20F, 24F, 26F, 28F, and 30F Glulam Beams
Arizona Structural Laminators, LLC

Products: 20F, 24F, 26F, 28F, and 30F Glulam Beams
Arizona Structural Laminators, LLC, 2000 W Central Avenue, P.O. Box 2008, Eagar, AZ 85925 (928) 333-5501

1. Basis of the product report:
   - 2012 IRC: Sections 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
   - Full-scale glulam beam test data and model analysis

2. Product description:
   Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams are used as beams, headers, rafters, or purlins, and are manufactured in accordance with manufacturing specifications approved by APA. The glulam beams are manufactured in accordance with Arizona Structural Laminators’ in-plant manufacturing standard approved by APA. The adhesives used to manufacture the glulam beams are exterior-type adhesives meeting the requirements of ASTM D2559.

3. Design properties:
   Table 1 lists the design properties for Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams. The allowable loads for Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams shall be determined based on the design properties listed in Table 1.

4. Product installation:
   Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams shall be installed in accordance with the recommendations provided by the manufacturer and APA Technical Note: Glulam Connection Details, Form T300 (www.apawood.org/resource-library). 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:
   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, Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F 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 for Wood Construction (NDS).
6. Limitations:
   a) Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams recognized in this report shall be designed in accordance with the code using the design properties specified in this report.
   b) Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams shall have a minimum depth of four laminations with the exception of 20F-E/SP1, which shall have a minimum depth of three laminations.
   c) Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams are produced at Arizona Structural Laminators’ facility in Eagar, Arizona, under a quality assurance program audited by APA.
   d) This report is subject to re-examination in one year.

7. Identification:
   Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F glulam beams described in this report are identified by a label bearing the manufacturer’s name (Arizona Structural Laminators) and/or trademark, the APA assigned plant number (1084), the product standard (ANSI A190.1), the APA logo, the layup combination symbol, the report number PR-L271, and a means of identifying the date of manufacture.
Table 1. Allowable Design Values for Arizona Structural Laminators 20F, 24F, 26F, 28F, and 30F Glulam Beams for Normal Duration of Load (1,2)

| Symbol     | Species          | Outer/ Core/ Unb(3) | Bottom of Beam Stressed in Tension (Positive Bending) | Top of Beam Stressed in Tension (Negative Bending) | Compression Perpendicular to Grain | Shear Parallel to Grain | Modulus of Elasticity(1) | Extreme Fiber in Bending(6) | Comp. Perpendicular to Grain | Shear Parallel to Grain(4) | Modulus of Elasticity(5) | Extreme Fiber in Bending(6) | Comp. Perpendicular to Grain | Shear Parallel to Grain(4) | Modulus of Elasticity(5) | Axially Loaded | Fasteners |
|------------|------------------|---------------------|--------------------------------------------------------|----------------------------------------------------|----------------------------------|-------------------------|------------------------|---------------------------|----------------------------|-----------------------------|--------------------------|---------------------------|----------------------------|---------------------------|-----------------------------|--------------------------|-------------|----------|
| 20F-ES/P1  | SP/PP(4)         | (U)                 | 2000                                                   | 1450                                               | 805                              | 375                     | 210                    | 1.7                       | 1.6                       | 0.84                       | 950                      | 375                      | 190                      | 1.4                       | 1.3                       | 0.69                  | 900          | 1000     |
| 24F-EP2    | SP/PP(B)         |                        | 2400                                                   | 2400                                               | 805                              | 805                     | 210                    | 1.9                       | 1.8                       | 0.95                       | 1400                     | 375                      | 210                      | 1.4                       | 1.3                       | 0.69                  | 1050         | 950      |
| 24F-V4     | DF/DF(U)         |                        | 2400                                                   | 1850                                               | 650                              | 650                     | 265                    | 1.9                       | 1.8                       | 0.95                       | 1450                     | 560                      | 230                      | 1.7                       | 1.6                       | 0.85                  | 1100         | 1650     |
| 24F-V8     | DF/DF(B)         |                        | 2400                                                   | 2400                                               | 650                              | 650                     | 265                    | 1.9                       | 1.8                       | 0.95                       | 1550                     | 560                      | 230                      | 1.7                       | 1.6                       | 0.85                  | 1100         | 1650     |
| 26F-V5     | SP/SP(B)         |                        | 2600                                                   | 2600                                               | 740                              | 740                     | 300                    | 2.0                       | 1.9                       | 1.00                       | 1950                     | 650                      | 260                      | 1.9                       | 1.8                       | 0.95                  | 1300         | 1850     |
| 28F-E2     | SP/SP(B)         |                        | 2800                                                   | 2800                                               | 805                              | 805                     | 300                    | 2.2(10)                   | 2.1(10)                   | 1.09(10)                   | 2000                     | 650                      | 260                      | 1.8                       | 1.7                       | 0.90                  | 1300         | 1850     |
| 30F-E2     | SP/SP(B)         |                        | 3000                                                   | 3000                                               | 805                              | 805                     | 300                    | 2.2(10)                   | 2.1(10)                   | 1.09(10)                   | 1750                     | 650                      | 260                      | 1.8                       | 1.7                       | 0.90                  | 1350         | 1750     |

Wet-use factor

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Axial Loaded</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SG</td>
</tr>
</tbody>
</table>

(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) SP = Southern pine, PP = Ponderosa pine, and DF = Douglas fir-larch.

(4) The balance (B) layup is intended primarily for multiple-span or cantilevered beam applications, but may be used in simple-span applications. The unbalanced (U) layup is intended primarily for simple-span applications, but may be used in multiple-span or cantilevered beam applications.

(5) The values of Fv are based on members 5-1/8 inches in width by 12 inches in depth by 21 feet in length. For a larger beam volume, Fv shall be multiplied by a volume factor, C, = (5.125b)1/3 (12d)1/3 (21L)1/3 for 20F-ES/P1, 24F-ES/P2, 26F-V5/SP, 28F-E2/SP, and 30F-E2/SP layup combinations or C, = (5.125b)1/3 (12d)1/3 (21L)1/3 for 24F-V4/DF and 24F-V8/DF layup combinations, where b is the beam width (in.), d is the beam depth (in.), and L is the beam length (ft). The beam depths are limited to 4 or more laminations except for 20F-ES/P1, which shall have 3 or more laminations. 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 Fv = 0.5v and Fv = 0.5v shall be multiplied by a factor of 0.72. The tabulated Fv 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.

(6) 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 values shall be used unless the shear deflection is determined in addition to bending deflection based on the tabulated E.

(7) The values of Fv are based on members 12 inches in depth. For depths less than 12 inches, Fv 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) The wet-use factor is for horizontal members, load distribution is uniform, and maximum span is 12 feet. The wet-use factor shall be increased by multiplying by the wet-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.

(9) The bottom face is a Southern pine laminations and shall be permitted to be designed with a specific gravity of 0.55. For 28F-E2/SP and 30F-E2/SP members with more than 15 laminations, E, app = 2.1 x 10^6 psi, E, app = 2.0 x 10^6 psi, and E, app = 1.06 x 10^6 psi.
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.