



NORDIC LAM™

1-3/4-INCH WALL STUDS



Built for life



Distributed by:



FSC® CERTIFIED PRODUCTS AVAILABLE



The mark of
responsible forestry

NORDIC LAM™ WALL STUDS



SCOPE

This technical note features stud tables for glued laminated studs. These stud tables are intended for determining the feasibility of using tall wood stud walls for a given residential application. In a commercial application, a fully engineered design is required for each tall wall to consider the specific design considerations for that site, the effect of openings, the connections and other details. This document addresses the design of wall studs for wind perpendicular to the wall surface and vertical loads only. Complete structural analysis with consideration of loads originating from adjoining elements (e.g., lateral shear loads) is beyond the scope of this publication.

ASSUMPTIONS USED TO DEVELOP THE STUD TABLES

- ▶ The studs are laterally braced to prevent buckling in the narrow dimension.
- ▶ The loads are uniformly distributed along the top of the wall.
- ▶ Total load deflection criteria is stud length/180. Calculated total load deflection for each stud is given in the tables.
- ▶ The ratio of specified axial dead load to live load is 1. This table can be used conservatively when the specified axial dead load is less than the specified axial live load.
- ▶ Stud sizes are based on Limit States Design. The load combinations considered are:

1. axial load alone	1.25D + 1.5L
2. axial dead load plus wind	1.25D + 1.4W
3. axial load plus wind as companion load	1.25D + (1.5L or 1.5S) + 0.4W
4. axial load plus wind as principal load	1.25D + 1.4W + (0.5L or 0.5S)
- ▶ In conformance with the NBC, an importance factor of 0.75 is applied to the wind and axial loads in load combinations 2, 3, and 4 for serviceability limit states.
- ▶ Load cases 2, 3, and 4 are based on a load duration factor of 1.15.
- ▶ Eccentric axial loading of the studs is considered with maximum eccentricity equal to 1/6th of the stud depth.
- ▶ Studs are assumed to be pinned at both ends (effective length factor, K_e = 1.0).
- ▶ The tables can only be used for untreated studs in dry service conditions.
- ▶ Factored resistance values were calculated based on published values and CSA O86-09.

TABLE A.
LIMITATIONS OF CONVENTIONAL CONSTRUCTION⁽¹⁾

TYPE OF WALL	STUD SIZE	STUD HEIGHT ⁽²⁾	MAXIMUM SPACING
Walls supporting roof and ceiling only	2x3	8'	16"
	2x4	10'	24"
Walls supporting one floor, roof and ceiling	2x4	10'	16"
	2x6	10'	24"
Walls supporting two floors, roof and ceiling	2x4	10'	12"
	2x6	12'	16"
Nonbearing walls	2x3	8'	16"
	2x4	12'	16"

(1) Per NBC, Table 9.23.10.1.

(2) Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

HOW TO USE THE TABLES

- ▶ Determine the REFERENCE VELOCITY PRESSURE, q (in kPa), based on a probability of being exceeded in any one year of 1 in 50, for the building location. This is found in the NBC 2010, Appendix C, Table C-2; or may be obtained from the local jurisdiction.
- ▶ Determine the EXPOSURE FACTOR, C_e , from Table C, the COMPOSITE GUST EFFECT FACTOR-EXTERNAL PRESSURE COEFFICIENT, $C_g C_p$, from Table D, and the INTERNAL GUST EFFECT FACTOR AND INTERNAL PRESSURE COEFFICIENT, C_{gi} and C_{pi} , from Table E.
- ▶ Adjust the maximum SPECIFIED WIND PRESSURE in kPa: $p = q \times C_e \times (C_g C_p + C_{gi} \times C_{pi})$
- ▶ Calculate the LATERAL LOAD in plf based on the spacing of the studs:

$$\text{Lateral Load (plf)} = \text{Specified Wind Pressure (kPa)} \times 20.89 \times \text{Stud On-Centre Spacing (ft)}$$

Where 20.89 is the conversion factor from kPa to psf.

- ▶ Calculate the uniformly distributed factored dead load based on the structure supported. Also, consideration is to be given to the self-weight of the wall. Under many conditions it is appropriate to include the weight of the top half of the wall.
- ▶ Calculate the uniformly distributed factored live load based on live loads due to snow and associated rain and tributary width of the roof.
- ▶ The stud tables are appropriate for the typical case where the axial dead load does not exceed the axial live load.
- ▶ Calculate the total AXIAL LOAD in lbs based on the spacing of the studs:

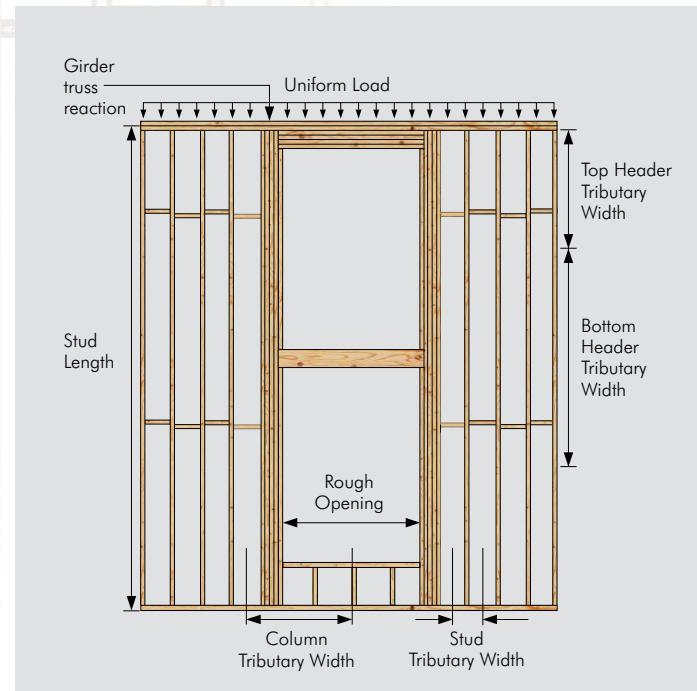
$$\text{Axial Load (lbs)} = [\text{Dead Load (plf)} + \text{Live Load (plf)}] \times \text{Stud On-Centre Spacing (ft)}$$

- ▶ **Studs:** Select a stud depth based on the stud length and the axial load (Table 1). The associated DEFLECTION should be considered for appropriateness where finishes are susceptible to cracking (Table B).
- ▶ **Columns and Headers:** Select a column for lateral and axial loads which are greater than or equal to calculated loads (Tables 2, 4, and 6), and/or a header for lateral and uniform loads which are greater than or equal to calculated loads (Tables 3, 5, and 7).

TABLE B.
TYPICAL DEFLECTION REQUIREMENTS

TYPE OF WALL	MAXIMUM DEFLECTION
Exterior walls with plaster or stucco finish	L/360
Exterior walls with brittle finishes	L/240
Exterior walls with flexible finishes	L/120
Members supporting windows	L/175

Note: For finishes that require a deflection stricter than L/360, use a design software or contact your local distributor.



**TABLE C.
EXPOSURE FACTOR, C_e**

MEAN ROOF HEIGHT (ft)	C_e - OPEN TERRAIN	C_e - ROUGH TERRAIN
Less than 20	0.90	
21	0.91	
22	0.92	
23	0.93	
24	0.94	
25	0.95	
26	0.95	
27	0.96	
28	0.97	
29	0.98	
30	0.98	

NOTES:

1. The mean roof height for low-rise construction is measured from above grade to the mean height of the roof, or to the eave if the roof slope is less than 7°.
2. Open Terrain: Level terrain with only scattered buildings, trees, or other obstructions, open water or shorelines thereof.
- Rough Terrain: Suburban, urban, or wooded terrain, extending upwind from the building uninterrupted for at least 1 km.



**TABLE D.
COMPOSITE GUST EFFECT FACTOR-EXTERNAL
PRESSURE COEFFICIENT, C_{gp}**

EFFECTIVE WIND AREA (ft ²)	C_{gp}
10	2.10
15	2.10
20	2.09
25	2.08
30	2.08
35	2.07
40	2.07
45	2.06
50	2.06
55	2.05
60	2.04



**TABLE E.
INTERNAL GUST EFFECT FACTOR, C_{gi} , AND INTERNAL PRESSURE COEFFICIENT, C_{pi}**

BUILDING CATEGORY		C_{gi}	C_{pi}
1	Buildings without any large or significant openings, but with small and uniformly distributed openings amounting to less than 0.1% of total surface area.	2.00	0.15
2	Buildings in which significant openings, if there are any, can be relied on to be closed during storms but in which background leakage may not be uniformly distributed. Most low-rise buildings fall into this category provided that all elements - especially shipping doors - are designed to be fully wind-resistant.	2.00	0.45
3	Buildings with large or significant openings. For example, sheds with one or more open sides, industrial buildings with shipping doors, ventilators or the like, which have a high probability of being open during a storm, or not being fully wind-resistant to design wind loads.	2.00	0.70

ES11 STUDS

TABLE 1.
MAXIMUM FACTORED AXIAL LOADS AND LATERAL DEFLECTIONS

STUD LENGTH (ft)	AXIAL LOAD / DEFLECTION RATIO	NORDIC LAM 1-3/4" x 5-1/2"					NORDIC LAM 1-3/4" x 7-1/4"				
		LATERAL LOAD (plf)					LATERAL LOAD (plf)				
		15	30	45	60	75	15	30	45	60	75
8	Axial Load (lbs)	7447	7447	7447	7447	7447	9817	9817	9817	9817	9817
	Deflection Ratio	L/3369	L/1684	L/1123	L/842	L/673	L/7718	L/3859	L/2572	L/1929	L/1543
9	Axial Load (lbs)	7447	7447	7447	7447	7447	9817	9817	9817	9817	9817
	Deflection Ratio	L/2366	L/1183	L/788	L/591	L/473	L/5421	L/2710	L/1807	L/1355	L/1084
10	Axial Load (lbs)	7447	7447	7447	7447	7405	9817	9817	9817	9817	9817
	Deflection Ratio	L/1725	L/862	L/575	L/431	L/345	L/3951	L/1975	L/1317	L/987	L/790
11	Axial Load (lbs)	7447	7447	7447	6754	4381	9817	9817	9817	9817	9817
	Deflection Ratio	L/1296	L/648	L/432	L/324	L/259	L/2969	L/1484	L/989	L/742	L/593
12	Axial Load (lbs)	7286	7286	6753	4332	1636	9817	9817	9817	9817	9817
	Deflection Ratio	L/998	L/499	L/332	L/249	L/199	L/2286	L/1143	L/762	L/571	L/457
13	Axial Load (lbs)	6539	6539	4820	2192		9817	9817	9817	9817	9817
	Deflection Ratio	L/785	L/392	L/261	L/196		L/1798	L/899	L/599	L/449	L/359
14	Axial Load (lbs)	5866	5686	3165			9817	9817	9817	9817	7226
	Deflection Ratio	L/628	L/314	L/209			L/1440	L/720	L/480	L/360	L/288
15	Axial Load (lbs)	5261	4364				9817	9817	9817	7636	4365
	Deflection Ratio	L/511	L/255				L/1170	L/585	L/390	L/292	L/234
16	Axial Load (lbs)	4719	3244				9462	9462	8525	5302	1675
	Deflection Ratio	L/421	L/210				L/964	L/482	L/321	L/241	L/192
17	Axial Load (lbs)	4214					8717	8717	6599	3167	
	Deflection Ratio	L/351					L/804	L/402	L/268	L/201	
18	Axial Load (lbs)	3695					8027	8027	4891		
	Deflection Ratio	L/295					L/677	L/338	L/225		
19	Axial Load (lbs)	3239					7391	6738	3354		
	Deflection Ratio	L/251					L/576	L/288	L/192		
20	Axial Load (lbs)	2720					6806	5481			
	Deflection Ratio	L/215					L/493	L/246			
21	Axial Load (lbs)	2221					6266	4370			
	Deflection Ratio	L/186					L/426	L/213			
22	Axial Load (lbs)						5767	3382			
	Deflection Ratio						L/371	L/185			
23	Axial Load (lbs)						5230				
	Deflection Ratio						L/324				
24	Axial Load (lbs)						4731				
	Deflection Ratio						L/285				
25	Axial Load (lbs)						4280				
	Deflection Ratio						L/252				
26	Axial Load (lbs)						3779				
	Deflection Ratio						L/224				
27	Axial Load (lbs)						3249				
	Deflection Ratio						L/200				
28	Axial Load (lbs)						2778				
	Deflection Ratio						L/180				
29	Axial Load (lbs)										
	Deflection Ratio										
30	Axial Load (lbs)										
	Deflection Ratio										

NOTES:

1. Values shown are the maximum factored axial load, in pounds (lbs), that can be applied to the stud in addition to the lateral load, and the deflection ratio based on the span (L).
2. Sizes shown in the table are based on dry service conditions.
3. The designer must ensure that the design assumptions used to develop the table are appropriate for the application. See page 2 for stud table design assumptions. For additional design information, contact Nordic Engineered Wood.
4. The table is based on a compression perpendicular-to-grain resistance of 841 psi, adjusted per CSA O86.
5. One face of the stud must be laterally supported by sheathing, fastened to meet the requirements of NBC Part 9. The other face must be sheathed with either structural sheathing or drywall.
6. Maximum spacing of full depth blocking is 8 ft.

ES12 COLUMNS

L/360 LATERAL DEFLECTION RATIO

TABLE 2.

MAXIMUM FACTORED AXIAL AND LATERAL LOADS

COLUMN LENGTH (ft)	AXIAL AND LATERAL LOADS	5-1/2" WALL THICKNESS					7-1/4" WALL THICKNESS								
		1-3/4"		1-3/4"		3-1/2"	5-1/2"	7-1/4"	1-3/4"		1-3/4"		3-1/2"	5-1/2"	7-1/4"
		2x	3x			(Plank)			2x	3x			(Plank)		
8	Axial Load (lbs) Lateral Load (plf)	14894 150	22341 150	19268 150	30279 150	39913 150	14894 150	19633 150	25399 150	39913 150	52613 150				
9	Axial Load (lbs) Lateral Load (plf)	14894 148	22341 150	19268 150	30279 150	39913 150	14894 148	19633 150	25399 150	39913 150	52613 150				
10	Axial Load (lbs) Lateral Load (plf)	14894 104	22341 150	19268 121	30279 150	39913 150	14894 104	19633 150	25399 150	39913 150	52613 150				
11	Axial Load (lbs) Lateral Load (plf)	14894 75	22341 113	19268 87	30279 137	39913 150	14894 75	19633 150	25399 150	39913 150	52613 150				
12	Axial Load (lbs) Lateral Load (plf)	13911 57	20724 86	19268 64	30275 100	39646 133	13911 57	19633 143	25399 150	39913 150	52613 150				
13	Axial Load (lbs) Lateral Load (plf)	12536 46	18652 69	17263 51	26902 81	35250 107	12536 46	19633 109	25399 127	39913 150	52613 150				
14	Axial Load (lbs) Lateral Load (plf)	11278 37	16777 56	15349 42	23916 66	31353 87	11278 37	19633 85	25399 98	39913 150	52613 150				
15	Axial Load (lbs) Lateral Load (plf)	10136 31	15087 46	13648 35	21279 55	27908 73	10136 31	19354 67	25399 77	39913 121	52613 150				
16	Axial Load (lbs) Lateral Load (plf)	9111 26	13568 38	12147 29	18950 46	24863 61	9111 26	17884 56	24927 62	38745 98	50714 130				
17	Axial Load (lbs) Lateral Load (plf)	8192 22	12205 33	10823 25	16893 40	22171 52	8192 22	16515 47	22794 53	35457 83	46433 110				
18	Axial Load (lbs) Lateral Load (plf)	7369 18	10985 28	9654 22	15076 34	19792 45	7369 18	15243 40	20848 45	32452 71	42517 94				
19	Axial Load (lbs) Lateral Load (plf)	6634 16	9892 24	8622 19	13469 30	17688 39	6634 16	14067 34	19077 39	29712 61	38941 81				
20	Axial Load (lbs) Lateral Load (plf)	5976 13	8915 20	7710 16	12049 25	15827 34	5976 13	12980 30	17464 34	27214 54	35680 71				
21	Axial Load (lbs) Lateral Load (plf)	5388 12	8040 17	6903 14	10793 22	14181 29	5388 12	11978 26	15996 30	24938 47	32706 62				
22	Axial Load (lbs) Lateral Load (plf)	4863 10	7259 15	6191 12	9683 19	12716 25	4863 10	11055 23	14660 26	22865 42	29955 55				
23	Axial Load (lbs) Lateral Load (plf)									10205 20	13443 24	20976 37	27458 49		
24	Axial Load (lbs) Lateral Load (plf)									9424 18	12336 21	19255 33	25189 44		
25	Axial Load (lbs) Lateral Load (plf)									8705 16	11327 19	17687 30	23127 39		
26	Axial Load (lbs) Lateral Load (plf)									8045 14	10408 17	16257 26	21252 35		
27	Axial Load (lbs) Lateral Load (plf)									7438 13	9571 15	14955 24	19546 31		
28	Axial Load (lbs) Lateral Load (plf)									6880 11	8808 14	13765 21	17993 28		
29	Axial Load (lbs) Lateral Load (plf)									6368 10	8114 12	12676 19	16581 25		
30	Axial Load (lbs) Lateral Load (plf)									5891 9	7481 11	11686 17	15294 23		

NOTES:

- Values shown are the maximum factored axial loads, in pounds (lbs), and lateral loads, in pounds per lineal foot (plf), that can be applied to the column.
- Selected column shall satisfy both total axial and lateral wind loads. Refer to page 3 for determining the lateral load.
- The table is based on dry-use conditions. The values are based on a duration of load factor of 1.15 for combined axial and lateral loads, and 1.00 for axial load only.
- The table is based on a compression perpendicular-to-grain stress of 841 psi.
- 1-3/4-inch built-up columns have been designed for ES11 stud grade. Built-up columns shall be nailed in accordance with CSA O86-09, 6.5.8.7.
- One face of the column must be laterally supported by sheathing, fastened to meet the requirements of NBC, Part 9. The other face must be sheathed with either structural sheathing or drywall.
- Maximum spacing of full depth blocking is 8 ft.

24F HEADERS

L/360 LATERAL DEFLECTION RATIO

TABLE 3.

MAXIMUM FACTORED UNIFORM AND LATERAL LOADS (plf)

WIDTH (in.)	DEPTH (in.)	CRITERIA	ROUGH OPENING (ft)									
			3	4	5	6	7	8	9	10	11	12
5-1/2	3-1/2	L/240 TL	1001	725	423	254	166	105	64	--	--	--
		L/360 WL	500	500	500	500	444	301	214	--	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--	--
	5-1/2	L/240 TL	2307	1762	1424	1083	523	384	316	207	140	97
		L/360 WL	500	500	500	500	500	394	280	206	156	120
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3041	2322	1878	1575	1356	728	660	482	329	230
		L/360 WL	500	500	500	500	500	500	369	271	205	159
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	3880	2963	2396	2010	1731	1519	1078	1012	692	488
		L/360 WL	500	500	500	500	500	500	471	346	262	203
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
7	11-1/4	L/240 TL	4718	3604	2914	2445	2105	1847	1646	1483	1254	887
		L/360 WL	500	500	500	500	500	500	500	421	318	246
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	3-1/2	L/240 TL	1274	963	609	394	228	133	82	52	--	--
		L/360 WL	500	500	500	500	500	500	440	324	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--
	5-1/2	L/240 TL	2003	1529	1235	1036	755	534	334	217	146	101
		L/360 WL	500	500	500	500	500	500	500	500	385	298
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3870	2956	2390	2005	1726	1484	933	614	418	293
		L/360 WL	500	500	500	500	500	500	500	500	423	327
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	4938	3771	3049	2558	2203	1933	1722	1287	881	621
		L/360 WL	500	500	500	500	500	500	500	500	500	418
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	11-1/4	L/240 TL	6005	4587	3708	3111	2679	2351	2094	1888	1596	1129
		L/360 WL	500	500	500	500	500	500	500	500	500	500
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

NOTES:

- Values shown are the maximum factored uniform (vertical) and lateral loads, in pounds per lineal foot (plf), that can be applied to the header in addition to its own weight.
- Selected header shall satisfy both total vertical (TL) and wind loads (WL). Refer to page 3 for determining the lateral load.
- The table is based on uniform loads and dry-use conditions. The values are based on a duration of load factor of 1.15 for combined uniform and lateral loads, and 1.00 for uniform load only.
- The total load deflection is limited to the most restrictive of L/240 or 5/16 inch.
- Trimmers shall support the full header width. Verify trimmer maximum allowable axial load to support the header.
- Multiple pieces may be used when properly connected.
- Sufficient bearing length shall be provided at supports. Review bearing length requirements (shown in inches) to ensure adequacy.

ES12 COLUMNS

L/240 LATERAL DEFLECTION RATIO

TABLE 4.

MAXIMUM FACTORED AXIAL AND LATERAL LOADS

COLUMN LENGTH (ft)	AXIAL AND LATERAL LOADS	5-1/2" WALL THICKNESS					7-1/4" WALL THICKNESS				
		1-3/4"	1-3/4"	3-1/2"	5-1/2"	7-1/4"	1-3/4"	1-3/4"	3-1/2"	5-1/2"	7-1/4"
		2x	3x		(Plank)		2x	3x			
8	Axial Load (lbs) Lateral Load (plf)	14894 150	22341 150	19268 150	30279 150	39913 150	14894 150	19633 150	25399 150	39913 150	52613 150
9	Axial Load (lbs) Lateral Load (plf)	14894 150	22341 150	19268 150	30279 150	39913 150	14894 150	19633 150	25399 150	39913 150	52613 150
10	Axial Load (lbs) Lateral Load (plf)	12139 150	22341 150	19268 150	30279 150	39913 150	12139 150	19633 150	25399 150	39913 150	52613 150
11	Axial Load (lbs) Lateral Load (plf)	11023 122	21724 150	19268 146	30279 150	39913 150	11023 122	19633 150	25399 150	39913 150	52613 150
12	Axial Load (lbs) Lateral Load (plf)	11122 94	16601 140	19268 112	30275 150	39646 150	11122 94	19633 150	25399 150	39913 150	52613 150
13	Axial Load (lbs) Lateral Load (plf)	10837 74	16158 110	17263 88	26902 139	35250 150	10837 74	17084 150	25399 150	39913 150	52613 150
14	Axial Load (lbs) Lateral Load (plf)	10333 59	15402 88	15349 71	23916 111	31353 147	10333 59	14195 135	25399 150	39913 150	52613 150
15	Axial Load (lbs) Lateral Load (plf)	9715 48	14487 72	13648 58	21279 90	27908 119	9715 48	14558 110	25399 132	39913 150	52613 150
16	Axial Load (lbs) Lateral Load (plf)	8969 39	13364 59	12147 47	18950 74	24863 98	8969 39	14519 90	24927 109	38745 150	50714 150
17	Axial Load (lbs) Lateral Load (plf)	8034 33	11976 49	10778 40	16832 62	22100 82	8034 33	14219 75	22794 90	35457 142	46433 150
18	Axial Load (lbs) Lateral Load (plf)	7203 28	10742 42	9577 33	14963 52	19651 69	7203 28	13751 64	20848 76	32452 120	42517 150
19	Axial Load (lbs) Lateral Load (plf)	6464 24	9643 35	8524 28	13324 44	17504 59	6464 24	13183 54	19077 65	29712 102	38941 134
20	Axial Load (lbs) Lateral Load (plf)	5807 20	8667 30	7601 24	11886 38	15619 50	5807 20	12558 46	17464 56	27214 87	35680 115
21	Axial Load (lbs) Lateral Load (plf)	5224 17	7800 26	6790 21	10621 33	13960 43	5224 17	11803 40	15996 48	24938 75	32706 99
22	Axial Load (lbs) Lateral Load (plf)	4706 15	7029 23	6077 18	9510 29	12490 38	4706 15	10862 35	14628 42	22830 66	29914 86
23	Axial Load (lbs) Lateral Load (plf)							10000 30	13372 37	20879 57	27326 76
24	Axial Load (lbs) Lateral Load (plf)							9212 27	12236 32	19112 51	24992 67
25	Axial Load (lbs) Lateral Load (plf)							8489 24	11208 28	17512 45	22883 59
26	Axial Load (lbs) Lateral Load (plf)							7828 21	10276 25	16062 40	20977 52
27	Axial Load (lbs) Lateral Load (plf)							7224 19	9431 23	14745 35	19250 47
28	Axial Load (lbs) Lateral Load (plf)							6672 17	8665 20	13547 32	17686 42
29	Axial Load (lbs) Lateral Load (plf)							6167 15	7970 18	12456 29	16271 38
30	Axial Load (lbs) Lateral Load (plf)							5706 14	7340 16	11467 26	14987 34

NOTES:

- Values shown are the maximum factored axial loads, in pounds (lbs), and lateral loads, in pounds per lineal foot (plf), that can be applied to the column.
- Selected column shall satisfy both total axial and lateral wind loads. Refer to page 3 for determining the lateral load.
- The table is based on dry-use conditions. The values are based on a duration of load factor of 1.15 for combined axial and lateral loads, and 1.00 for axial load only.
- The table is based on a compression perpendicular-to-grain stress of 841 psi.
- 1-3/4-inch built-up columns have been designed for ES11 stud grade. Built-up columns shall be nailed in accordance with CSA O86-09, 6.5.8.7.
- One face of the column must be laterally supported by sheathing, fastened to meet the requirements of NBC, Part 9. The other face must be sheathed with either structural sheathing or drywall.
- Maximum spacing of full depth blocking is 8 ft.

24F HEADERS

L/240 LATERAL DEFLECTION RATIO

TABLE 5.
MAXIMUM FACTORED UNIFORM AND LATERAL LOADS (plf)

WIDTH (in.)	DEPTH (in.)	CRITERIA	ROUGH OPENING (ft)									
			3	4	5	6	7	8	9	10	11	12
5-1/2	3-1/2	L/240 TL	1001	725	423	254	149	95	64	--	--	--
		L/240 WL	500	500	500	500	500	452	320	--	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--	--
	5-1/2	L/240 TL	2307	1762	1424	1083	523	366	290	207	140	97
		L/240 WL	500	500	500	500	500	402	320	261	216	181
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3041	2322	1878	1575	1356	728	507	411	329	230
		L/240 WL	500	500	500	500	500	422	344	285	238	
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	3880	2963	2396	2010	1731	1519	970	673	556	478
		L/240 WL	500	500	500	500	500	500	500	438	364	304
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	11-1/4	L/240 TL	4718	3604	2914	2445	2105	1847	1646	1147	826	715
		L/240 WL	500	500	500	500	500	500	500	500	443	365
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
7	3-1/2	L/240 TL	1274	963	609	394	228	133	82	52	--	--
		L/240 WL	500	500	500	500	500	500	500	486	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--
	5-1/2	L/240 TL	2003	1529	1235	1036	755	534	334	217	146	101
		L/240 WL	500	500	500	500	500	500	500	500	500	447
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3870	2956	2390	2005	1726	1484	933	614	418	293
		L/240 WL	500	500	500	500	500	500	500	500	462	390
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	4938	3771	3049	2558	2203	1933	1722	1287	881	593
		L/240 WL	500	500	500	500	500	500	500	500	500	497
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	11-1/4	L/240 TL	6005	4587	3708	3111	2679	2351	2094	1888	1596	1129
		L/240 WL	500	500	500	500	500	500	500	500	500	500
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

NOTES:

- Values shown are the maximum factored uniform (vertical) and lateral loads, in pounds per lineal foot (plf), that can be applied to the header in addition to its own weight.
- Selected header shall satisfy both total vertical (TL) and wind loads (WL). Refer to page 3 for determining the lateral load.
- The table is based on uniform loads and dry-use conditions. The values are based on a duration of load factor of 1.15 for combined uniform and lateral loads, and 1.00 for uniform load only.
- The total load deflection is limited to the most restrictive of L/240 or 5/16 inch.
- Trimmers shall support the full header width. Verify trimmer maximum allowable axial load to support the header.
- Multiple pieces may be used when properly connected.
- Sufficient bearing length shall be provided at supports. Review bearing length requirements (shown in inches) to ensure adequacy.



ES12 COLUMNS

L/180 LATERAL DEFLECTION RATIO

TABLE 6.

MAXIMUM FACTORED AXIAL AND LATERAL LOADS

COLUMN LENGTH (ft)	AXIAL AND LATERAL LOADS	5-1/2" WALL THICKNESS					7-1/4" WALL THICKNESS				
		1-3/4"	1-3/4"	3-1/2"	5-1/2"	7-1/4"	1-3/4"	1-3/4"	3-1/2"	5-1/2"	7-1/4"
		2x	3x		(Plank)		2x	3x			
8	Axial Load (lbs) Lateral Load (plf)	14894 150	22341 150	19268 150	30279 150	39913 150	14894 150	19633 150	25399 150	39913 150	52613 150
9	Axial Load (lbs) Lateral Load (plf)	14894 150	22341 150	19268 150	30279 150	39913 150	14894 150	19633 150	25399 150	39913 150	52613 150
10	Axial Load (lbs) Lateral Load (plf)	12139 150	22341 150	19268 150	30279 150	39913 150	12139 150	19633 150	25399 150	39913 150	52613 150
11	Axial Load (lbs) Lateral Load (plf)	8821 134	21724 150	19268 150	30279 150	39913 150	8821 134	19633 150	25399 150	39913 150	52613 150
12	Axial Load (lbs) Lateral Load (plf)	7728 113	14966 150	16724 150	30275 150	39646 150	7728 113	19633 150	25399 150	39913 150	52613 150
13	Axial Load (lbs) Lateral Load (plf)	6781 96	10125 144	15766 118	26902 150	35250 150	6781 96	17084 150	25399 150	39913 150	52613 150
14	Axial Load (lbs) Lateral Load (plf)	6807 79	10159 118	14664 94	22897 148	31353 150	6807 79	12170 144	25399 150	39913 150	52613 150
15	Axial Load (lbs) Lateral Load (plf)	6859 64	10238 96	13251 77	20674 121	27342 150	6859 64	10992 126	25399 150	39913 150	52613 150
16	Axial Load (lbs) Lateral Load (plf)	6713 53	10023 79	11754 63	18349 99	24084 131	6713 53	9940 110	21729 145	38745 150	50714 150
17	Axial Load (lbs) Lateral Load (plf)	6454 44	9637 66	10442 53	16310 83	21415 109	6454 44	9000 98	20762 121	35457 150	46433 150
18	Axial Load (lbs) Lateral Load (plf)	6131 37	9157 55	9293 44	14521 70	19072 92	6131 37	8800 85	19685 102	32009 150	42517 150
19	Axial Load (lbs) Lateral Load (plf)	5777 31	8631 47	8284 38	12949 59	17013 78	5777 31	8979 72	18564 86	28957 136	38858 150
20	Axial Load (lbs) Lateral Load (plf)	5413 27	8089 40	7396 32	11566 51	15200 67	5413 27	8963 62	16960 74	26448 116	34805 150
21	Axial Load (lbs) Lateral Load (plf)	5032 23	7514 35	6616 28	10351 44	13606 58	5032 23	8811 53	15494 64	24174 101	31719 133
22	Axial Load (lbs) Lateral Load (plf)	4542 20	6785 30	5930 24	9281 38	12188 50	4542 20	8571 46	14168 56	22114 87	28970 115
23	Axial Load (lbs) Lateral Load (plf)							8274 41	12967 49	20248 77	26490 101
24	Axial Load (lbs) Lateral Load (plf)							7941 36	11879 43	18556 67	24250 89
25	Axial Load (lbs) Lateral Load (plf)							7589 32	10892 38	17020 60	22223 79
26	Axial Load (lbs) Lateral Load (plf)							7229 28	9996 34	15626 53	20388 70
27	Axial Load (lbs) Lateral Load (plf)							6870 25	9184 30	14361 47	18728 62
28	Axial Load (lbs) Lateral Load (plf)							6431 23	8447 27	13208 42	17223 56
29	Axial Load (lbs) Lateral Load (plf)							5954 20	7778 24	12155 38	15859 50
30	Axial Load (lbs) Lateral Load (plf)							5516 18	7171 22	11200 35	14622 45

NOTES:

- Values shown are the maximum factored axial loads, in pounds (lbs), and lateral loads, in pounds per lineal foot (plf), that can be applied to the column.
- Selected column shall satisfy both total axial and lateral wind loads. Refer to page 3 for determining the lateral load.
- The table is based on dry-use conditions. The values are based on a duration of load factor of 1.15 for combined axial and lateral loads, and 1.00 for axial load only.
- The table is based on a compression perpendicular-to-grain stress of 841 psi.
- 1-3/4-inch built-up columns have been designed for ES11 stud grade. Built-up columns shall be nailed in accordance with CSA O86-09, 6.5.8.7.
- One face of the column must be laterally supported by sheathing, fastened to meet the requirements of NBC, Part 9. The other face must be sheathed with either structural sheathing or drywall.
- Maximum spacing of full depth blocking is 8 ft.

24F HEADERS

L/180 LATERAL DEFLECTION RATIO

TABLE 7.
MAXIMUM FACTORED UNIFORM AND LATERAL LOADS (plf)

WIDTH (in.)	DEPTH (in.)	CRITERIA	ROUGH OPENING (ft)									
			3	4	5	6	7	8	9	10	11	12
5-1/2	3-1/2	L/240 TL	1001	725	423	254	149	81	54	--	--	--
		L/180 WL	500	500	500	500	500	500	427	--	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--	--
	5-1/2	L/240 TL	2307	1762	1424	1083	523	366	290	207	140	97
		L/180 WL	500	500	500	500	500	402	320	261	216	183
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3041	2322	1878	1575	1356	728	507	411	329	230
		L/180 WL	500	500	500	500	500	500	422	344	285	241
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	3880	2963	2396	2010	1731	1519	970	673	556	466
		L/180 WL	500	500	500	500	500	500	500	438	364	307
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
7	11-1/4	L/240 TL	4718	3604	2914	2445	2105	1847	1646	1147	826	715
		L/180 WL	500	500	500	500	500	500	500	500	443	365
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	3-1/2	L/240 TL	1274	963	609	394	228	133	82	52	--	--
		L/180 WL	500	500	500	500	500	500	500	500	--	--
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	--	--
	5-1/2	L/240 TL	2003	1529	1235	1036	755	534	334	217	146	101
		L/180 WL	500	500	500	500	500	500	500	500	500	500
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	7-1/4	L/240 TL	3870	2956	2390	2005	1726	1484	933	614	418	293
		L/180 WL	500	500	500	500	500	500	500	500	462	390
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	9-1/4	L/240 TL	4938	3771	3049	2558	2203	1933	1722	1287	881	593
		L/180 WL	500	500	500	500	500	500	500	500	500	497
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	11-1/4	L/240 TL	6005	4587	3708	3111	2679	2351	2094	1888	1596	1129
		L/180 WL	500	500	500	500	500	500	500	500	500	500
		End B.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

NOTES:

- Values shown are the maximum factored uniform (vertical) and lateral loads, in pounds per lineal foot (plf), that can be applied to the header in addition to its own weight.
- Selected header shall satisfy both total vertical (TL) and wind loads (WL). Refer to page 3 for determining the lateral load.
- The table is based on uniform loads and dry-use conditions. The values are based on a duration of load factor of 1.15 for combined uniform and lateral loads, and 1.00 for uniform load only.
- The total load deflection is limited to the most restrictive of L/240 or 5/16 inch.
- Trimmers shall support the full header width. Verify trimmer maximum allowable axial load to support the header.
- Multiple pieces may be used when properly connected.
- Sufficient bearing length shall be provided at supports. Review bearing length requirements (shown in inches) to ensure adequacy.



DESIGN VALUES FOR NORDIC LAM™



SPECIFIED STRENGTHS AND DESIGN PROPERTIES ^(1,2,3)

APPLICATION	WALL STUDS	COLUMNS
APPEARANCE GRADE	INDUSTRIAL	INDUSTRIAL
STRESS GRADE	ES11	ES12
EWS LAYUP COMBINATION	ES11/NPG	ES12/NPG
Bending About X-X Axis		
Bending at extreme fibre (F_{bx}) ^(4,5)	2495 psi	4453 psi
Longitudinal shear (F_{vx}) ⁽⁶⁾	319 psi	319 psi
Compression perpendicular to grain (F_{cpx}) ⁽⁷⁾	841 psi	1088 psi
Shear-free modulus of elasticity (E_x)	1.6E+06 psi	1.9E+06 psi
Apparent modulus of elasticity ($E_{x,app.}$) ⁽⁸⁾	1.5E+06 psi	1.8E+06 psi
Bending About Y-Y Axis		
Bending at extreme fibre (F_{by}) ⁽⁵⁾ for 3 laminations	3249 psi 2959 psi	4453 psi 4453 psi
Longitudinal shear (F_{vy}) ⁽⁶⁾	218 psi	319 psi
Compression perpendicular to grain (F_{cpy}) ⁽⁷⁾	841 psi	1088 psi
Shear-Free modulus of elasticity (E_y)	1.6E+06 psi	1.9E+06 psi
Apparent modulus of elasticity ($E_{y,app.}$) ⁽⁸⁾	1.5E+06 psi	1.8E+06 psi
Axially Loaded		
Compression parallel to grain (F_c) for 3 laminations	3234 psi 2814 psi	4786 psi 3539 psi
Tension parallel to grain (F_t)	1813 psi	2959 psi
Tension perpendicular to grain (F_{tp})	74 psi	74 psi
Modulus of elasticity (E_a) ⁽⁸⁾	1.6E+06 psi	1.9E+06 psi
Mean relative density	0.42	0.47
Density (for member weight)	35pcf	35pcf

- (1) The combinations in this table are applicable to members consisting of 4 or more laminations, unless otherwise noted (3-lamination applies to 3-1/2 x 3-1/2 in. columns).
- (2) The tabulated design values are for dry service conditions. For wet service conditions, multiply the tabulated values by the wet service condition factors, K_s , per CSA O86-09, Clause 6.4.2.
- (3) The tabulated design values are for standard term duration of load. For other durations of load, see applicable design code (CSA O86-09, Clauses 4.3.2 and 6).
- (4) Nordic Lam bending members are symmetrical throughout the depth of the member (balanced layups). Vertically glued-laminated beams shall be designed using the specified strengths and modulus of elasticity for bending about Y-Y axis. (Clause 6.5.3 of CSA O86-09 is not applicable.)
- (5) The tabulated specified strengths in bending (F_{bx} and F_{by}) shall be multiplied by a size factor, K_{Zbg} . The size factor formula is: $K_{Zbg} = 1.03(BL)^{-0.18} \leq 1.0$, where B = net beam width (m), and L = length of beam segment from point of zero moment to point of zero moment (m).
- (6) At the location of notches in rectangular members, the specified strength in shear (F_s) shall be multiplied by a notch factor, K_N , determined per CSA O86-09, Clause 6.5.7.2.2.
- (7) The compression perpendicular to grain strength values (F_{cp}) shall be permitted to be adjusted by a size factor for bearing, K_{Zcp} , per CSA O86-09, Clause 6.5.9.2.
- (8) The tabulated apparent E values already include a 5% shear deflection. For column stability calculations, E_{05} shall be determined by multiplying the tabulated apparent modulus of elasticity by 0.87.
- (9) Design of glulam members shall be in accordance to CSA O86-09 Standard.

Refer to Nordic Lam Design and Construction Guide for more information.
Nordic Lam products are listed in APA Product Report PR-L294C and CCMC Evaluation Report 13216-R.



Sustainable Wood Solutions

HEAD OFFICE AND TECHNICAL SERVICES

info@nordicewp.com • www.nordicewp.com

T. 514.871.8526 • F. 514.871.9789

