E1 | SP/SP (U) | 2,800 | 2,300 | 805 | 805 | 300 | 2.2[10] | 2.1[10] | 1.11[10] | 1,600 | 650 | 260 | 1.8 | 1.7 | 0.90 | 1,300 | 1,850 | 0.55 | 0.55 |
| MAX-CORE® 28F-E2 | SP/SP (B) | 2,800 | 2,800 | 805 | 805 | 300 | 2.2[10] | 2.1[10] | 1.11[10] | 2,000 | 650 | 260 | 1.8 | 1.7 | 0.90 | 1,300 | 1,850 | 0.55 | 0.55 |
| MAX-CORE® 30F-E1[9] | SP/SP (U) | 3,000 | 2,400 | 805 | 805 | 300 | 2.2[10] | 2.1[10] | 1.11[10] | 1,750 | 650 | 260 | 1.8 | 1.7 | 0.90 | 1,250 | 1,750 | 0.55 | 0.55 |
| MAX-CORE® 30F-E2[9] | SP/SP (B) | 3,000 | 3,000 | 805 | 805 | 300 | 2.2[10] | 2.1[10] | 1.11[10] | 1,750 | 650 | 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 | |

(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, multiply the tabulated values by the wet-use factors shown at the bottom of the table.

(3) DF = Douglas fir-Larch and SP = Southern pine.

(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 $F_{bx}$ 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, $F_{bx}$ shall be multiplied by a volume factor, $C_v = (5.125/b)^{1/10}\,(12/d)^{1/10}\,(21/L)^{1/10}$ for 16F-V3/DF, 16F-V6/DF, 24F-V4/DF, and 24F-V8/DF layup combinations or $C_v = (5.125/b)^{1/20}\,(12/d)^{1/20}\,(21/L)^{1/20}$ for 24F-V3/SP, 24F-V4/SP, 24F-V5/SP, 24F-V5M1/SP, 28F-E1/SP, 28F-E2/SP, 30F-E1/SP, and 30F-E2/SP layup combinations, 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 (2024 NDS 3.4.3.1 or 2018 and 2015 NDS 3.4.3.3), the $F_{vx}$ and $F_{vy}$ values shall be multiplied by a factor of 0.72. The tabulated $F_{vy}$ 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 tabulated E values include true E (also known as "shear-free E"), apparent E, and E for beam stability calculation (NDS 3.3.3.8). For calculating beam deflections, the tabulated $E_{app}$ values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated $E_{true}$. The axial modulus of elasticity, $E_{axial}$ and $E_{axial\ min}$, shall be equal to the tabulated $E_{y\ true}$ and $E_{y\ min}$ values.

(8) The values of $F_{by}$ are based on members 12 inches in depth. For depths less than 12 inches, $F_{by}$ shall be permitted to be increased by multiplying by the flat use 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.

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

(10) For members of more than 15 laminations, $E_{x\ true}$ = 2.1 x $10^6$ psi, $E_{x\ app}$ = 2.0 x $10^6$ psi, and $E_{x\ min}$ = 1.06 x $10^6$ psi.

(11) This combination may contain lumber with wane. If lumber with wane is used, the design value for shear parallel to grain, $F_{vx}$, shall be multiplied by 0.67 if wane is allowed on both sides. If wane is limited to one side, $F_{vx}$ 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)

| Combination Symbol | Species(2) | Grade | All Loading | | | | Axially Loaded | | | Bending about Y-Y Axis | | | | Bending about X-X Axis | | Fasteners |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Modulus of Elasticity(3) | | | Compression Perpendicular to Grain | Tension Parallel to Grain | Compression Parallel to Grain | | Loaded Parallel to Wide Faces of Laminations | | | | Loaded Perpendicular to Wide Faces of Laminations | | Specific Gravity for Dowel-Type Fastener Design |
| | | | | | | | | | | Bending(4) | | | Shear Parallel to Grain(5,6) | Bending(7) | Shear Parallel to Grain(5) | |
| | | | | | | | 2 or More Lams | 4 or More Lams | 2 or 3 Lams | 4 or More Lams | 3 Lams | 2 Lams | | 2 Lams to 15 in. Deep(8) | | |
| | | | $E_{x\ true}$, $E_{y\ true}$ or $E_{axial}$ ($10^6$ psi) | $E_{x\ app}$ or $E_{y\ app}$ ($10^6$ psi) | $E_{x\ min}$, $E_{y\ min}$ or $E_{axial\ min}$ ($10^6$ psi) | $F_{c\perp}$ (psi) | $F_t$ (psi) | $F_c$ (psi) | $F_c$ (psi) | $F_{by}$ (psi) | $F_{by}$ (psi) | $F_{by}$ (psi) | $F_{vy}$ (psi) | $F_{bx}$ (psi) | $F_{vx}$ (psi) | SG |
| MAX-CORE® Combination No. 2 | DF | L2 | 1.7 | 1.6 | 0.85 | 560 | 1,250 | 1,950 | 1,600 | 1,800 | 1,600 | 1,300 | 230 | 1,700 | 265 | 0.50 |
| MAX-CORE® Combination No. 3 | DF | L2D | 2.0 | 1.9 | 1.00 | 650 | 1,450 | 2,300 | 1,900 | 2,100 | 1,850 | 1,550 | 230 | 2,000 | 265 | 0.50 |
| MAX-CORE® Combination No. 5 | DF | L1 | 2.1 | 2.0 | 1.06 | 650 | 1,650 | 2,400 | 2,100 | 2,400 | 2,100 | 1,800 | 230 | 2,200 | 265 | 0.50 |
| MAX-CORE® Combination No. 47 | SP | N2M12 | 1.5 | 1.4 | 0.74 | 650 | 1,200 | 1,900 | 1,150 | 1,750 | 1,550 | 1,300 | 260 | 1,400 | 300 | 0.55 |
| MAX-CORE® Combination No. 50 | SP | N1D14 | 2.0 | 1.9 | 1.00 | 740 | 1,550 | 2,300 | 1,700 | 2,300 | 2,100 | 1,750 | 260 | 2,100(8) | 300 | 0.55 |
| Wet-use factors | | | 0.833 | | | 0.53 | 0.8 | 0.73 | | 0.8 | | | 0.875 | 0.8 | 0.875 | see NDS |

(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 = Southern 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), $E_{axial\ min}$ 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 $F_{by}$ are based on members 12 inches in depth. For depths less than 12 inches, $F_{by}$ shall be permitted to be increased by multiplying by the flat use 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 (2024 NDS 3.4.3.1 or 2018 and 2015 NDS 3.4.3.3), the tabulated $F_{vx}$ and $F_{vy}$ values shall be multiplied by 0.72.

(6) The tabulated $F_{vy}$ values are for members of 4 or more lams. The tabulated $F_{vy}$ values shall be multiplied by a factor of 0.95 for 3 lams and 0.84 for 2 lams. For members with 5, 7, or 9 lams manufactured from multiple-piece lams with unbonded edge joints, the tabulated $F_{vy}$ 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 $F_{vy}$ values shall be multiplied by a factor of 0.5. This adjustment shall be cumulative with the adjustment specified in Footnote 5.

(7) The values of $F_{bx}$ 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, $F_{bx}$ shall be multiplied by a volume factor, $C_v = (5.125/b)^{1/10}\ (12/d)^{1/10}\ (21/L)^{1/10}$ for Combination 2 (L2/DF), Combination 3 (L2D/DF), Combination 5 (L1//DF) layup combinations or $C_v = (5.125/b)^{1/20}\ (12/d)^{1/20}\ (21/L)^{1/20}$ for Combination 47 (N2M12/SP) and Combination 50 (N1D14//SP) layup combinations, 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 $F_{bx}$ values are for members without special tension lams up to 15 inches in depth. When the member depth is greater than 15 inches, the tabulated $F_{bx}$ values shall be multiplied by a factor of 0.88. If special tension lams are used, the tabulated $F_{bx}$ values are permitted to be increased by a factor of 1.18, regardless of the member depth, provided that the increased $F_{bx}$ values do not exceed 2,400 psi. This factor shall be cumulative with the volume factor, $C_v$, specified in Footnote (7).

*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 ANSI National Accreditation Board (ANAB), and an accredited testing organization under ISO/IEC 17025 by ANAB. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, Validation Entity, and Product Evaluation 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

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