Boise Cascade
Engineered Wood Pro

CITY OF PORTLAND, MAINE
RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 10/06/17

1½" VERSA-LAM® 2.0 3100

for beams and headers

VL 1.5 3100 091812

VERSA-LAM® Products

An Introduction to VERSA-LAM® Products

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When you specify VERSA-LAM® laminated veneer headers/beams, you are building quality into your design. They are excellent as floor and roof framing supports or as headers for doors, windows and garage doors and columns.

Because they have no camber, VERSA-LAM® LVL products provide flatter, quieter floors, and consequently, the builder can expect happier customers with significantly fewer call backs.

VERSA-LAM®
2.0 3100

1½" VERSA-LAM® 2.0 3100 Design Values

Design Property		
Grade		2.0 3100
Modulus of Elasticity	E(x 10^6 psi)(1)	2.0
Bending	F_b (psi)(2)(3)	3100
Horizontal Shear	F_v (psi)(2)(4)	285
Tension Parallel to Grain	F_t (psi)(2)(5)	2150
Compression Parallel to Grain	$F_{c\parallel}$ (psi)(2)	3000
Compression Perpendicular to Grain	$F_{c\perp}$ (psi)(1)(6)	750
Equivalent Specific Gravity for Fastener Design	(SG)	0.5

1. This value cannot be adjusted for load duration.
2. This value is based upon a load duration of 100% and may be adjusted for other load durations.
3. Fiber stress bending value shall be multiplied by the depth factor, $(12/d)^{1/9}$ where d = member depth [in].
4. Stress applied perpendicular to the gluelines.
5. Tension value shall be multiplied by a length factor, $(4/L)^{1/8}$ where L = member length [ft]. Use L = 4 for members less than four feet long.
6. Stress applied parallel to the gluelines.

* Design properties are limited to dry conditions of use where the maximum moisture content of the material will not exceed 16%.

Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in^4]
1½	3½	1.4	998	907	5.4
	5½	2.2	1568	2131	20.8
	7¼	2.9	2066	3590	47.6
	9¼	3.8	2636	5688	98.9
	9½	3.9	2708	5982	107.2
	11¼	4.6	3206	8233	178.0
	11⅞	4.8	3384	9118	209.3
	14	5.7	3990	12443	343.0
	16	6.5	4560	16013	512.0
	18	7.3	5130	20003	729.0
	20	8.1	5700	24408	1000.0
	24	9.8	6840	34443	1728.0

VERSA-LAM® Beam Details

Bearing at concrete/masonry walls

Bearing for door or window header

Beam to beam connector

Bearing at column

Slope seat cut

Bevel cut

Beam to concrete/masonry walls

Bearing framing into wall

VERSA-LAM® Installation Notes

- Minimum of ½" air space between beam and wall pocket or adequate barrier must be provided between beam and concrete/masonry.
- Adequate bearing shall be provided. If not shown on plans, please refer to load tables in your region's Specifier Guide.
- VERSA-LAM® beams are intended for interior applications only and should be kept as dry as possible during construction.
- Continuous lateral support of top of beam shall be provided (side or top bearing framing).

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Allowable Holes in VERSA-LAM® 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.
3. The horizontal distance between adjacent holes must be at least two times the size of the larger hole.
4. Do not drill more than three access holes in any four foot long section of beam.
5. The maximum round hole diameter permitted is:

Beam Depth	Max. Hole Diameter
5½"	¾"
7¼"	1"
9¼" and greater	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.
8. This hole chart is valid for beams supporting uniform load only. For beams supporting concentrated loads or for beams with larger holes, contact Boise Cascade EWP Engineering.

Multiple Member Connectors

Side-Loaded Applications

Number of Members	Maximum Uniform Side Load [plf]							
	Nailed		½" Dia. Through Bolt(1)			⅝" Dia. Through Bolt(1)		
	2 rows 16d Sinkers @ 12" o.c.	3 rows 16d Sinkers @ 12" o.c.	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered
1½" VERSA-LAM® (Depths of 18" and less)								
2	470	705	435	870	1735	480	965	1930
3(2)	350	525	325	650	1300	360	725	1450
4(3)	use bolt schedule		290	580	1155	320	640	1285
1½" VERSA-LAM® (Depths of 24")								
	Nailed		½" Dia. Through Bolt(1)			⅝" Dia. Through Bolt(1)		
	3 rows 16d Sinkers @ 12" o.c.	4 rows 16d Sinkers @ 12" o.c.	3 rows @ 24" o.c. 8" staggered	3 rows @ 18" o.c. 6" staggered	3 rows @ 12" o.c. 4" staggered	3 rows @ 24" o.c. 8" staggered	3 rows @ 18" o.c. 6" staggered	3 rows @ 12" o.c. 4" staggered
2	705	940	650	870	1300	725	965	1450
3	525	705	485	650	975	540	725	1085
4(3)	use bolt schedule		430	575	865	480	640	965

1. Design values apply to common bolts that conform to ANSI/ASME standard B18.21-1981 (ASTM A307 Grades A&B, SAE J429 Grades 1 or 2, or higher). A washer not less than a standard cut washer shall be between the wood and the bolt head and between the wood and the nut. The distance from the edge of the beam to the bolt holes must be at least 2" for ½" bolts and 2½" for ⅝" bolts. Bolt holes shall be the same diameter as the bolt.
2. The nail schedules shown apply to both sides of a three member beam.
3. 6" wide beams must be top-loaded or loaded from both sides.

Top-Loaded Applications

For top-loaded beams and beams with side loads with less than those shown:

Plies	Depth	Nailing	Maximum Uniform Load From One Side
(2) 1½" plies	Depth 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	410 plf
	Depth 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	615 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	825 plf
(3) 1½" plies (2)	Depth 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	305 plf
	Depth 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	460 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	615 plf
(4) 1½" plies	Depth 18" & less	2 rows ½" bolts @ 24" o.c., staggered	290 plf
	Depth = 24"	3 rows ½" bolts @ 24" o.c., staggered every 8"	435 plf

1. Beams wider than 6" must be designed by the engineer of record.
2. All values in these tables may be increased by 15% for snow-load roofs and by 25% for non-snow load roofs where the building code allows.
3. Use allowable load tables or BC CALC® software to size beams.
4. An equivalent specific gravity of 0.5 may be used when designing specific connections with VERSA-LAM®.
5. Connection values are based upon the 2012 NDS.
6. ***FastenMaster TrussLok, Simpson Strong-Tie SDW, and USP WS screws may also be used to connect multiple member VERSA-LAM® beams, contact Boise Cascade EWP Engineering for further information.***

Designing Connections for Multiple VERSA-LAM® Members

When using multiple ply VERSA-LAM® beams to create a wider member, the connection of the plies is as critical as determining the beam size. When side loaded beams are not connected properly, the inside plies do not support their share of the load and thus the load-carrying capacity of the full member decreases significantly. The following is an example of how to size and connect a multiple-ply VERSA-LAM® floor beam.

Given: Beam shown below is supporting residential floor load (40 psf live load, 10 psf dead load) and is spanning 16'-0". Beam depth is limited to 14".

Find: A multiple 1½" ply VERSA-LAM® that is adequate to support the design loads and the member's proper connection schedule.

1. Calculate the tributary width that beam is supporting:
   14' / 2 + 18' / 2 = 16'.
2. Use BC CALC® to size beam.
   A Triple VERSA-LAM® 2.0 3100 1½" x 14" is found to adequately support the design loads.
3. Calculate the maximum plf load from one side (the right side in this case).
   Max. Side Load = (18' / 2) x (40 + 10 psf) = 450 plf
4. Go to the Side-Loaded Applictions Table, 3 members
5. The proper connection schedule must have a capacity greater than the max. side load:
   Nailed: 3 rows 16d sinkers @ 12" o.c. (both sides):
   525 plf is greater than 450 plf OK
   Bolts: ½" diameter 2 rows @ 12" staggered:
   650 plf is greater than 450 plf OK

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If in doubt, ask!
For the closest
Boise Cascade EWP
distributor/support center,
call
1-800-232-0788

Lifetime Guaranteed Quality and Performance

Boise Cascade warrants its BCI® Joist, VERSA-LAM®, and ALLJOIST® products to comply with our specifications, to be free from defects in material and workmanship, and to meet or exceed our performance specifications for the normal and expected life of the structure when correctly stored, installed and used according to our Installation Guide.

Closest Allowable Nail Spacing

1½" VERSA-LAM® 2.0 3100				
	Nailing Parallel to Glue Lines (Narrow Face)		Nailing Perpendicular to Glue Lines (Wide Face)	
Nail Size	O.C. [inches]	End [inches]	O.C. [inches]	End [inches]
8d Box	3	1½	2	½
8d Common	3	2	2	1
10d & 12d Box	3	2	2	1
16d Box	3	2	2	1
10d & 12d Common	4	3	2	2
16d Sinker	4	3	2	2
16d Common	6	4	2	2

Simpson Strong-Tie A35 and LPT4 connectors may be attached to the side VERSA-LAM®. Use nails as specified by Simpson Strong-Tie.

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