



BOISE GLULAM® Beam Product Guide

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Glued laminated timbers from Boise Cascade Engineered Wood Products add functional beauty to any residential or commercial project.

Just ask for BOISE GLULAM[®] beams.

No discussion of engineered wood products is complete without mention of glued laminated timber. Glulams are sometimes forgotten in what has become an increasingly crowded field of newer products.

Laminated timbers are often the most cost-effective and easy-toinstall alternative for beam applications to residential, commercial and light industrial construction. It is usually easy to determine whether to specify a balanced or unbalanced layup and whether to choose Industrial or Architectural appearance grade beams.

The benefit to BOISE GLULAM[®] beams is that they can be manufactured either with or without camber. Most stock beams are available with either a small amount of camber (5000' radius) or no camber, depending on market demands.

BOISE GLULAM[®] beams are manufactured primarily from Douglas Fir-Larch and other softwood species and carry the APA trademark.

STOCK BEAMS

For most residential applications, stock beams are the product of choice. BOISE GLULAM[®] stock beams are available through our trusted distributors, located strategically throughout the country. Our beams are manufactured in widths of $3\frac{1}{8}$ ", $3\frac{1}{2}$ ", $5\frac{1}{8}$ ", $5\frac{1}{2}$ ", $6\frac{3}{4}$ ", and $8\frac{3}{4}$ ", with depths ranging from 6" to 24" and lengths up to 66 feet, with or without camber. Stock beams are available in Architectural appearance grade except $3\frac{1}{2}$ " and $5\frac{1}{2}$ " which are Framing header grade only. Architectural Appearance is intended for exposed applications but can also be used for concealed beams, headers, columns, and rafters. Check with your local distributor for availability.



CUSTOM BEAMS

Custom beams are used when large cross-sections, longer lengths, curved and arched shapes, different appearances, or specific certifications are required.

Custom widths: 3¹/₈", 3¹/₂", 5¹/₈", 5¹/₂", 6³/₄", 8³/₄", 10³/₄", 12¹/₄", 14¹/₄" Depths ranging from 6" to 57¹/₂" (depending upon the width)

BOISE GLULAM[®] custom beams are manufactured on a made-toorder basis. Please call to determine availability of BOISE GLULAM[®] custom beams. See pages 45-47 in our Western Commercial Guide for additional information.

IJC (I-JOIST COMPATIBLE) BEAMS

IJC (I-Joist Compatible) sizes are readily available. Consult your local distributor for availability. IJC sizes have proven to be cost-effective product options to other structural members such as LVL.

BOISE GLULAM® MANUFACTURING STANDARDS

APA Mill Number: 1107

APA EWS Trademarked Glulam Under These Standards: – ANSI A190.1-2012 – CSA O122-06 and CSA O177-06

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BOISE GLULAM® Stock Beam and Column Sizes



Architectural and Industrial Appearance Beams

Header (Framing) Beams

6"

to

24"

3½"

5½"

6"

to

24"

Columns

31/8" to 83/4"

ARCHITECTURAL APPEARANCE BEAMS

These beams are the beams of choice in applications where members are exposed to view, because they have a smooth, attractive finish. Stock beams are often supplied with this appearance so they may be exposed to view in the finished structure. Voids greater than ³/₄" are filled, three sides (excluding the top) are planed or sanded, and edges are eased on the bottom face of the member.

INDUSTRIAL APPEARANCE BEAMS

These beams are used in concealed applications or in other places where appearance is not of primary importance, such as such as commercial buildings, warehouses, and garages. Voids are not filled, and only the two wide surfaces are planed.

HEADER BEAMS – FRAMING GRADE

BOISE GLULAM[®] headers are commonly used for concealed applications such as doors and windows where appearance is not of importance. They come in two common widths, $3\frac{1}{2}$ " and $5\frac{1}{2}$ ". Check with your local distributor for availability.

COLUMNS

Glulam columns are straight and dimensionally true, making framing an easy task. Because columns are available in long lengths, the members do not have to be spliced together, as is often necessary with sawn lumber. The columns can be exposed to view as a unique architectural feature of the framing system.

BOISE GLULAM[®] columns have all four edges eased to match the widths of the Architectural glulams beams and have the same architectural appearance. All sides may be exposed to view.

BALANCED AND UNBALANCED BEAM LAYUPS

The most critical areas of a glulam beam are the outside laminations. Thus, the strongest laminations are placed in these areas in either unbalanced or balanced layups.

In unbalanced beams, typically known as V4s, the bottom lamination is stronger than all the other laminations. This allows for a more efficient use of timber resources. It is very important to install unbalanced BOISE GLULAM[®] beams with the top side up. *(The word "top" is always printed on the corresponding side.)* V4 glulams may be designed and installed in both single and multiple-span applications, and in relatively short cantilevers.

Balanced glulam beams, or V8s, have the same high-strength laminations on both the top and bottom of the beam, creating a symmetric layup. A V8 glulam can be designed for multiple-span conditions and cantilevers. V8s can also be used for single spans, but V4s are most cost-effective for this type of application. V8 BOISE GLULAM[®] beams may be special ordered at an additional cost; check with your local distributor for availability.

APPARENT & TRUE MODULUS OF ELASTICITY

A beam's deflection is dependent upon the modulus of elasticity (MOE) and the beam's cross-section. There are two components of deflection, deformation from bending and deformation from shear. An "apparent" MOE is typically published for wood structural products. The apparent MOE encompasses both deflection components. However a "true" MOE value is sometimes referenced, which only corresponds to the bending portion of deflection and thus is "shear-free". A true MOE is approximately 5% higher than the apparent MOE (the difference does vary slightly depending upon span length and beam depth). For example, the true MOE of a 24F-V4/DF glulam is approximately 1,900,000 psi but the apparent and published MOE is 1,800,000 psi. The designer must add the shear deflection component to bending deflection when using the higher true MOE.

LAYUP COMBINATIONS

Balanced Vs Unbalanced Layup Example



6"

to

9"

DEFLECTION AND CAMBER

For relatively long span lengths, deflection may control the design of glulam beams. Building codes limit deflection for floor and roof members with "L/over" limits. The "L" is simply the span length in inches. It can be divided by a number — *for example, 360 for live load on floors* — to determine the maximum amount of deflection a member can have for the corresponding span under full design loads. Thus, a greater amount of deflection is allowed for members with longer spans.

Camber is the amount of curvature (reverse deflection) that is built into a glulam beam during the manufacturing process to offset a portion of the

design load deflection. Beams may be manufactured with a 5000' radius camber on a special order basis. The industry has moved to a 5000-foot radius camber which has become the standard camber. Camber is specified mostly to reduce the aesthetic effect of long-span members. Camber can also be specified to reduce the amount of deflection or create roof drainage — for example, it may be used to limit water collection on near-flat roofs.

The table to the below illustrates the camber at the center of the beam when specific lengths and radii are specified.

	CAMBER CURVATURE IN INCHES																
Ream								Ra	adius In F	eet							
Length	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3500	5000
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1⁄8	1⁄8	1⁄8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1⁄4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	0	0	0	0	0	0	0	0	0	0	0
10	³ /8	1⁄4	1⁄4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	0	0	0	0	0	0
12	1⁄2	³ /8	1⁄4	1⁄4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	0	0
14	3⁄4	1⁄2	3⁄8	1/4	1⁄4	1/4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	0
16	1	5⁄8	1⁄2	3⁄8	3⁄8	1⁄4	1⁄4	1⁄4	1⁄4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	0
18	11⁄4	3⁄4	5⁄8	1⁄2	3⁄8	3⁄8	1⁄4	1⁄4	1⁄4	1⁄4	1⁄4	1⁄8	1⁄8	1⁄8	1⁄8	1⁄8	1⁄/8
20	1½	1	3⁄4	5⁄8	1⁄2	3⁄8	3⁄8	1⁄8	1⁄4	1⁄4	1⁄4	1⁄4	1⁄4	1⁄4	1⁄4	1⁄8	1⁄8
22	1%	11⁄4	7⁄8	3⁄4	5⁄8	1⁄2	1⁄2	3⁄8	3⁄8	3⁄8	1⁄4	1/4	1⁄4	1/4	1⁄4	1/4	1⁄8
24	21⁄8	1½	11⁄/8	7∕8	3⁄4	5⁄8	1⁄2	1⁄2	3⁄8	3⁄8	3⁄8	3⁄8	1⁄4	1⁄4	1⁄4	1⁄4	1⁄8
26	2½	1¾	11⁄4	1	7⁄8	3⁄4	5⁄8	5⁄8	1⁄2	1⁄2	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	1⁄4	1⁄4
28	3	2	1½	11⁄/8	1	7⁄8	3⁄4	5⁄8	5⁄8	1⁄2	1⁄2	1⁄2	3⁄8	3⁄8	3⁄8	3⁄8	1⁄4
30	33⁄8	2 ¹ / ₄	1¾	13⁄/8	11⁄/8	1	7⁄8	3⁄4	5⁄/8	⁵ ⁄8	⁵ ⁄8	1⁄2	1∕2	1∕2	3⁄8	3⁄8	1⁄4
32	31⁄8	2½	1%	1½	1¼	11⁄8	1	7⁄8	3⁄4	3⁄4	5⁄8	5⁄8	1⁄2	1⁄2	1⁄2	1⁄2	1⁄4
34	4 3⁄/8	21⁄8	2½	1¾	1½	11⁄4	11⁄/8	1	7⁄8	3⁄4	3⁄4	5⁄8	5⁄8	5⁄8	1⁄2	1⁄2	3⁄8
36	41⁄8	3¼	2 3⁄/8	2	1%	13⁄/8	1¼	11⁄/8	1	7⁄8	3⁄4	3⁄4	3⁄4	5⁄8	5⁄8	1⁄2	3⁄8
38	5¾	35⁄8	2 ¾	2½	1¾	1½	13⁄/8	11⁄4	11⁄/8	1	7⁄8	7⁄8	3⁄4	3⁄4	5⁄8	5⁄8	3⁄8
40	6	4	3	23/8	2	1¾	1½	13⁄/8	1¼	11⁄8	1	7⁄8	7⁄8	3⁄4	3⁄4	5⁄8	1∕2
42	65⁄8	43⁄8	3¼	25⁄8	2 ¹ / ₄	1%	15⁄8	1½	13⁄/8	11⁄4	11⁄8	1	1	7∕8	7⁄8	3⁄4	1∕2
44	7¼	41⁄8	35⁄8	21⁄8	2 ³ / ₈	2½	1%	1%	1½	13⁄8	1¼	11⁄8	1	1	7⁄8	7∕8	1∕2
46	71⁄8	5¼	4	31⁄/8	25⁄8	2¼	2	1¾	15⁄/8	1½	13⁄8	11⁄4	11⁄/8	1	1	7∕8	5⁄8
48	8%	5 ¾	4 3⁄/8	3½	21⁄8	2½	2½	1%	1¾	1%	1½	13⁄/8	11⁄4	11⁄/8	11⁄8	1	5⁄8
50	<u>9¾</u>	6¼	4¾	3¾	31⁄/8	25⁄8	2 3⁄/8	2½	11%	1¾	15⁄/8	1½	13⁄8	1¼	11⁄/8	11⁄/8	3⁄4
52	101⁄/8	6 ¾	5½	4	33⁄8	21⁄8	2½	2¼	2	1%	1¾	1½	1½	13//8	11⁄4	11⁄8	3⁄4
54	10%	7 ¼	5½	4 ³ / ₈	35⁄8	31⁄/8	2 ¾	2 ³ / ₈	2½	2	1%	11%	1½	1½	13⁄/8	11⁄4	7⁄8
56	11¾	71⁄8	5%	4¾	31⁄8	33⁄8	3	25%	23⁄8	2 1⁄/s	2	1¾	1%	1%	1½	13⁄/8	7⁄8
58	125⁄8	8 3⁄/8	6¼	5	4 ¹ ⁄ ₄	35⁄8	31⁄8	2 ¾	2½	21⁄4	2½	2	1¾	1%	15⁄/8	1½	1
60	13½	9	6¾	5¾	4½	31%8	33⁄8	3	2 ¾	2½	2 ¼	21⁄/8	11⁄8	1¾	1¾	1½	1
62	14%	95⁄8	7¼	5 ¾	4¾	41⁄8	35⁄8	3¼	21⁄8	25⁄8	2 ³ ⁄8	2¼	2	11⁄8	1¾	1%	11⁄/8
64	153/8	10¼	7%	6½	51⁄/8	4 3⁄/8	31⁄8	3¾	31⁄/8	2¾	2½	23/8	2 ¹ ⁄ ₄	2	11%	1¾	11⁄4
66	163/8	10%	8½	6½	5½	45⁄8	4	35⁄8	3¼	3	2 ¾	2½	2 ³ / ₈	2½	2	11%	11⁄4
68	17%	11½	8%	67/8	5 ¾	5	43⁄8	31⁄8	3½	31⁄8	21⁄8	25⁄8	2½	2¼	21⁄8	2	1%
70	183/8	12 ¹ ⁄ ₄	91⁄4	73⁄/8	6½	5¼	45⁄8	41⁄8	35⁄8	33⁄8	31⁄8	21⁄8	25/8	2½	2 ¹ / ₄	21⁄8	1½
72	19½	13	9 ¾	7¾	6½	5½	41⁄8	4 ³ /8	37⁄8	3½	3¼	3	2 ¾	2%	2 ³ / ₈	2¼	1%
74	20 ½	13¾	101⁄4	8¼	6%	57/8	5½	45⁄8	4½	3¾	33/8	31⁄/8	21⁄8	2¾	25/8	2 ³ / ₈	15⁄8
76	21%	14½	10%	8%	7¼	6¼	5¾	41⁄8	4	4	31%	3¾	31⁄8	21⁄8	2 ¾	2½	1¾

ANSI A190.1-2012 4.2.2 Tolerance for Camber or Straightness – The tolerances are applicable at the time of manufacture without allowances for dead load deflection. Up to 20 ft., the tolerance is plus or minus ½ in. Over 20 ft., increase tolerance ½ in. per each additional 20 ft. or fraction thereof, but not to exceed ½ in.

The tolerances are intended for use with straight or slightly cambered members and are not applicable to curved members such as arches.

ADHESIVES

BOISE GLULAM[®] beams are manufactured with exterior-grade or wet-use adhesives that comply with all recognized national glulam standards. The purpose of exterior-grade adhesives is to ensure that the design values of the beams are not compromised when the beams are directly exposed to the weather during construction. Though wet-use adhesives are required when glulam beams exceed a moisture content of 16% for extended periods of time after installation, the beams still must be protected from exterior exposure. (For applications where moisture content may exceed 19%, see Preservative Treatment.) (ANSI A190.1-2012 Standard for Wood Products -Structural Glued Laminated Timber) See page 6 of

this guide – "Exposed Applications for Glulam"

HANDLING & STORAGE

Water-resistant wrapping is often specified to protect beams from moisture, soiling, and surface scratches during transit and job-site storage. Because exposure to sunlight can discolor beams, opaque wrappings are recommended. Beams can be wrapped individually or by the bundle. In applications where appearance is especially important, individual wrapping should be left intact until installation to minimize exposure to job-site conditions.

Beams are commonly loaded and unloaded with forklifts. For greater stability, the sides of the beams, rather than the bottoms, should rest on the forks. Supporting extremely long beams on their sides, however, can cause them to flex excessively, increasing the risk of damage. Use multiple forklifts to lift long beam members.

A level, well-drained, covered storage site is recommended. *Keep beams off the ground, using lumber blocking, skids, or a rack system. Keep beams level.* The wrapping on beams should be left in place to protect them from moisture, soiling, sunlight, and scratches. For long-term storage, cut slits in the bottom of the wrapping to allow ventilation and draining of any entrapped moisture. Proper ventilation and drainage will reduce the likelihood of water damage, staining, and the start of decay.

CHECKING

Checking occurs naturally in timber when wood fibers dry. As the outer fibers lose moisture and attempt to shrink, they are restrained by the fiber in the inner portion of the beam, which loses moisture at a much slower rate. Rapid drying increases the difference in moisture content between the inner and outer fibers and thus the chances for checking in the timber member. To minimize the potential for checking, BOISE GLULAM[®] is produced from special grades of lumber specifically dried to less than 16% moisture content.

Example of Checking



End

Side

See Tech Note BG-1 at http://www.bc.com/wood/ewp/ guides-resources/Technical-Notes/BOISE-GLULAM-Technical-Notes.html. Contact Boise Cascade EWP Engineering for any further technical guidance.

FIELD NOTCHING & DRILLING

Glulam beams are generally designed for applications where they will be highly stressed under design loads. For this reason, field modifications such as notching, tapering, or drilling may only be made only after approval has been given by the project's design professional of record and/or Boise Cascade Engineered Wood Products representative. For the proper location of smaller holes, please refer to page 9. Analysis of notches and tapered end cuts on BOISE GLULAM[®] beams may be performed by a qualified user of BC CALC[®], Boise Cascade EWP's engineered wood sizing software.

DIMENSIONAL TOLERANCES

The tolerances permitted at the time of manufacture per ANSI Standard A190.1-2012 are as follows:

- **Width** Plus or minus 1/16" of the specified width.
- **Depth** Plus $\frac{1}{8}$ " per foot of depth. Minus $\frac{3}{16}$ ", or $\frac{1}{16}$ " per foot of depth, whichever is larger.
- Length Up to 20 feet Plus or minus ¹/₁₆" Over 20 feet – Plus or minus ¹/₁₆" per 20 feet of length.

Note that the above tolerances do not apply to rough sawn textured beams.

Camber or Straightness – Tolerances are intended for use with straight or slightly cambered beams. The tolerances permitted at the time of manufacture, without allowance for dead load deflection, are as follows:

Up to 20 feet - Plus or minus 1/4".

Over 20 feet – Add $\frac{1}{8}$ " per each additional 20 feet or fraction thereof, but not to exceed plus or minus $\frac{3}{4}$ ".

Squareness – The tolerance of the cross section shall be within plus or minus ¹/₈" per foot of specified depth, unless a specially shaped beam is selected.

EXPOSED APPLICATIONS FOR GLULAM

BOISE GLULAM[®] beams are intended for applications where mold, decay, and/or insect attack are not concerns. For conditions where glulams are permanently exposed to the weather, have direct ground or concrete contact, or are exposed to significant moisture from condensation or other sources, preservative treatment is required as specified by applicable building codes. For information on different treatments for specific applications, please consult a wood treater or treating association. Please note that when glulams are treated, design values may be affected.

All field cuts – including notches, end cuts, and holes – should be performed before the glulam beam is treated. All fasteners used with treated glulam beams must be resistant to corrosion from moisture. Consumer Information Sheets that detail proper use and handling of products with the specified treatments should be obtained from the treater for proper use and handling of products with the specified treatments. In addition, Material Safety Data Sheets (MSDS) and OSHA-required hazard labels provided with each preservative should be reviewed. Please note that when glulams are treated and installed in exterior applications, design values shall be adjusted per building code provisions. Durable species glulams such as Port Orford Cedar are readily available and provide alternative product for exposed applications. This may be a good option for your top appearance applications. See **Durable Species Flyer** for additional information on options Consult your local distributor for availability.

FIRE RESISTANCE

BOISE GLULAM[®] beams, like many other wood products, have advantageous fire-endurance properties. Unlike steel that loses a large percentage of its strength when exposed to typical temperatures during a fire, wood beams char on the surface. Charring forms a self-insulating surface layer when wood is exposed to flame or relatively high temperatures. The wood below this layer retains its structural properties during a fire. Most solid wood members, including BOISE GLULAM® beams, char at a rate of approximately 11/2 inches per hour. BOISE GLULAM® may be special ordered to create a beam with a one-hour fire rating. In this beam specification, an additional high grade tension lamination replaces a core lamination in the manufacturing process. The project's design professional of record shall specify this type of fire-resistance requirement.

Larger glulam beams may be utilized in heavy timber construction, and a fire-resistance classification where exposed beams are designed to maintain a specified strength level for a specified duration during a fire. For further information on heavy timber construction, please refer to *Heavy Timber Construction - Wood Construction Data #5,* American Wood Council.

The adhesives used in BOISE GLULAM[®] beams do not reduce the fire-endurance properties of the wood material. When compared to wood, the adhesives have a higher ignition temperature and char in a very similar manner. When burned, the adhesives do not increase smoke toxicity. See Boise Cascade *Fire Design* & *Installation Guide* for further design and detailing information. For further information on fire-resistance design, please contact Boise Cascade EWP Engineering.



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Width (in)	Depth (in)	Weight (plf)	Allowable Shear (lbs)	Allowable Moment (ft-lbs)	Moment of Inertia (in⁴)
	6	4.6	3313	3750	56.3
	7½	5.7	4141	5859	109.9
	9	6.8	4969	8438	189.8
	10½	8.0	5797	11484	301.5
31⁄8	12	9.1	6625	15000	450.0
	13½	10.3	7453	18984	640.7
	15	11.4	8281	23438	878.9
	16½	12.5	9109	28359	1169.8
	18	13.7	9938	33750	1518.8
	41⁄2	3.8	2783	2363	26.6
	6	5.1	3710	4200	63.0
	71⁄2	6.4	4638	6563	123.0
21/	9	7.7	5565	9450	212.6
3/2	10½	8.9	6493	12863	337.6
	12	10.2	7420	16800	504.0
	13½	11.5	8348	21263	717.6
	15	12.8	9275	26250	984.4
	6	7.5	5433	6150	92.3
	71⁄2	9.3	6791	9609	180.2
	9	11.2	8149	13838	311.3
	10½	13.1	9507	18834	494.4
	12	14.9	10865	24600	738.0
	13½	16.8	12223	30770	1050.8
51⁄8	15	18.7	13581	37589	1441.4
	16½	20.6	14939	45052	1918.5
	18	22.4	16298	53151	2490.8
	19½	24.3	17656	61881	3166.8
	21	26.2	19014	71237	3955.2
	221/2	28.0	20372	81215	4864.7
	24	29.9	21730	91810	5904.0

BOISE GLULAM® 24F-V4 Design Values

Width (in)	Depth (in)	Weight (plf)	Allowable Shear (lbs)	Allowable Moment (ft-lbs)	Moment of Inertia (in⁴)
	9	12.0	8745	14850	334.1
	10½	14.0	10203	20213	530.6
51⁄2	12	16.0	11660	26214	792.0
	13½	18.0	13118	32789	1127.7
	15	20.1	14575	40056	1546.9
	7½	12.3	8944	12656	237.3
	9	14.8	10733	18225	410.1
	10½	17.2	12521	24457	651.2
	12	19.7	14310	31520	972.0
	13½	22.1	16099	39425	1384.0
63/	15	24.6	17888	48163	1898.4
074	16½	27.1	19676	57724	2526.8
	18	29.5	21465	68102	3280.5
	19½	32.0	23254	79288	4170.9
	21	34.5	25043	91276	5209.3
	221/2	36.9	26831	104061	6407.2
	24	39.4	28620	117636	7776.0
	9	19.1	13913	23048	531.6
	10½	22.3	16231	30891	844.1
	12	25.5	18550	39812	1260.0
	13½	28.7	20869	49798	1794.0
	15	31.9	23188	60834	2460.9
8¾	16½	35.1	25506	72911	3275.5
	18	38.3	27825	86018	4252.5
	19½	41.5	30144	100147	5406.7
	21	44.7	32463	115290	6752.8
	221/2	47.9	34781	131438	8305.7
	24	51.0	37100	148585	10080.0

Notes:

1) Allowable moment calculated using glulam volume factor (C_v) with a span length of 21 ft. Allowable moment shall be multiplied by (21/Span Length [ft])^{1/10} for longer spans.

BOISE GLULAM® 24F-V4 Allowable Design Stresses

Ben	ding	Horizontal	Modulus	Tension	Compression	Compression	
F _b [psi]		of Elasticity	Parallel to	Parallel to	Perpendicular	
Tension Zone	Compression	Shear	(Apparent)	Grain	Grain	to Grain	
in Tension	Zone in Tension	F _v [psi]	E [psi]	F _t [psi]	F _c [psi]	F _c [psi]	
2400	1850	265	1,800,000*	1100	1650	650	

Notes:

The data is for stock beams. For information on sizes not listed, please use BC CALC[®] software or consult with Boise Cascade EWP Engineering. Designer of record shall review the glulam's application and consider the conditions of use. Contact Boise Cascade EWP Engineering for non-standard application design stresses and reduction factors for wet-use and stability conditions.

*See note on Apparent vs True MOE on page 3 for clarification

BOISE GLULAM® COLUMNS

Allowable Axial Load — Combination 3 Column Grade

		3 ¹ / ₈ "		e Colu	umn		5178" Wide Column Allowable Axial Load (lb)									
Column Length	3 ¹ / ₈ " x 6"			3	¹ / ₈ " x 7 ¹ / ₂	" 2	5	¹ / ₈ " x 5 ¹ / ₈	" 3		5 ¹ / ₈ " x 6"		5	¹ / ₈ " x 7 ¹ / ₂	" 2	
[ft]	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	
4	20,200	22,160	23,340	25,260	27,710	29,180	31,380	35,530	38,170							
5	16,940	18,150	18,850	21,180	22,690	23,570	29,520	33,080	35,340	35,890	40,450	43,330				
6	13,890	14,650	15,090	17,370	18,320	18,860	27,360	30,300	32,110	33,760	37,640	39,950				
7	11,400	11,920	12,210	14,260	14,890	15,270	24,990	27,300	28,690	31,060	33,850	35,520	34,870	37,470	38,990	
8	9,460	9,820	10,030	11,830	12,280	12,530	22,530	24,270	25,290	27,870	29,960	31,180	30,990	32,950	34,080	
9	7,940	8,210	8,360	9,930	10,260	10,450	20,110	21,440	22,210	24,780	26,340	27,250	27,470	28,960	29,830	
10	6,750	6,950	7,060	8,440	8,690	8,830	17,900	18,920	19,520	21,970	23,160	23,850	24,380	25,550	26,220	
11	5,800	5,950	6,040	7,250	7,440	7,550	15,940	16,760	17,230	19,490	20,430	20,970	21,700	22,640	23,190	
12	5,030	5,150	5,220	6,290	6,440	6,530	14,240	14,900	15,280	17,350	18,110	18,530	19,400	20,160	20,600	
13	4,400	4,500	4,550	5,500	5,620	5,698	12,770	13,310	13,610	15,520	16,120	16,480	17,420	18,050	18,410	
14							11,500	11,940	12,200	13,930	14,440	14,720	15,720	16,240	16,540	
15							10,400	10,770	10,980	12,570	12,980	13,220	14,240	14,670	14,930	
16							9,440	9,750	9,930	11,380	11,740	11,930	12,950	13,320	13,530	
17							8,600	8,860	9,010	10,350	10,650	10,820	11,820	12,140	12,320	
18							7,860	8,090	8,220	9,450	9,710	9,850	10,830	11,110	11,270	
19							7,220	7,410	7,520	8,660	8,880	9,010	9,960	10,200	10,340	
20							6,640	6,810	6,910	7,960	8,160	8,260	9,190	9,390	9,510	
21							6,130	6,280	6,370	7,340	7,510	7,610	8,580	8,780	8,900	
22																
23																
04																

Column		6 ³ /4"		e Col	umn I (lb)		8³/₄" \ Allowa	Nide Co able Axial Lo	olumn	Notes:
Length		6 ³ / ₄ " x 6'	ı	6 ³ / ₄ " x 7 ¹ / ₂ "				8³/₄" x 9"		1) Table assumes that the column is braced at
[ft]	100%	115%	125%	100%	115%	125%	100%	115%	125%	column ends only. Effective column length is equal to actual column length
4										
5										2) Allowable loads are based on one-piece
6										column members used in dry service
7										conditions.
8										3) Allowable loads are based on an eccentricity
9	35,920	38,870	40,620							value equal to 0 167 multiplied by the column
10	32,700	35,020	36,390							thickness or width (worst case)
11	29,620	31,470	32,540							
12	26,820	28,310	29,180	39,870	42,340	43,790				4) Allowable loads are based on axial loading
13	24,310	25,530	26,240	36,390	38,420	39,600				columns using the design provisions of the
14	22,080	23,100	23,680	33,240	34,920	35,900				National Design Specification for Wood
15	20,100	20,960	21,460	30,410	31,830	32,640				Construction (NDS), 2001 edition. For side
16	18,360	19,090	19,500	27,870	29,070	29,760				or other combined bending and axial loads,
17	16,820	17,440	17,800	25,620	26,650	27,230				use BC COLUMN software to analyze such
18	15,460	15,990	16,300	23,600	24,480	24,990				conditions
19	14,250	14,710	14,970	21,800	22,570	23,000				
20	13,170	13,570	13,800	20,180	20,850	21,240				5) See below for allowable design stresses.
21	12,200	12,550	12,750	18,730	19,320	19,650				6) Load values are not shown for short lengths
22	11,330	11,640	11,820	17,430	17,940	18,240	39,360	41,030	41,950	due to loads exceeding common connector
23	10,550	10,820	10,980	16,250	16,710	16,970	36,940	38,400	39,250	capacities Load values are not shown for
24	9,840	10,090	10,230	15,180	15,590	15,820	34,710	36,020	36,760	longer lengths if the controlling slenderness
25							32,660	33,830	34,510	ratio ovcoode 50 (por NDS)
26							30,780	31,840	32,440	Tallo exceeds 50 (per NDS).
27							29,060	30,010	30,560	 It may be possible to exceed the limitations of
28							27,460	28,330	28,830	the table by analyzing a specific application
29							26,000	26,780	27,240	with the BC COLUMN software.
30							24,630	25,360	25,780	

BOISE GLULAM[®] Column Allowable Design Stresses Combination 3 Column Grade

	Bending	F _b [psi]	Modulus of El	asticity E [psi]		
	Load Perpendicular	Load Parallel	Load Perpendicular	Load Parallel		
Compression Parallel to Grain F _c [psi]					Compression Perpendicular to Grain (limiting direction F _c [psi]	Tension Parallel to Grain F _t [psi]
2300	2000	2100	1,900,000	1,900,000	650	1450

Equivalent specific gravity for fastener design: SG = 0.5.

Horizontal Holes

Allowable Holes in Glulam Beams





Notes:

- 1) Square and rectangular holes are not permitted.
- 2) Round holes may be drilled or cut with a hole saw anywhere within the shaded area of the beam.
- The horizontal distance between adjacent holes shall 3) be at least two times the diameter of the larger hole.
- 4) Do not drill more than three access holes in any 4-foot long section of beam.
- 5) The maximum round hole diameter permitted is:

Beam Depth	6" & 7 ½"	9" & greater	
Maximum Hole Diameter	1"	2"	

- 6) These limitations apply to holes drilled for plumbing or wiring access only. The size and location of holes drilled for fasteners are governed by the provisions of the National Design Specification® for Wood Construction.
- 7) Beams deflect under load. Size holes to provide clearance where required.
- This hole chart is valid for BOISE GLULAM® beams 8) supporting uniform load only. For beams supporting concentrated loads or for beams with larger holes, contact Boise Cascade EWP Engineering.
- 9) For vertical holes, see page 28 of the BOISE GLULAM® Specifier Guide for provisions with ridge beams or contact Boise Cascade EWP Engineering.



Common Details



BOISE GLULAM[®] — Douglas Fir-Larch Solid Sawn Substitution Table

Floor Beam Applications (100%) Duration for BOISE GLULAM®

24F-V4 BOISE GLULAM® Equivalent Member

	4x6 Doug Fir-Larch		4x8 Doug Fir-Larch		4x Doug Fi	10 ir-Larch	4x Doug F	12 ir-Larch	6) Doug F	(8 ir-Larch	6X Doug Fi	10 ir-Larch	6x Doug F	12 ir-Larch
Span [ft]	Select Structural	No. 1	Select Structural	No. 1	Select Structural	No. 1	Select Structural	No. 1	Select Structural	No. 1	Select Structural	No. 1	Select Structural	No. 1
10	3.125 x 6	3.125 х 6	3.125 x 7.5	3.125 x 7.5	3.125 x 9	3.125 x 9	3.125 x 9	3.125 x 9	3.125 x 9	3.125 x 9	3.125 x 10.5	3.125 x 10.5	3.125 x 10.5	3.125 x 10.5
10									5.125 x 7.5	5.125 x 7.5	5.125 x 9	5.125 x 9	5.125 x 9	5.125 x 9
10	3.125 x 6	3.125 х 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 9	3.125 x 10.5	3.125 x 10.5	3.125 x 9	3.125 x 9	3.125 x 10.5	3.125 x 10.5	3.125 x 12	3.125 x 12
12									5.125 x 7.5	5.125 x 7.5	5.125 x 9	5.125 x 9	5.125 x 10.5	5.125 x 10.5
14	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 9	3.125 x 12	3.125 x 10.5	3.125 x 9	3.125 x 9	3.125 x 12	3.125 x 10.5	3.125 x 13.5	3.125 x 12
14									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 9	5.125 x 10.5	5.125 x 10.5
1/	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 9	3.125 x 12	3.125 x 10.5	3.125 x 9	3.125 x 9	3.125 x 12	3.125 x 12	3.125 x 13.5	3.125 x 13.5
10									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 10.5	5.125 x 12	5.125 x 12
10	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 10.5	3.125 x 12	3.125 x 10.5	3.125 x 9	3.125 x 9	3.125 x 12	3.125 x 12	3.125 x 13.5	3.125 x 13.5
18									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 10.5	5.125 x 12	5.125 x 12
20	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 10.5	3.125 x 12	3.125 x 12	3.125 x 9	3.125 x 9	3.125 x 12	3.125 x 12	3.125 x 13.5	3.125 x 13.5
20									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 10.5	5.125 x 12	5.125 x 12
22	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 10.5	3.125 x 12	3.125 x 12	3.125 x 9	3.125 x 9	3.125 x 12	3.125 x 12	3.125 x 13.5	3.125 x 13.5
22									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 10.5	5.125 x 12	5.125 x 12
24	3.125 x 6	3.125 x 6	3.125 x 9	3.125 x 7.5	3.125 x 10.5	3.125 x 10.5	3.125 x 12	3.125 x 12	3.125 x 9	3.125 x 9	3.125 x 10.5	3.125 x 10.5	3.125 x 13.5	3.125 x 13.5
24									5.125 x 7.5	5.125 x 7.5	5.125 x 10.5	5.125 x 10.5	5.125 x 12	5.125 x 12

NOTES

- Table intended for preliminary design only. Substitutions should always be approved by the project's design professional of record.
- Table assumes that original solid sawn beam was sized properly, loading should always be verified.
- Table was developed by comparing allowable uniform load capacities due to the worst case control of bending, shear and deflection limits for simple span applications.
- Deflection limited to L/360 for live load, based upon a live load/total load ratio of 0.8 (residential floor loading 40/10 psf).

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