



Boise Cascade[®]
ENGINEERED WOOD PRODUCTS

EASTERN UNITED STATES



VERSA-LAM[®] LVL DESIGN GUIDE

Eastern US | For Products Manufactured in Alexandria, Louisiana and Thorsby, Alabama

FLOORS | ROOFS | WALLS

www.BC.com/ewp



Design Property	Versa-Lam® LVL Beams	Versa-Lam® LVL Columns	1½" Versa-Stud® LVL
Grade	2.1E 3100	1.8E 2650	1.8E 2650
Modulus of Elasticity True (Shear-Free) E ($\times 10^6$ psi) ^{(1) (7)}	2.1	1.8	1.8
Modulus of Elasticity Apparent E ($\times 10^6$ psi) ⁽¹⁾	2.0	1.7	1.7
Modulus of Elasticity for Stability E_{min} ($\times 10^6$ psi) ^{(1) (8)}	1.1	0.9	0.9
Bending F_b (psi) ^{(2) (3)}	3100	2650	2650
Horizontal Shear F_v (psi) ^{(2) (4)}	285	285	285
Tension Parallel to Grain F_t (psi) ^{(2) (5)}	2150	1650	1650
Compression Parallel to Grain F_{cl} (psi) ⁽²⁾	3000	3000	3000
Compression Perpendicular to Grain F_c (psi) ^{(2) (6)}	750	750	750
Equivalent Specific Gravity for Fastener Design (SG)	0.5	0.5	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.
 7. True or shear-free modulus of elasticity does not account for shear deformation.
 8. E_{min} is the reference modulus of elasticity for beam and column stability calculations. It is calculated using $E_{apparent}$ in accordance with Appendix D of the 2018 NDS. When calculating E_{min} , the coefficient of modulus of elasticity, COV_E , may be taken as 0.10, and the adjustment factor to convert E to a pure bending basis may be taken as 1.05.
- * Design properties are limited to dry conditions of use where the maximum moisture content of the material will not exceed 16%.

VERSA-LAM® LVL DESIGN VALUES

Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in ⁴]	Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in ⁴]
Versa-Stud® 1.8E 2650	1½	3½	1.5	998	776	5.4	Versa-Lam® 2.1E 3100	5¼	5¼	8.0	5,237	6,830	63.3
		5½	2.4	1,568	1,821	20.8			5½	8.4	5,486	7,457	72.8
		7¼	3.2	2,066	3,069	47.6			7¼	11.0	7,232	12,566	166.7
Versa-Lam® 2.1E 3100	1¾	3½	1.8	1,164	1,058	6.3			9¼	14.1	9,227	19,908	346.3
		5½	2.8	1,829	2,486	24.3			9½	14.5	9,476	20,937	375.1
		7¼	3.7	2,411	4,189	55.6			11¼	17.1	11,222	28,814	622.9
		9¼	4.7	3,076	6,636	115.4			11⅞	18.1	11,845	31,913	732.6
		9½	4.8	3,159	6,979	125.0			14	21.3	13,965	43,552	1200.5
		11¼	5.7	3,741	9,605	207.6			16	24.4	15,960	56,046	1792.0
		11⅞	6.0	3,948	10,638	244.2			18	27.4	17,955	70,011	2551.5
		14	7.1	4,655	14,517	400.2			20	30.4	19,950	85,428	3500.0
		16	8.1	5,320	18,682	597.3			24	36.5	23,940	120,549	6048.0
		18	9.1	5,985	23,337	850.5		7	9¼	16.6	12,303	26,544	461.7
		24	12.2	7,980	40,183	2016.0			9½	17.1	12,635	27,916	500.1
Versa-Lam® 2.1E 3100	3¾	5½	5.6	3,658	4,971	48.5			11¼	20.2	14,963	38,419	830.6
		7¼	7.4	4,821	8,377	111.1			11⅞	21.4	15,794	42,550	976.8
		9¼	9.4	6,151	13,272	230.8			14	25.2	18,620	58,069	1600.7
		9½	9.6	6,318	13,958	250.1			16	28.8	21,280	74,728	2389.3
		11¼	11.4	7,481	19,210	415.3			18	32.4	23,940	93,348	3402.0
		11⅞	12.1	7,897	21,275	488.4			20	36.0	26,600	113,904	4666.7
		14	14.2	9,310	29,035	800.3		24	43.2	31,920	160,732	8064.0	
		16	16.2	10,640	37,364	1194.7							
		18	18.3	11,970	46,674	1701.0							
		20	20.3	13,300	56,952	2333.3							

VERSA-LAM® 1.8E 2650 COLUMN TABLES

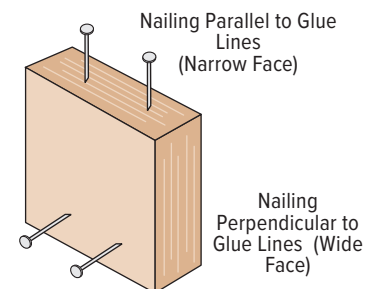
Column Length [ft]	Allowable Axial Load (lb)														
	3½" x 3½"			3½" x 4¾"			3½" x 5¼"			3½" x 5½"			3½" x 7"		
	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%
4	14,700	16,090	16,930	18,390	20,130	21,180	22,070	24,165	25,430	23,130	25,320	26,640	29,450	32,240	33,920
5	12,270	13,150	13,660	15,350	16,440	17,090	18,425	19,740	20,515	19,300	20,680	21,490	24,580	26,330	27,365
6	10,080	10,650	10,980	12,610	13,320	13,740	15,140	15,995	16,495	15,860	16,750	17,280	20,195	21,335	22,000
7	8,310	8,705	8,930	10,400	10,890	11,170	12,480	13,075	13,415	13,080	13,700	14,050	16,650	17,435	17,890
8	6,930	7,205	7,370	8,660	9,010	9,210	10,405	10,825	11,070	10,900	11,340	11,600	13,880	14,440	14,760
9	5,840	6,050	6,160	7,300	7,560	7,710	8,770	9,080	9,260	9,190	9,510	9,700	11,700	12,115	12,350
10	4,980	5,135	5,225	6,230	6,420	6,540	7,480	7,715	7,850	7,830	8,080	8,220	9,975	10,290	10,470
11	4,290	4,410	4,480	5,360	5,520	5,600	6,445	6,625	6,730	6,750	6,940	7,050	8,595	8,835	8,975
12	3,730	3,825	3,880	4,660	4,780	4,850	5,600	5,745	5,830	5,870	6,020	6,100	7,475	7,665	7,775
13	3,270	3,350	3,390	4,090	4,190	4,240	4,915	5,030	5,095	5,150	5,270	5,340	6,555	6,710	6,795
14	2,890	2,950	2,990	3,610	3,690	3,740	4,340	4,435	4,490	4,550	4,650	4,700	5,790	5,915	5,990
Column Length [ft]	3½" x 7¼"			5¼" x 5¼"			5¼" x 5½"			5¼" x 7"			5¼" x 7¼"		
	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%
	4	30,500	33,390	35,130											
5	25,460	27,270	28,340												
6	20,910	22,090	22,780	33,070	36,220	38,110	34,670	37,950	39,930						
7	17,250	18,060	18,530	29,420	31,730	33,085	30,830	33,240	34,660						
8	14,370	14,960	15,290	25,875	27,570	28,565	27,110	28,880	29,930	34,525	36,790	38,115	35,760	38,090	39,480
9	12,120	12,540	12,790	22,690	23,970	24,715	23,770	25,110	25,900	30,275	31,985	32,980	31,360	33,130	34,160
10	10,330	10,660	10,840	19,930	20,920	21,495	20,880	21,920	22,520	26,600	27,920	28,685	27,550	28,920	29,710
11	8,900	9,150	9,300	17,585	18,375	18,820	18,420	19,250	19,720	23,465	24,510	25,125	24,310	25,400	26,010
12	7,740	7,940	8,050	15,590	16,220	16,585	16,340	16,990	17,380	20,805	21,650	22,130	21,550	22,420	22,930
13	6,790	6,950	7,040	13,895	14,410	14,700	14,560	15,100	15,400	18,545	19,225	19,620	19,210	19,920	20,320
14	6,000	6,130	6,200	12,450	12,870	13,115	13,040	13,480	13,740	16,615	17,180	17,500	17,210	17,790	18,130
15				11,210	11,560	11,760	11,740	12,110	12,320	14,960	15,425	15,695	15,490	15,980	16,260
16				10,135	10,430	10,600	10,620	10,930	11,110	13,525	13,920	14,150	14,010	14,420	14,650
17				9,205	9,455	9,600	9,650	9,910	10,060	12,285	12,620	12,810	12,730	13,070	13,270
18				8,395	8,610	8,735	8,800	9,020	9,150	11,205	11,495	11,655	11,610	11,900	12,070
19				7,685	7,870	7,975	8,050	8,250	8,360	10,260	10,505	10,645	10,620	10,880	11,030
20				7,060	7,220	7,310	7,400	7,560	7,660	9,420	9,635	9,760	9,760	9,980	10,110
21				6,505	6,645	6,725	6,820	6,960	7,050	8,680	8,870	8,980	8,990	9,190	9,300
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- Table assumes that the column is braced at column ends only. Effective column length is equal to actual column length.
- Allowable loads are based upon one-piece (solid) column members used in dry service conditions. BC Calc® sizing software (www.BCCalc.com) may be used for multi-piece column design.
- Allowable loads are based on an eccentricity value equal to 0.167 multiplied by either the column thickness or width (worst case).
- Allowable loads are based on axially loaded columns using the design provisions of the 2018 National Design Specification (NDS) for Wood Construction. Table capacity values based upon a buckling length coefficient, K_{ce} , equal to 1.0

- (rotation free, translation fixed at each column end per NDS Appendix G). A K_{ce} coefficient of 1.0 conservatively models typical wood column applications. For other end fixity conditions, contact Boise Cascade EWP Engineering. For side or other combined bending and axial loads, see provisions in 2018 NDS.
- Load values are not shown for short lengths due to loads exceeding common connector capacities. Load values are not shown for longer lengths if the controlling slenderness ratio exceeds 50 (per NDS).
- Lateral loads (wind loading) are not considered in this table. BC Calc® sizing software (www.BCCalc.com) may be used for out of plane lateral load column application design.

CLOSEST ALLOWABLE NAIL SPACING

Versa-Lam® Products Nail Size	Nailing Parallel to Glue Lines (Narrow Face) ⁽¹⁾						Nailing Perpendicular to Glue Lines (Wide Face)	
	Versa-Lam® 1½"		Versa-Lam® 1¾"		Versa-Lam® 3½" & Wider		All Products	
	O.C. [in]	End [in]	O.C. [in]	End [in]	O.C. [in]	End [in]	O.C. [in]	End [in]
8d Box (0.113"ø x 2.5")	3	1½	2	1	2	½	2	½
8d Common (0.131"ø x 2.5")	3	2	3	2	2	1	2	1
10d & 12d Box (0.128"ø x 3", 3.25")	3	2	3	2	2	1	2	1
16d Box (0.135"ø x 3.5")	3	2	3	2	2	1	2	1
10d & 12d Common & 16d Sinker (0.148"ø x 3", 3.25")	4	3	4	3	2	2	2	2
16d Common (0.162"ø x 3.5")	6	4	6	3	2	2	2	2



- For 1¾" thickness and greater, 2 rows of nails (such as for a metal strap) are allowed (use ½" minimum offset between rows and stagger nails).

KEY TO TABLE: **Top Figure** - Allowable Total Load [plf]
Middle Figure - Allowable Live Load [plf]
Bottom Figure - Minimum Required Bearing Length at End / Intermediate Supports [inches]

SPAN (ft)	1¾" Versa-Lam® 2.1E 3100				Double Ply 1¾" Versa-Lam® 2.1E 3100 or 3½" Versa-Lam® 2.1E 3100					Triple Ply 1¾" Versa-Lam® 2.1E 3100 or 5¼" Versa-Lam® 2.1E 3100					Quadruple Ply 1¾" Versa-Lam® 2.1E 3100 or 7" Versa-Lam® 2.1E 3100							
	7¼"	9½"	11⅞"	14"	7¼"	9½"	11⅞"	14"	16"	18"	9½"	11⅞"	14"	16"	18"	20"	11⅞"	14"	16"	18"	20"	24"
6	763	1063	1424	1795	1525	2126	2849	3590	4387	4794	3189	4273	5384	6580	7191	7188	5697	7179	8773	9588	9584	9576
	693	-	-	-	1385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.8/4.4	2.4/6.1	3.3/8.2	4.1/10.3	1.8/4.4	2.4/6.1	3.3/8.2	4.1/10.3	5/12.6	5.5/13.8	2.4/6.1	3.3/8.2	4.1/10.3	5/12.6	5.5/13.8	5.5/13.8	3.3/8.2	4.1/10.3	5/12.6	5.5/13.8	5.5/13.8	5.5/13.8
7	636	877	1160	1444	1271	1753	2321	2888	3482	4107	2630	3481	4331	5223	6160	6157	4641	5775	6964	8213	8209	8201
	452	-	-	-	905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.7/4.3	2.4/5.9	3.1/7.8	3.9/9.7	1.7/4.3	2.4/5.9	3.1/7.8	3.9/9.7	4.7/11.7	5.5/13.8	2.4/5.9	3.1/7.8	3.9/9.7	4.7/11.7	5.5/13.8	5.5/13.8	3.1/7.8	3.9/9.7	4.7/11.7	5.5/13.8	5.5/13.8	5.5/13.8
8	462	746	979	1207	924	1492	1957	2414	2886	3402	2237	2936	3622	4328	5103	5384	3914	4829	5771	6803	7178	7170
	310	660	-	-	621	1321	-	-	-	-	1981	-	-	-	-	-	-	-	-	-	-	-
	1.5/3.5	2.3/5.7	3/7.5	3.7/9.3	1.5/3.5	2.3/5.7	3/7.5	3.7/9.3	4.4/11.1	5.2/13	2.3/5.7	3/7.5	3.7/9.3	4.4/11.1	5.2/13	5.5/13.8	3/7.5	3.7/9.3	4.4/11.1	5.2/13	5.5/13.8	5.5/13.8
9	329	649	846	1037	658	1297	1692	2074	2463	2884	1946	2537	3111	3694	4325	4782	3383	4148	4926	5767	6376	6368
	222	477	-	-	444	954	-	-	-	-	1431	-	-	-	-	-	-	-	-	-	-	-
	1.5/3	2.2/5.6	2.9/7.3	3.6/8.9	1.5/3	2.2/5.6	2.9/7.3	3.6/8.9	4.3/10.6	5/12.4	2.2/5.6	2.9/7.3	3.6/8.9	4.3/10.6	5/12.4	5.5/13.8	2.9/7.3	3.6/8.9	4.3/10.6	5/12.4	5.5/13.8	5.5/13.8
10	242	527	745	909	484	1055	1489	1817	2148	2502	1582	2234	2726	3222	3753	4301	2978	3635	4296	5003	5734	5726
	164	355	660	-	327	710	1321	-	-	-	1065	1981	-	-	-	-	2642	-	-	-	-	-
	1.5/3	2/5.1	2.9/7.1	3.5/8.7	1.5/3	2/5.1	2.9/7.1	3.5/8.7	4.1/10.3	4.8/12	2/5.1	2.9/7.1	3.5/8.7	4.1/10.3	4.8/12	5.5/13.8	2.9/7.1	3.5/8.7	4.1/10.3	4.8/12	5.5/13.8	5.5/13.8
11	183	401	665	808	365	803	1330	1617	1904	2209	1204	1995	2425	2856	3313	3800	2659	3233	3807	4417	5067	5201
	124	271	508	798	248	541	1015	1595	-	-	812	1523	2393	-	-	-	2031	3190	-	-	-	-
	1.5/3	1.7/4.3	2.8/7.7	3.4/8.5	1.5/3	1.7/4.3	2.8/7.7	3.4/8.5	4/10.1	4.7/11.7	1.7/4.3	2.8/7.7	3.4/8.5	4/10.1	4.7/11.7	5.4/13.4	2.8/7.7	3.4/8.5	4/10.1	4.7/11.7	5.4/13.4	5.5/13.8
12	141	312	585	728	282	623	1170	1456	1709	1977	935	1755	2184	2564	2965	3390	2340	2912	3418	3953	4519	4764
	96	211	398	629	193	422	796	1258	-	-	633	1194	1887	-	-	-	1592	2517	-	-	-	-
	1.5/3	1.5/3.6	2.7/6.8	3.4/8.4	1.5/3	1.5/3.6	2.7/6.8	3.4/8.4	3.9/9.9	4.6/11.4	1.5/3.6	2.7/6.8	3.4/8.4	3.9/9.9	4.6/11.4	5.2/13	2.7/6.8	3.4/8.4	3.9/9.9	4.6/11.4	5.2/13	5.5/13.8
13	111	246	470	662	221	493	941	1324	1550	1789	739	1411	1986	2326	2683	3059	1881	2647	3101	3577	4078	4394
	76	168	318	504	152	335	635	1009	1456	-	503	953	1513	2185	-	-	1270	2017	2913	-	-	-
	1.5/3	1.5/3.1	2.4/5.9	3.3/8.3	1.5/3	1.5/3.1	2.4/5.9	3.3/8.3	3.9/9.7	4.5/11.2	1.5/3.1	2.4/5.9	3.3/8.3	3.9/9.7	4.5/11.2	5.1/12.7	2.4/5.9	3.3/8.3	3.9/9.7	4.5/11.2	5.1/12.7	5.5/13.8
14	88	198	380	585	176	396	759	1171	1418	1633	594	1139	1756	2128	2449	2786	1519	2342	2837	3265	3715	4076
	61	135	257	410	123	270	514	820	1189	-	405	771	1230	1783	-	-	1029	1640	2378	-	-	-
	1.5/3	1.5/3	2.1/5.1	3.2/7.9	1.5/3	1.5/3	2.1/5.1	3.2/7.9	3.8/9.6	4.4/11	1.5/3	2.1/5.1	3.2/7.9	3.8/9.6	4.4/11	5/12.5	2.1/5.1	3.2/7.9	3.8/9.6	4.4/11	5/12.5	5.5/13.8
15	71	161	310	499	143	322	621	998	1307	1502	483	931	1497	1960	2253	2558	1242	1997	2614	3003	3410	3801
	50	111	211	338	100	221	422	675	982	1359	332	633	1013	1473	2039	-	844	1350	1964	2718	-	-
	1.5/3	1.5/3	1.8/4.5	2.9/7.2	1.5/3	1.5/3	1.8/4.5	2.9/7.2	3.8/9.5	4.3/10.9	1.5/3	1.8/4.5	2.9/7.2	3.8/9.5	4.3/10.9	4.9/12.3	1.8/4.5	2.9/7.2	3.8/9.5	4.3/10.9	4.9/12.3	5.5/13.8
16	58	132	257	414	117	265	514	829	1151	1390	397	770	1243	1727	2085	2364	1027	1658	2303	2780	3151	3561
	41	92	175	281	83	183	350	562	820	1138	275	526	843	1230	1707	2279	701	1124	1640	2277	3038	-
	1.5/3	1.5/3	1.6/4	2.6/6.4	1.5/3	1.5/3	1.6/4	2.6/6.4	3.6/8.9	4.3/10.7	1.5/3	1.6/4	2.6/6.4	3.6/8.9	4.3/10.7	4.9/12.2	1.6/4	2.6/6.4	3.6/8.9	4.3/10.7	4.9/12.2	5.5/13.8
17	110	214	347	96	220	429	695	1018	1274	330	643	1042	1527	1911	2196	858	1389	2036	2547	2929	3348	
	77	147	236	69	153	294	473	691	962	230	441	709	1037	1443	1931	588	945	1382	1924	2575	-	
	1.5/3	1.5/3.6	2.3/5.7	1.5/3	1.5/3	1.5/3.6	2.3/5.7	3.3/8.4	4.2/10.5	1.5/3	1.5/3.6	2.3/5.7	3.3/8.4	4.2/10.5	4.8/12	1.5/3.6	2.3/5.7	3.3/8.4	4.2/10.5	4.8/12	5.5/13.8	
18	92	181	294	80	185	361	587	865	1134	277	542	881	1298	1701	2051	723	1175	1731	2268	2735	3160	
	65	124	201	58	130	249	401	588	820	194	373	602	882	1230	1650	498	802	1176	1640	2200	-	
	1.5/3	1.5/3.2	2.1/5.2	1.5/3	1.5/3	1.5/3.2	2.1/5.2	3/7.6	4/9.9	1.5/3	1.5/3.2	2.1/5.2	3/7.6	4/9.9	4.8/11.9	1.5/3.2	2.1/5.2	3/7.6	4/9.9	4.8/11.9	5.5/13.8	
19	78	153	250	67	156	307	500	739	1016	234	460	751	1109	1524	1863	614	1001	1479	2032	2484	2991	
	55	106	172	50	110	213	343	504	704	166	319	515	756	1056	1420	425	686	1008	1408	1893	-	
	1.5/3	1.5/3	1.9/4.7	1.5/3	1.5/3	1.5/3	1.9/4.7	2.7/6.8	3.7/9.4	1.5/3	1.5/3	1.9/4.7	2.7/6.8	3.7/9.4	4.6/11.4	1.5/3	1.9/4.7	2.7/6.8	3.7/9.4	4.6/11.4	5.5/13.8	
20	66	131	215	57	133	263	429	636	895	199	394	644	954	1343	1678	525	859	1272	1790	2237	2839	
	47	92	148	43	95	183	296	435	609	142	275	444	652	913	1230	366	592	870	1218	1640	2718	
	1.5/3	1.5/3	1.7/4.2	1.5/3	1.5/3	1.5/3	1.7/4.2	2.5/6.2	3.5/8.7	1.5/3	1.5/3	1.7/4.2	2.5/6.2	3.5/8.7	4.3/10.8	1.5/3	1.7/4.2	2.5/6.2	3.5/8.7	4.3/10.8	5.5/13.8	
22	98	161	-	-	98	196	322	479	678	147	293	483	719	1016	1379	391	644	959	1355	1839	2576	
	69	112	-	-	72	138	224	330	464	107	208	336	496	696	940	277	448	661	928	1253	2091	
	1.5/3	1.5/3.5	-	-	1.5/3	1.5/3	1.5/3.5	2.1/5.2	2.9/7.3	1.5/3	1.5/3	1.5/3.5	2.1/5.2	2.9/7.3	3.9/9.8	1.5/3	1.5/3.5	2.1/5.2	2.9/7.3	3.9/9.8	5.5/13.8	
24	74	123	-	-	73	149	246	369	523	110	223	370	553	785	1070	297	493	738	1047	1426	2184	
	54	87	-	-	55	107	174	257	361	83	161	261	385	542	733	214	348	513	722	978	1640	
	1.5/3	1.5/3	-	-	1.5/3	1.5/3	1.5/3	1.8/4.4	2.5/6.2	1.5/3	1.5/3	1.5/3	1.8/4.4	2.5/6.2	3.4/8.4	1.5/3	1.5/3	1.8/4.4	2.5/6.2	3.4/8.4	5.1/12.8	
26	57	96	-	-	56	115	192	289	411	84	172	288	433	617	844	230	384	577	823	1125	1853	
	42	69	-	-	44	85	137	203	286	65	127	206	305	430	583	169	275	407	573	777	1308	
	1.5/3	1.5/3	-	-	1.5/3	1.5/3	1.5/3	1.5/3.8	2.1/5.3	1.5/3	1.5/3	1.5/3	1.5/3.8	2.1/5.3	2.9/7.2	1.5/3	1.5/3	1.5/3.8	2.1/5.3	2.9/7.2	4.7/11.8	
28	76	-	-	-	90	151	229	328	64	135	227	344	492	675	180	303	458	656	900	1541		
	55	-	-	-	68	110	164	231	53	102	166	245	346	470	136	221	327	462	627	1060		
	1.5/3	-	-	-	1.5/3	1.5/3	1.5/3															

US EAST ROOF SNOW LOAD TABLES

VERSA-LAM® 2.1E 3100
(115% Load Duration)

KEY TO TABLE:
Top Figure - Allowable Total Load [plf]
Middle Figure - Allowable Live Load [plf]
Bottom Figure - Minimum Required Bearing Length at End / Intermediate Supports [inches]

SPAN (ft)	1 3/4" Versa-Lam® 2.1E 3100				Double Ply 1 3/4" Versa-Lam® 2.1E 3100 or 3 1/2" Versa-Lam® 2.1E 3100					Triple Ply 1 3/4" Versa-Lam® 2.1E 3100 or 5 1/4" Versa-Lam® 2.1E 3100						Quadruple Ply 1 3/4" Versa-Lam® 2.1E 3100 or 7" Versa-Lam® 2.1E 3100						
	7 1/4"	9 1/2"	11 7/8"	14"	7 1/4"	9 1/2"	11 7/8"	14"	16"	18"	9 1/2"	11 7/8"	14"	16"	18"	20"	11 7/8"	14"	16"	18"	20"	24"
6	878	1223	1639	2065	1755	2446	3278	4130	4796	4794	3669	4917	6195	7194	7191	7188	6556	8260	9592	9588	9584	9576
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	2/5	2.8/7	3.8/9.4	4.7/11.8	2/5	2.8/7	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	2.8/7	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	5.5/13.8	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	5.5/13.8	5.5/13.8
	731	1009	1335	1661	1463	2018	2670	3323	4007	4107	3027	4006	4984	6010	6160	6157	5341	6646	8013	8213	8209	8201
8	678	-	-	-	1357	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/4.9	2.7/6.8	3.6/8.9	4.4/11.1	2/4.9	2.7/6.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	2.7/6.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	5.5/13.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	5.5/13.8	5.5/13.8
9	598	858	1126	1389	1197	1717	2252	2779	3321	3591	2575	3379	4168	4981	5387	5384	4505	5558	6642	7182	7178	7170
	466	-	-	-	931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	1.8/4.6	2.6/6.6	3.5/8.6	4.3/10.6	1.8/4.6	2.6/6.6	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	2.6/6.6	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	5.5/13.8	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	5.5/13.8	5.5/13.8
	440	747	974	1194	880	1493	1947	2387	2835	3190	2240	2921	3581	4252	4785	4782	3894	4774	5670	6380	6376	6368
11	333	715	-	-	665	1431	-	-	-	-	2146	-	-	-	-	-	-	-	-	-	-	-
	1.5/3.8	2.6/6.4	3.4/8.4	4.1/10.3	1.5/3.8	2.6/6.4	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	2.6/6.4	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	5.5/13.8	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	5.5/13.8	5.5/13.8
12	324	637	857	1046	648	1274	1714	2092	2472	2869	1912	2571	3138	3709	4304	4301	3429	4184	4945	5738	5734	5726
	246	532	-	-	491	1065	-	-	-	-	1597	-	-	-	-	-	-	-	-	-	-	-
13	1.5/3.1	2.4/6.1	3.3/8.2	4/10	1.5/3.1	2.4/6.1	3.3/8.2	4/10	4.7/11.9	5.5/13.8	2.4/6.1	3.3/8.2	4/10	4.7/11.9	5.5/13.8	5.5/13.8	3.3/8.2	4/10	4.7/11.9	5.5/13.8	5.5/13.8	5.5/13.8
	245	526	765	931	489	1052	1531	1861	2192	2543	1577	2296	2792	3288	3814	3907	3062	3723	4383	5085	5209	5201
14	186	406	762	-	372	812	1523	-	-	-	1218	2285	-	-	-	-	3046	-	-	-	-	-
	1.5/3	2.2/5.6	3.2/8.1	3.9/9.8	1.5/3	2.2/5.6	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	2.2/5.6	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	5.5/13.8	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	5.5/13.8	5.5/13.8
15	189	417	674	838	378	834	1347	1676	1968	2276	1252	2021	2514	2952	3414	3579	2694	3353	3936	4552	4772	4764
	144	317	597	-	289	633	1194	-	-	-	950	1791	-	-	-	-	2389	-	-	-	-	-
16	1.5/3	1.9/4.8	3.1/7.8	3.9/9.7	1.5/3	1.9/4.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	1.9/4.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	5.5/13.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	5.5/13.8	5.5/13.8
	149	330	573	762	297	660	1146	1524	1785	2060	991	1719	2287	2678	3089	3301	2292	3049	3571	4119	4402	4394
17	114	251	476	756	229	503	953	1513	-	-	754	1429	2269	-	-	-	1905	3026	-	-	-	-
	1.5/3	1.7/4.1	2.9/7.2	3.8/9.5	1.5/3	1.7/4.1	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	1.7/4.1	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	5.5/13.8	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	5.5/13.8	5.5/13.8
18	119	265	493	674	238	531	987	1349	1634	1880	796	1480	2023	2450	2821	3063	1973	2697	3267	3761	4084	4076
	92	203	386	615	184	405	771	1230	-	-	608	1157	1845	-	-	-	1543	2460	-	-	-	-
19	1.5/3	1.5/3.6	2.7/6.7	3.6/9.1	1.5/3	1.5/3.6	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	1.5/3.6	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	5.5/13.8	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	5.5/13.8	5.5/13.8
	96	216	416	586	193	432	832	1173	1505	1730	649	1248	1759	2258	2595	2857	1664	2346	3011	3459	3809	3801
20	75	166	317	506	150	332	633	1013	1473	-	497	950	1519	2210	-	-	1266	2025	2946	-	-	-
	1.5/3	1.5/3.2	2.4/6	3.4/8.5	1.5/3	1.5/3.2	2.4/6	3.4/8.5	4.3/10.9	5/12.5	1.5/3.2	2.4/6	3.4/8.5	4.3/10.9	5/12.5	5.5/13.8	2.4/6	3.4/8.5	4.3/10.9	5/12.5	5.5/13.8	5.5/13.8
21	79	178	344	515	158	356	689	1029	1327	1601	535	1033	1544	1990	2402	2677	1377	2058	2653	3202	3569	3561
	62	137	263	421	124	275	526	843	1230	-	412	788	1264	1845	-	-	1051	1686	2460	-	-	-
22	1.5/3	1.5/3	2.1/5.3	3.2/7.9	1.5/3	1.5/3	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	1.5/3	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	5.5/13.8	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	5.5/13.8	5.5/13.8
	65	148	288	455	131	297	576	910	1173	1468	445	864	1365	1760	2201	2517	1152	1820	2346	2935	3356	3348
23	52	115	220	354	104	230	441	709	1037	1443	345	661	1063	1555	2165	-	882	1418	2074	2886	-	-
	1.5/3	1.5/3	1.9/4.8	3/7.5	1.5/3	1.5/3	1.9/4.8	3/7.5	3.9/9.6	4.8/12	1.5/3	1.9/4.8	3/7.5	3.9/9.6	4.8/12	5.5/13.8	1.9/4.8	3/7.5	3.9/9.6	4.8/12	5.5/13.8	5.5/13.8
24	55	125	243	394	109	249	486	788	1045	1307	374	729	1182	1567	1961	2364	972	1576	2089	2614	3151	3160
	44	97	187	301	87	194	373	602	882	1230	291	560	902	1322	1845	-	747	1203	1763	2460	-	-
25	1.5/3	1.5/3	1.7/4.3	2.8/6.9	1.5/3	1.5/3	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	1.5/3	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	5.5/13.7	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	5.5/13.7	5.5/13.8
	46	106	207	336	92	211	413	672	936	1171	317	620	1008	1404	1757	2147	827	1344	1872	2342	2862	2991
26	37	83	160	257	74	166	319	515	756	1056	249	479	772	1133	1584	2130	638	1029	1511	2112	2839	-
	1.5/3	1.5/3	1.5/3.8	2.5/6.2	1.5/3	1.5/3	1.5/3.8	2.5/6.2	3.4/8.6	4.3/10.8	1.5/3	1.5/3.8	2.5/6.2	3.4/8.6	4.3/10.8	5.3/13.1	1.5/3.8	2.5/6.2	3.4/8.6	4.3/10.8	5.3/13.1	5.5/13.8
27	90	177	289	78	180	354	577	843	1055	270	531	866	1265	1583	1934	2306	708	1155	1686	2110	2579	2839
	71	137	222	64	142	275	444	652	913	214	412	666	979	1370	1845	549	887	1305	1827	2460	-	-
28	1.5/3	1.5/3.5	2.3/5.6	1.5/3	1.5/3	1.5/3.5	2.3/5.6	3.3/8.2	4.1/10.2	1.5/3	1.5/3.5	2.3/5.6	3.3/8.2	4.1/10.2	5/12.5	1.5/3.5	2.3/5.6	3.3/8.2	4.1/10.2	5/12.5	5.5/13.8	5.5/13.8
	67	132	217	57	134	265	434	645	869	200	397	651	967	1303	1593	529	868	1289	1738	2124	2576	-
29	54	104	168	48	107	208	336	496	696	161	311	504	743	1044	1410	515	672	991	1392	1880	-	-
	1.5/3	1.5/3	1.9/4.7	1.5/3	1.5/3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	1.5/3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	4.5/11.3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	4.5/11.3	5.5/13.8	5.5/13.8
30	51	101	167	42	101	202	333	497	704	152	303	500	746	1056	1334	404	667	994	1408	1779	2357	-
	42	80	130	37	83	161	261	385	542	125	241	391	578	813	1100	321	521	770	1083	1467	-	-
31	1.5/3	1.5/3	1.6/4	1.5/3	1.5/3	1.6/4	2.3/5.9	3.3/8.3	1.5/3	1.5/3	1.6/4	2.3/5.9	3.3/8.3	4.2/10.4	1.5/3	1.5/3	1.6/4	2.3/5.9	3.3/8.3	4.2/10.4	5.5/13.8	5.5/13.8
	79	130	-	-	78	157	261	390	555	116	236	391	585	832	1132	314	521	781	1109	1510	2139	-
32	63	103	-	-	65	127	206	305	430	98	190	309	457	645	874	254	412	610	859	1166	1963	-
	1.5/3	1.5/3.4	-	-	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	3.8/9.6	1.5/3	1.5/3.4	2/5	2.8/7.1	3.8/9.6	5.4/13.5	-
33	62	103	-	-	60	124	207	311	443	91	186	310	466	665	910	248	413	622	887	1214	1837	-
	51																					

KEY TO TABLE: **Top Figure** - Allowable Total Load [plf]
Middle Figure - Allowable Live Load [plf]
Bottom Figure - Minimum Required Bearing Length at End / Intermediate Supports [inches]

SPAN (ft)	1¾" Versa-Lam® 2.1E 3100				Double Ply 1¾" Versa-Lam® 2.1E 3100 or 3½" Versa-Lam® 2.1E 3100					Triple Ply 1¾" Versa-Lam® 2.1E 3100 or 5¼" Versa-Lam® 2.1E 3100					Quadruple Ply 1¾" Versa-Lam® 2.1E 3100 or 7" Versa-Lam® 2.1E 3100							
	7¼"	9½"	11¾"	14"	7¼"	9½"	11¾"	14"	16"	18"	9½"	11¾"	14"	16"	18"	20"	11¾"	14"	16"	18"	20"	24"
6	954	1330	1782	2245	1908	2660	3564	4491	4796	4794	3990	5346	6736	7194	7191	7188	7128	8981	9592	9588	9584	9576
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	2.2/5.5	3.1/7.6	4.1/10.2	5.1/12.9	2.2/5.5	3.1/7.6	4.1/10.2	5.1/12.9	5.5/13.8	5.5/13.8	3.1/7.6	4.1/10.2	5.1/12.9	5.5/13.8	5.5/13.8	5.5/13.8	4.1/10.2	5.1/12.9	5.5/13.8	5.5/13.8	5.5/13.8	5.5/13.8
	795	1097	1452	1807	1591	2194	2904	3613	4109	4107	3291	4356	5420	6163	6160	6157	5807	7226	8217	8213	8209	8201
8	678	-	-	-	1357	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.1/5.3	2.9/7.3	3.9/9.7	4.8/12.1	2.1/5.3	2.9/7.3	3.9/9.7	4.8/12.1	5.5/13.8	5.5/13.8	2.9/7.3	3.9/9.7	4.8/12.1	5.5/13.8	5.5/13.8	5.5/13.8	3.9/9.7	4.8/12.1	5.5/13.8	5.5/13.8	5.5/13.8	5.5/13.8
9	617	933	1225	1511	1235	1867	2449	3022	3593	3591	2800	3674	4532	5390	5387	5384	4899	6043	7186	7182	7178	7170
	466	-	-	-	931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	1.9/4.7	2.9/7.1	3.8/9.4	4.6/11.6	1.9/4.7	2.9/7.1	3.8/9.4	4.6/11.6	5.5/13.8	5.5/13.8	2.9/7.1	3.8/9.4	4.6/11.6	5.5/13.8	5.5/13.8	5.5/13.8	3.8/9.4	4.6/11.6	5.5/13.8	5.5/13.8	5.5/13.8	5.5/13.8
	440	812	1059	1298	880	1624	2117	2596	3083	3190	2436	3176	3894	4624	4785	4782	4235	5192	6166	6380	6376	6368
11	333	715	-	-	665	1431	-	-	-	-	2146	-	-	-	-	-	-	-	-	-	-	-
	1.5/3.8	2.8/7.7	3.7/9.1	4.5/11.2	1.5/3.8	2.8/7.7	3.7/9.1	4.5/11.2	5.3/13.3	5.5/13.8	2.8/7.7	3.7/9.1	4.5/11.2	5.3/13.3	5.5/13.8	5.5/13.8	3.7/9.1	4.5/11.2	5.3/13.3	5.5/13.8	5.5/13.8	5.5/13.8
12	324	693	932	1138	648	1386	1864	2275	2689	2869	2079	2797	3413	4033	4304	4301	3729	4550	5378	5738	5734	5726
	246	532	-	-	491	1065	-	-	-	-	1597	-	-	-	-	-	-	-	-	-	-	-
13	1.5/3.1	2.7/6.6	3.6/8.9	4.4/10.9	1.5/3.1	2.7/6.6	3.6/8.9	4.4/10.9	5.2/12.9	5.5/13.8	2.7/6.6	3.6/8.9	4.4/10.9	5.2/12.9	5.5/13.8	5.5/13.8	3.6/8.9	4.4/10.9	5.2/12.9	5.5/13.8	5.5/13.8	5.5/13.8
	245	537	833	1012	489	1073	1665	2024	2384	2607	1610	2498	3037	3576	3910	3907	3330	4049	4767	5213	5209	5201
14	186	406	762	-	372	812	1523	-	-	-	1218	2285	-	-	-	-	3046	-	-	-	-	-
	1.5/3	2.3/5.7	3.5/8.8	4.3/10.7	1.5/3	2.3/5.7	3.5/8.8	4.3/10.7	5/12.6	5.5/13.8	2.3/5.7	3.5/8.8	4.3/10.7	5/12.6	5.5/13.8	5.5/13.8	3.5/8.8	4.3/10.7	5/12.6	5.5/13.8	5.5/13.8	5.5/13.8
15	189	417	733	912	378	834	1465	1823	2141	2388	1252	2198	2735	3211	3582	3579	2931	3647	4281	4776	4772	4764
	144	317	597	-	289	633	1194	-	-	-	950	1791	-	-	-	-	2389	-	-	-	-	-
16	1.5/3	1.9/4.8	3.4/8.4	4.2/10.5	1.5/3	1.9/4.8	3.4/8.4	4.2/10.5	4.9/12.3	5.5/13.8	1.9/4.8	3.4/8.4	4.2/10.5	4.9/12.3	5.5/13.8	5.5/13.8	3.4/8.4	4.2/10.5	4.9/12.3	5.5/13.8	5.5/13.8	5.5/13.8
	149	330	623	829	297	660	1247	1658	1942	2203	991	1870	2487	2913	3304	3301	2494	3316	3884	4406	4402	4394
17	114	251	476	756	229	503	953	1513	-	-	754	1429	2269	-	-	-	1905	3026	-	-	-	-
	1.5/3	1.7/4.1	3.1/7.8	4.1/10.4	1.5/3	1.7/4.1	3.1/7.8	4.1/10.4	4.8/12.1	5.5/13.8	1.7/4.1	3.1/7.8	4.1/10.4	4.8/12.1	5.5/13.8	5.5/13.8	3.1/7.8	4.1/10.4	4.8/12.1	5.5/13.8	5.5/13.8	5.5/13.8
18	119	265	508	734	238	531	1017	1467	1777	2044	796	1525	2201	2666	3066	3063	2033	2934	3554	4088	4084	4076
	92	203	386	615	184	405	771	1230	-	-	608	1157	1845	-	-	-	1543	2460	-	-	-	-
19	1.5/3	1.5/3.6	2.7/6.9	4/9.9	1.5/3	1.5/3.6	2.7/6.9	4/9.9	4.8/12	5.5/13.8	1.5/3.6	2.7/6.9	4/9.9	4.8/12	5.5/13.8	5.5/13.8	2.7/6.9	4/9.9	4.8/12	5.5/13.8	5.5/13.8	5.5/13.8
	96	216	416	638	193	432	832	1276	1638	1882	649	1248	1914	2456	2823	2857	1664	2552	3275	3763	3809	3801
20	75	166	317	506	150	332	633	1013	1473	-	497	950	1519	2210	-	-	1266	2025	2946	-	-	-
	1.5/3	1.5/3.2	2.4/6	3.7/9.2	1.5/3	1.5/3.2	2.4/6	3.7/9.2	4.7/11.8	5.4/13.6	1.5/3.2	2.4/6	3.7/9.2	4.7/11.8	5.4/13.6	5.5/13.8	2.4/6	3.7/9.2	4.7/11.8	5.4/13.6	5.5/13.8	5.5/13.8
21	79	178	344	555	158	356	689	1110	1443	1742	535	1033	1665	2165	2613	2677	1377	2220	2887	3484	3569	3561
	62	137	263	421	124	275	526	843	1230	1707	412	788	1264	1845	2561	-	1051	1686	2460	3415	-	-
22	1.5/3	1.5/3	2.1/5.3	3.4/8.6	1.5/3	1.5/3	2.1/5.3	3.4/8.6	4.4/11.1	5.4/13.4	1.5/3	2.1/5.3	3.4/8.6	4.4/11.1	5.4/13.4	5.5/13.8	2.1/5.3	3.4/8.6	4.4/11.1	5.4/13.4	5.5/13.8	5.5/13.8
	65	148	288	466	131	297	576	931	1277	1597	445	864	1397	1915	2395	2517	1152	1862	2553	3193	3356	3348
23	52	115	220	354	104	230	441	709	1037	1443	345	661	1063	1555	2165	-	882	1418	2074	2886	-	-
	1.5/3	1.5/3	1.9/4.8	3.1/7.7	1.5/3	1.5/3	1.9/4.8	3.1/7.7	4.2/10.5	5.2/13.1	1.5/3	1.9/4.8	3.1/7.7	4.2/10.5	5.2/13.1	5.5/13.8	1.9/4.8	3.1/7.7	4.2/10.5	5.2/13.1	5.5/13.8	5.5/13.8
24	55	125	243	394	109	249	486	788	1137	1422	374	729	1182	1705	2133	2376	972	1576	2274	2845	3168	3160
	44	97	187	301	87	194	373	602	882	1230	291	560	902	1322	1845	-	747	1203	1763	2460	-	-
25	1.5/3	1.5/3	1.7/4.3	2.8/6.9	1.5/3	1.5/3	1.7/4.3	2.8/6.9	4/9.9	4.9/12.3	1.5/3	1.7/4.3	2.8/6.9	4/9.9	4.9/12.3	5.5/13.8	1.7/4.3	2.8/6.9	4/9.9	4.9/12.3	5.5/13.8	5.5/13.8
	46	106	207	336	92	211	413	672	991	1275	317	620	1008	1487	1912	2249	827	1344	1983	2549	2999	2991
26	37	83	160	257	74	166	319	515	756	1056	249	479	772	1133	1584	2130	638	1029	1511	2112	2839	-
	1.5/3	1.5/3	1.5/3.8	2.5/6.2	1.5/3	1.5/3.8	2.5/6.2	3.6/9.1	4.7/11.7	5.5/13.8	1.5/3	1.5/3.8	2.5/6.2	3.6/9.1	4.7/11.7	5.5/13.8	1.5/3.8	2.5/6.2	3.6/9.1	4.7/11.7	5.5/13.8	5.5/13.8
27	39	90	177	289	78	180	354	577	854	1149	270	531	866	1280	1723	2105	708	1155	1707	2297	2807	2839
	32	71	137	222	64	142	275	444	652	913	214	412	666	979	1370	1845	549	887	1305	1827	2460	-
28	1.5/3	1.5/3	1.5/3.5	2.3/5.6	1.5/3	1.5/3	1.5/3.5	2.3/5.6	3.3/8.3	4.4/11.1	1.5/3	1.5/3.5	2.3/5.6	3.3/8.3	4.4/11.1	5.4/13.6	1.5/3.5	2.3/5.6	3.3/8.3	4.4/11.1	5.4/13.6	5.5/13.8
	67	132	217	357	134	265	434	645	909	200	397	651	967	1364	1735	2130	529	868	1289	1819	2313	2576
29	54	104	168	268	48	107	208	336	496	696	161	311	504	767	1044	1410	415	672	991	1392	1880	-
	1.5/3	1.5/3	1.9/4.7	3.1/7.7	1.5/3	1.5/3	1.9/4.7	3.1/7.7	4.2/10.5	5.2/13.1	1.5/3	1.5/3	1.9/4.7	3.1/7.7	4.2/10.5	5.2/13.1	1.5/3	1.9/4.7	3.1/7.7	4.2/10.5	5.2/13.1	5.5/13.8
30	51	101	167	268	42	101	202	333	497	704	152	303	500	746	1056	1436	404	667	994	1408	1915	2357
	42	80	130	217	37	83	161	261	385	542	125	241	391	578	813	1100	321	521	770	1083	1467	-
31	1.5/3	1.5/3	1.6/4	2.5/6.2	1.5/3	1.5/3	1.6/4	2.5/6.2	3.3/8.3	4.4/11.1	1.5/3	1.5/3	1.6/4	2.5/6.2	3.3/8.3	4.4/11.1	1.5/3	1.6/4	2.5/6.2	3.3/8.3	4.4/11.1	5.5/13.8
	39	79	130	217	37	83	161	261	385	542	125	241	391	578	813	1100	321	521	770	1083	1467	-
32	39	79	130	217	37	83	161	261	385	542	125	241	391	578	813	1100	321	521	770	1083	1467	-
	33	63	103	167	28	63	127	206	305	430	98	190	309	457	645	874	254	412	610	859	1166	1963
33	1.5/3	1.5/3	1.5/3.4	2.3/5.6	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	3.5/8.8	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	3						

MULTIPLE MEMBER CONNECTORS

Side-Loaded Applications

Number of Members	Maximum Uniform Side Load [plf]							
	Nailed ⁽³⁾		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
1¾" Versa-Lam® (Depths of 18" and less)								
2	470	705	505	1010	2020	560	1120	2245
3 ⁽²⁾	350	525	375	755	1515	420	840	1685
4 ⁽³⁾	use bolt schedule		335	670	1345	370	745	1495
3½" Versa-Lam®								
2 ⁽³⁾	use bolt schedule		855	1715	N/A	1125	2250	N/A
1¾" Versa-Lam® (Depths of 24" and less)								
Number of Members	Nailed ⁽³⁾		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	755	1010	1515	840	1120
3 ⁽²⁾	525	705	565	755	1135	630	840	1260
4 ⁽⁴⁾	use bolt schedule		505	670	1010	560	745	1120

- 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.
- The nail schedules shown apply to both sides of a 3-member beam.
- 16d box nails = 0.135" diameter x 3.5" length, 16d sinker nails = 0.148" diameter x 3.25" length.
- 7" wide beams must be top-loaded or loaded from both sides (lesser side shall be no less than 25% of opposite side).

Top-Loaded Applications

For top-loaded beams and beams with side loads less than shown in Side-Loaded Applications table above:			
Plies	Depth	Nailing ⁽²⁾	Maximum Uniform Load From One Side
(2) 1¾" plies	Depths 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	400 plf
	Depths 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	600 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	800 plf
(3) 1¾" plies ⁽¹⁾	Depths 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	300 plf
	Depths 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	450 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	600 plf
(4) 1¾" plies	Depths 18" & less	2 rows ½" bolts @ 24" o.c., staggered	335 plf
	Depth = 24"	3 rows ½" bolts @ 24" o.c., staggered every 8"	505 plf
(2) 3½" plies	Depths 18" & less	2 rows ½" bolts @ 24" o.c., staggered	855 plf
	Depth 20" - 24"	3 rows ½" bolts @ 24" o.c., staggered every 8"	1285 plf

- The nail schedules shown apply to both sides of a 3-member beam.
- 16d box nails = 0.135" diameter x 3.5" length, 16d sinker nails = 0.148" diameter x 3.25" length.
- Beams wider than 7" must be designed by the engineer of record.
- 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.
- Use allowable load tables or BC Calc® software to size beams.
- An equivalent specific gravity of 0.5 may be used when designing specific connections with Versa-Lam®.
- Connection values are based upon the 2018 NDS.
- FastenMaster TrussLOK®, Simpson Strong-Tie SDW or SDS, and USP WS screws may also be used to connect multiple member Versa-Lam® beams, contact Boise Cascade EWP Engineering for further information.

VERSA-STUD® 1.8E 2650

Reference Design Values

Product	Bending F _b [psi]	Compression Parallel to Grain F _c [psi]	Compression Perp to Grain F _{c⊥} [psi]	Modulus of Elasticity - Apparent E [psi]	Horizontal Shear F _v [psi]
Versa-Stud® 1.8E 2650 1½" x 5½"	2865	3000	450	1,700,000	285
Spruce Pine Fir (North) # 1 / 2 Grade 2 x 6	1138	1150	425	1,400,000	135
Hem-Fir # 2 Grade 2 x 6	1105	1300	405	1,300,000	150
Western Woods # 2 Grade 2 x 6	878	900	335	1,000,000	135

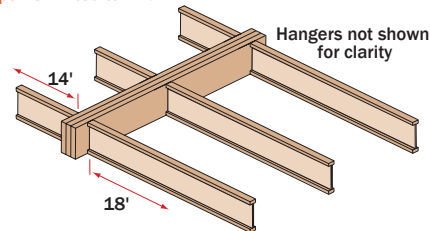
- Design values are for loads applied to the narrow face of the studs.
- Dimension lumber values taken from 2018 NDS Supplement: Design Values for Wood Construction (per 2018 IBC/IRC).
- Repetitive member factors have not been applied to the bending values. Depth (size) factors per ICC-ES ESR-1040 and 2018 NDS have been applied to the corresponding bending values.

For further design information, please see VERSA-STUD 1.8E 2650 Eastern Tall Wall Guide.

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 1¾" ply Versa-Lam® that is adequate to support the design loads and the member's proper connection schedule.

- Calculate the tributary width that beam is supporting:
 $14' / 2 + 18' / 2 = 16'$
- Use PLF tables on pages 3-5 of this guide or BC Calc® to size beam.
A Triple Versa-Lam® 2.1 3100 1¾" x 14" is found to adequately support the design loads
- Calculate the maximum plf load from one side (the right side in this case).
 $\text{Max. Side Load} = (18' / 2) \times (40 + 10 \text{ psf}) = 450 \text{ plf}$
- Go to the Multiple Member Connection Table, Side-Loaded Applications, 1¾" Versa-Lam®, 3 members.
- The proper connection schedule must have a capacity greater than the max. side load:

Nailed: 3 rows 16d sinkers @ 12" o.c.:

525 plf is greater than 450 plf OK

Bolts: ½" diameter 2 rows @ 12" staggered:

755 plf is greater than 450 plf OK

VERSA-LAM® LVL BEAM DETAILS

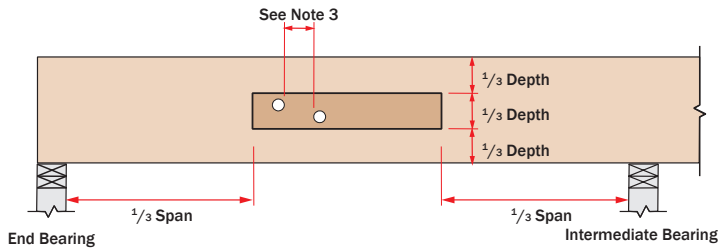
<p>BEARING AT CONCRETE/MASONRY WALLS</p> <p>Provide moisture barrier and lateral restraint at bearing.</p> <p>1/2" air space required between concrete and wood.</p> <p>B01</p>	<p>BEARING FOR DOOR OR WINDOW HEADER</p> <p>Strap per code if top plate is not continuous over header.</p> <p>Trimmers</p> <p>B02</p>	<p>BEAM TO BEAM CONNECTOR</p> <p>Hanger per design professional of record.</p> <p>B03</p>	<p>BEARING AT COLUMN</p> <p>Versa-Lam® column</p> <p>Column connector per design professional of record.</p> <p>B04</p>
<p>SLOPE SEAT CUT</p> <p>Sloped seat cut. Not to exceed inside face of bearing.</p> <p>Blocking not shown for clarity.</p> <p>B06</p>	<p>BEVEL CUT</p> <p>DO NOT bevel cut Versa-Lam® beyond inside face of wall without approval from Boise Cascade EWP Engineering or BC Calc® software analysis.</p> <p>B07</p>	<p>BEAM TO CONCRETE/MASONRY WALLS</p> <p>Wood top plate must be flush with inside of wall.</p> <p>Hanger</p> <p>Moisture barrier between concrete and wood.</p> <p>B08</p>	<p>BEARING FRAMING INTO WALL</p> <p>Strap per code if top plate is not continuous.</p> <p>B09</p>

INSTALLATION NOTES

- Minimum of 1/2" 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 on pages 3-5 of this 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).

ALLOWABLE HOLES IN VERSA-LAM® LVL BEAMS



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
5 1/2"	3/4"
7 1/4"	1"
9 1/4" 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, use BC Calc® sizing software (www.BCCalc.com) or contact Boise Cascade EWP Engineering.



Boise Cascade®
ENGINEERED WOOD PRODUCTS

**EASTERN UNITED STATES
DESIGN INFORMATION**

Rev 06.20.19

