



# BEAMS, HEADERS, AND COLUMNS



Featuring Trus Joist<sup>®</sup> TimberStrand<sup>®</sup> LSL,  
Microllam<sup>®</sup> LVL, and Parallam<sup>®</sup> PSL

- Uniform and Predictable
- Minimal Bowing, Twisting, and Shrinking
- Strong and Straight
- Limited Product Warranty





The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Trus Joist® products, contact your Weyerhaeuser representative.

This guide is for use with NBCC 2010, NBCC 2015, CSA O86-09 and CSA O86-14.

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## Why Choose Trus Joist® Beams, Columns, and Headers?

- Reliable performance
- Consistent quality and dependable uniformity
- Flexible solutions for your beam and header needs
- Backed by a limited product warranty

Using advanced technology, Weyerhaeuser manufactures engineered lumber that is consistently straight and strong, and that resists bowing, twisting, and shrinking. That means less waste, easier installation, and higher design values for starters; plus fewer callbacks, shorter cycle times, more design flexibility, and lower overall installed cost in the end. Trus Joist® TimberStrand® LSL, Microllam® LVL, and Parallam® PSL are structural solutions you can count on—guaranteed.

## This guide features Trus Joist® engineered lumber in the following widths and depths:

### TimberStrand® LSL

**1.55E TimberStrand® LSL** header and beam sizes:

Widths: 1¾" and 3½"

Depths: 9½", 11⅞", 14", and 16"

### Microllam® LVL

**2.0E Microllam® LVL** header and beam sizes:

Width: 1¾"

Depths: 5½", 7¼", 9¼", 9½", 11¼", 11⅞", 14", 16", 18", and 20"

### Parallam® PSL

**2.2E Parallam® PSL** header and beam sizes:

Widths: 3½", 5¼", and 7"

Depths: 9¼", 9½", 11¼", 11⅞", 14", 16", and 19"

**1.8E Parallam® PSL** column and post sizes:

3½" x 3½"    3½" x 5¼"    3½" x 7"    5¼" x 5¼"    5¼" x 7"    7" x 7"

For deeper depth Parallam® PSL beams, see the *Trus Joist® 2.2E Parallam® PSL Deep Beam Technical Resource Sheet, #TJ-7501*, or contact your Weyerhaeuser representative.

Grades shown are available in Western Canada; some sizes may not be available in your region.

## PRODUCT STORAGE



Protect product from sun and water

**CAUTION:**  
Wrap is slippery when wet or icy

Align stickers (2x3 or larger)  
directly over support blocks

Use support blocks (6x6 or larger)  
at 10' on-centre to keep bundles  
out of mud and water

# STRUCTURAL SOLUTIONS

## Trus Joist® TimberStrand® Laminated Strand Lumber (LSL)

- One-piece members reduce labor time
- Every piece is straight and strong
- Unique properties allow you to drill larger holes through 1.55E TimberStrand® LSL. See **Allowable Holes** on page 12.

Code Evaluations: See **CCMC 12627-R**



## Trus Joist® Microllam® Laminated Veneer Lumber (LVL)

- Can easily be built up on site to reduce heavy lifting
- Offers reliable and economical solutions for beam and header applications
- Manufacturing process minimizes many of the natural inconsistencies found in wood

Code Evaluations: See **CCMC 08675-R**



## Trus Joist® Parallam® Parallel Strand Lumber (PSL)

- Allows long spans for open floor plans without intermediate posts or columns
- Has warm, unique grain that is perfect for applications with exposed beams
- Provides ideal solutions for cantilever and multi-span applications
- Solid sections save time on site assembly

Code Evaluations: See **CCMC 11161-R**



## General Assumptions for Products Shown in this Guide

- Specified strengths and factored resistances are based on Limit States Design per CSA O86.
- Lateral support is required at bearing and along the span at 24" on-centre, maximum.
- Bearing lengths are based on each product's bearing resistance for applicable grade and orientation.
- All members 7¼" and less in depth are restricted to a maximum deflection of 5/16".
- Beams that are 1¾" x 16" and deeper require multiple plies. Some exceptions allowed when using Weyerhaeuser software.
- No camber.
- Beams and columns must remain straight to within 5L²/4608 (in.) of true alignment. L is the unrestrained length of the member in feet.

For applications not covered in this guide, contact your Weyerhaeuser representative.

**See pages 14–16 for multiple-member beam connections.**

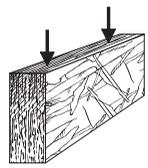
**TimberStrand® LSL, Microllam® LVL, and untreated Parallam® PSL are intended for dry-use applications**

# DESIGN PROPERTIES

## Factored Resistances<sup>(1)</sup> (Standard Term)

Grade	Width	Design Property	Depth										
			5½"	7¼"	9¼"	9½"	11¼"	11¾"	14"	16"	18"	19"	20"
<b>TimberStrand® LSL</b>													
1.55E	1¾"	Factored Moment Resistance (ft-lbs)				8,665		13,260	18,155	23,425			
		Factored Shear Resistance (lbs)				5,735		7,170	8,455	9,660			
		Moment of Inertia (in. <sup>4</sup> )				125		244	400	597			
		Weight (plf)				5.2		6.5	7.7	8.8			
	3½"	Factored Moment Resistance (ft-lbs)				17,325		26,525	36,310	46,850			
		Factored Shear Resistance (lbs)				11,470		14,340	16,905	19,320			
		Moment of Inertia (in. <sup>4</sup> )				250		488	800	1,195			
		Weight (plf)				10.4		13.0	15.3	17.5			
<b>Microllam® LVL</b>													
2.0E	1¾"	Factored Moment Resistance (ft-lbs)	3,535	5,915	9,315	9,790	13,420	14,845	20,175	25,875	32,230		39,220
		Factored Shear Resistance (lbs)	3,060	4,035	5,150	5,285	6,260	6,610	7,790	8,905	10,015		11,130
		Moment of Inertia (in. <sup>4</sup> )	24	56	115	125	208	244	400	597	851		1,167
		Weight (plf)	2.8	3.7	4.7	4.8	5.7	6.1	7.1	8.2	9.2		10.2
<b>Parallam® PSL</b>													
2.2E	3½"	Factored Moment Resistance (ft-lbs)			20,655	21,720	29,890	33,105	45,180	58,145		80,445	
		Factored Shear Resistance (lbs)			10,490	10,775	12,760	13,465	15,875	18,145		21,545	
		Moment of Inertia (in. <sup>4</sup> )			231	250	415	488	800	1,195		2,001	
		Weight (plf)			10.1	10.4	12.3	13.0	15.3	17.5		20.8	
	5¼"	Factored Moment Resistance (ft-lbs)			30,980	32,580	44,840	49,660	67,775	87,220		120,665	
		Factored Shear Resistance (lbs)			15,735	16,160	19,135	20,200	23,815	27,215		32,320	
		Moment of Inertia (in. <sup>4</sup> )			346	375	623	733	1,201	1,792		3,001	
		Weight (plf)			15.2	15.6	18.5	19.5	23.0	26.3		31.2	
	7"	Factored Moment Resistance (ft-lbs)			41,305	43,440	59,785	66,215	90,365	116,290		160,890	
		Factored Shear Resistance (lbs)			20,980	21,545	25,515	26,935	31,750	36,290		43,090	
		Moment of Inertia (in. <sup>4</sup> )			462	500	831	977	1,601	2,389		4,001	
		Weight (plf)			20.2	20.8	24.6	26.0	30.6	35.0		41.6	

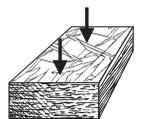
Beam Orientation



Column Orientation



Plank Orientation



(1) For product in beam orientation, unless otherwise noted.

## Specified Strengths<sup>(1)</sup> and Moduli of Elasticity (Standard Term)

Grade	Orientation	G Shear Modulus of Elasticity (psi)	E Modulus of Elasticity <sup>(2)</sup> (psi)	f <sub>b</sub> Flexural Stress <sup>(3)</sup> (psi)	f <sub>t</sub> Tension Stress <sup>(4)</sup> (psi)	f <sub>c⊥</sub> Compression Perpendicular to Grain (psi)	f <sub>c  </sub> Compression Parallel to Grain (psi)	f <sub>v</sub> Horizontal Shear Parallel to Grain (psi)	SG Equivalent Specific Gravity <sup>(5)</sup>
<b>TimberStrand® LSL</b>									
1.55E	Beam	96,875	1.55 x 10 <sup>6</sup>	4,295	1,975 <sup>(7)</sup>	1,635	3,465	575 <sup>(7)</sup>	0.50 <sup>(6)</sup>
<b>Microllam® LVL</b>									
2.0E	Beam	125,000	2.0 x 10 <sup>6</sup>	4,805	2,870	1,365	4,005	530	0.50
<b>Parallam® PSL</b>									
1.8E	Column	112,500	1.8 x 10 <sup>6</sup>	4,435 <sup>(8)</sup>	3,245	990 <sup>(8)</sup>	3,990	355 <sup>(8)</sup>	0.50
2.2E	Beam	137,500	2.2 x 10 <sup>6</sup>	5,360	3,750	1,135	4,630 <sup>(9)</sup>	540	0.50

(1) To obtain factored resistances, apply the appropriate formulae from CSA O86 to the specified strengths shown.

(2) To properly calculate deflections for the full range of typical SCL span and loading applications, bending and shear deflection must be considered. Use the following equation for simple span, uniformly loaded beams:

$$\Delta = \frac{270 wL^4}{Ebd^3} + \frac{28.8 wL^2}{Ebd}$$

Where:  $\Delta$  = deflection (in.)     $w$  = uniform load (plf)  
 $L$  = span (feet)     $b$  = beam thickness (in.)  
 $d$  = beam depth (in.)     $E$  = modulus of elasticity (psi)

For other span and loading conditions, use engineering mechanics to account for both bending and shear deflection or use Forte®WEB software.

(3) For 12" depth. For other depths, multiply f<sub>b</sub> by the appropriate factor as follows:

- For TimberStrand® LSL, multiply by  $\left[\frac{12}{d}\right]^{0.092}$
- For Microllam® LVL, multiply by  $\left[\frac{12}{d}\right]^{0.136}$
- For Parallam® PSL, multiply by  $\left[\frac{12}{d}\right]^{0.111}$

**TimberStrand® LSL, Microllam® LVL, and untreated Parallam® PSL are intended for dry-use applications**

(4) f<sub>t</sub> has been adjusted to reflect the volume effects for most standard applications.

(5) For lateral connection design only.

(6) Specific gravity of 0.58 may be used for bolts installed perpendicular to face and loaded perpendicular to grain.

(7) Value accounts for large hole capabilities. See **Allowable Holes** on page 12.

(8) Value shown is for plank orientation.

(9) For column applications, use a specified strength of 800 psi. Alternatively, refer to CCMC 11161-R, Table 4.4.1, footnote 9.

# FLOOR AND/OR SNOW LOAD TABLES

## How to Use This Table

1. Calculate the factored and unfactored total load (TL) (neglect beam weight) and the unfactored live load (LL) on the beam or header in pounds per linear foot (plf).
2. Select appropriate **Span** (centre-to-centre of bearing).
3. Scan horizontally to find the proper width and a depth that has a capacity that meets or exceeds actual loads.
4. Review bearing length requirements to ensure adequacy.

## General Notes

- Table is based on:
  - Uniform loads (beam weight considered).
  - More restrictive of simple or continuous span.
  - Deflection criteria of L/360 live load (LL) and L/240 total load (TL).
- For a live load deflection limit of L/480, multiply **Unfactored Resistance (LL)** by 0.75. For a total load limit of L/180 multiply **Unfactored Resistance (TL)** by 1.33. The resulting loads must not exceed the **Total Factored Resistance** shown.
- For continuous spans, ratio of short span to long span should be 0.4 or greater to prevent uplift.

Also **General Assumptions** on page 3.

## 1.55E TimberStrand® LSL: Floor and/or Snow—Standard Term (PLF)

Span	Condition	1½" Width			3½" Width				5¼" Width (2- or 3-ply)			
		9½"	11½"	14"	9½"	11½"	14"	16"	9½"	11½"	14"	16"
4'	Unfactored Resistance (LL)	*	*	*	*	*	*	*	*	*	*	*
	Unfactored Resistance (TL)	*	*	*	*	*	*	*	*	*	*	*
	Total Factored Resistance	3,350	4,738	5,140	6,701	9,477	10,278	10,278	10,052	14,215	15,417	15,417
	Min. End/Int. Bearing (in.)	2.9/7.3	4.1/10.4	4.5/11.3	2.9/7.3	4.1/10.4	4.5/11.3	4.5/11.3	2.9/7.3	4.1/10.4	4.5/11.3	4.5/11.3
5'	Unfactored Resistance (LL)	1,658	*	*	3,316	*	*	*	4,975	*	*	*
	Unfactored Resistance (TL)	*	*	*	*	*	*	*	*	*	*	*
	Total Factored Resistance	2,451	3,349	4,110	4,903	6,698	8,218	8,218	7,354	10,047	12,327	12,327
	Min. End/Int. Bearing (in.)	2.7/6.7	3.7/9.2	4.5/11.3	2.7/6.7	3.7/9.2	4.5/11.3	4.5/11.3	2.7/6.7	3.7/9.2	4.5/11.3	4.5/11.3
6'	Unfactored Resistance (LL)	1,048	*	*	2,097	*	*	*	3,146	*	*	*
	Unfactored Resistance (TL)	*	*	*	*	*	*	*	*	*	*	*
	Total Factored Resistance	1,918	2,589	3,262	3,837	5,178	6,524	6,845	5,756	7,767	9,787	10,267
	Min. End/Int. Bearing (in.)	2.5/6.3	3.4/8.5	4.3/10.7	2.5/6.3	3.4/8.5	4.3/10.7	4.5/11.3	2.5/6.3	3.4/8.5	4.3/10.7	4.5/11.3
8'	Unfactored Resistance (LL)	487	886	1,352	974	1,773	2,705	*	1,462	2,660	4,058	*
	Unfactored Resistance (TL)	725	*	*	1,451	*	*	*	2,177	*	*	*
	Total Factored Resistance	1,076	1,649	2,195	2,152	3,299	4,390	5,128	3,229	4,948	6,586	7,692
	Min. End/Int. Bearing (in.)	1.9/4.7	2.9/7.2	3.9/9.6	1.9/4.7	2.9/7.2	3.9/9.6	4.5/11.3	1.9/4.7	2.9/7.2	3.9/9.6	4.5/11.3
9'-6"	Unfactored Resistance (LL)	302	560	870	605	1,121	1,740	2,456	907	1,681	2,610	3,684
	Unfactored Resistance (TL)	448	*	*	897	*	*	*	1,346	*	*	*
	Total Factored Resistance	761	1,167	1,599	1,522	2,334	3,199	4,130	2,284	3,502	4,799	6,196
	Min. End/Int. Bearing (in.)	1.6/4	2.4/6.1	3.3/8.3	1.6/4	2.4/6.1	3.3/8.3	4.3/10.8	1.6/4	2.4/6.1	3.3/8.3	4.3/10.8
10'	Unfactored Resistance (LL)	261	487	760	523	974	1,520	2,154	785	1,462	2,280	3,232
	Unfactored Resistance (TL)	387	724	*	775	1,449	*	*	1,162	2,174	*	*
	Total Factored Resistance	686	1,052	1,442	1,373	2,105	2,885	3,725	2,059	3,158	4,328	5,588
	Min. End/Int. Bearing (in.)	1.5/3.8	2.3/5.8	3.2/7.9	1.5/3.8	2.3/5.8	3.2/7.9	4.1/10.2	1.5/3.8	2.3/5.8	3.2/7.9	4.1/10.2
12'	Unfactored Resistance (LL)	155	293	464	311	587	928	1,334	467	881	1,393	2,001
	Unfactored Resistance (TL)	228	434	688	456	868	1,377	*	685	1,302	2,066	*
	Total Factored Resistance	474	728	999	949	1,457	1,998	2,580	1,424	2,185	2,997	3,871
	Min. End/Int. Bearing (in.)	1.5/3.5	1.9/4.8	2.6/6.6	1.5/3.5	1.9/4.8	2.6/6.6	3.4/8.5	1.5/3.5	1.9/4.8	2.6/6.6	3.4/8.5
14'	Unfactored Resistance (LL)	99	189	302	199	379	605	877	299	569	907	1,316
	Unfactored Resistance (TL)	144	278	446	288	556	892	1,298	433	834	1,338	1,948
	Total Factored Resistance	347	533	731	694	1,066	1,462	1,890	1,041	1,599	2,194	2,835
	Min. End/Int. Bearing (in.)	1.5/3.5	1.7/4.1	2.3/5.7	1.5/3.5	1.7/4.1	2.3/5.7	2.9/7.3	1.5/3.5	1.7/4.1	2.3/5.7	2.9/7.3
16'-6"	Unfactored Resistance (LL)	61	118	189	123	236	379	555	185	354	569	832
	Unfactored Resistance (TL)	87	170	277	174	341	554	815	262	512	831	1,222
	Total Factored Resistance	248	381	523	496	763	1,047	1,354	744	1,144	1,571	2,032
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.9/4.8	1.5/3.5	1.5/3.5	1.9/4.8	2.5/6.2	1.5/3.5	1.5/3.5	1.9/4.8	2.5/6.2
18'-6"	Unfactored Resistance (LL)	44	84	136	88	169	273	401	132	254	410	601
	Unfactored Resistance (TL)	60	120	197	121	241	395	584	182	362	592	876
	Total Factored Resistance	196	301	414	392	603	829	1,073	588	905	1,244	1,609
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.7/4.3	1.5/3.5	1.5/3.5	1.7/4.3	2.2/5.5	1.5/3.5	1.5/3.5	1.7/4.3	2.2/5.5
20'	Unfactored Resistance (LL)		67	109	70	135	218	320	105	202	327	481
	Unfactored Resistance (TL)		94	156	94	189	312	463	142	284	468	695
	Total Factored Resistance		257	353	333	514	707	915	500	771	1,060	1,372
	Min. End/Int. Bearing (in.)		1.5/3.5	1.6/4	1.5/3.5	1.5/3.5	1.6/4	2/5.1	1.5/3.5	1.5/3.5	1.6/4	2/5.1

\* Indicates **Total Factored Resistance** value controls.

# FLOOR AND/OR SNOW LOAD TABLES

## How to Use This Table

1. Calculate the factored and unfactored total load (TL) (neglect beam weight) and the unfactored live load (LL) on the beam or header in pounds per linear foot (plf).
2. Select appropriate **Span** (centre-to-centre of bearing).
3. Scan horizontally to find the proper width and a depth that has a capacity that meets or exceeds actual loads.
4. Review bearing length requirements to ensure adequacy.

Also see **General Notes** on page 7.

## 2.OE Microllam® LVL: Floor and/or Snow—Standard Term (PLF)

Span	Condition	1¾" Width							3½" Width (2-ply)						
		5½"	7¼"	9¼"	9½"	11¼"	11½"	14"	5½"	7¼"	9¼"	9½"	11¼"	11½"	14"
6'	Unfactored Resistance (LL)	305	660	*	*	*	*	*	611	1,319	*	*	*	*	*
	Unfactored Resistance (TL)	455	*	*	*	*	*	*	911	*	*	*	*	*	
	Total Factored Resistance	782	1,278	1,722	1,781	2,219	2,386	2,859	1,564	2,556	3,444	3,562	4,438	4,773	5,713
	Min. End/Int. Bearing (in.)	1.5/3.5	2/5	2.7/6.8	2.8/7	3.5/8.7	3.8/9.4	4.5/11.3	1.5/3.5	2/5	2.7/6.8	2.8/7	3.5/8.7	3.8/9.4	4.5/11.3
8'	Unfactored Resistance (LL)	134	296	585	629	992	*	*	267	591	1,169	1,258	1,985	*	*
	Unfactored Resistance (TL)	154	343	*	*	*	*	*	308	686	*	*	*	*	*
	Total Factored Resistance	438	735	1,159	1,218	1,534	1,640	2,024	877	1,470	2,318	2,436	3,068	3,280	4,047
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.9	2.4/6.1	2.6/6.4	3.2/8.1	3.4/8.6	4.3/10.6	1.5/3.5	1.5/3.9	2.4/6.1	2.6/6.4	3.2/8.1	3.4/8.6	4.3/10.6
9'-6"	Unfactored Resistance (LL)	80	178	362	390	624	723	*	160	357	724	781	1,248	1,447	*
	Unfactored Resistance (TL)	77	175	539	581	*	*	*	154	349	1,077	1,162	*	*	*
	Total Factored Resistance	310	520	820	862	1,182	1,308	1,624	620	1,040	1,640	1,724	2,365	2,616	3,248
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	2.1/5.1	2.2/5.4	3/7.4	3.3/8.2	4.1/10.1	1.5/3.5	1.5/3.5	2.1/5.1	2.2/5.4	3/7.4	3.3/8.2	4.1/10.1
10'	Unfactored Resistance (LL)	65	146	313	338	542	629	981	131	292	627	676	1,084	1,258	1,961
	Unfactored Resistance (TL)	62	142	465	502	*	*	*	125	285	931	1,004	*	*	*
	Total Factored Resistance	279	469	739	777	1,066	1,180	1,524	559	937	1,479	1,555	2,133	2,360	3,047
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	2/4.9	2/5.1	2.8/7	3.1/7.8	4/10	1.5/3.5	1.5/3.5	2/4.9	2/5.1	2.8/7	3.1/7.8	4/10
12'	Unfactored Resistance (LL)	32	72	186	201	326	379	599	64	143	372	402	651	758	1,198
	Unfactored Resistance (TL)	29	68	274	297	483	563	*	58	136	549	593	965	1,125	*
	Total Factored Resistance	193	324	512	538	738	817	1,112	386	648	1,023	1,076	1,477	1,634	2,224
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.6/4.1	1.7/4.3	2.3/5.9	2.6/6.5	3.5/8.8	1.5/3.5	1.5/3.5	1.6/4.1	1.7/4.3	2.3/5.9	2.6/6.5	3.5/8.8
14'	Unfactored Resistance (LL)		39	119	129	210	245	390	35	78	238	257	420	490	781
	Unfactored Resistance (TL)		35	174	188	309	361	*	29	71	348	376	618	723	*
	Total Factored Resistance		237	374	394	541	598	814	282	474	749	787	1,081	1,197	1,629
	Min. End/Int. Bearing (in.)		1.5/3.5	1.5/3.5	1.5/3.7	2/5	2.2/5.5	3/7.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.7	2/5	2.2/5.5	3/7.5
16'-6"	Unfactored Resistance (LL)			74	80	130	153	245	18	41	147	159	261	305	490
	Unfactored Resistance (TL)			106	115	190	223	361	12	33	212	229	380	446	721
	Total Factored Resistance			268	282	387	429	584	201	338	536	563	774	857	1,168
	Min. End/Int. Bearing (in.)			1.5/3.5	1.5/3.5	1.7/4.3	1.9/4.7	2.6/6.4	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.7/4.3	1.9/4.7	2.6/6.4
18'-6"	Unfactored Resistance (LL)			53	57	93	109	176		26	105	114	187	219	353
	Unfactored Resistance (TL)			74	81	134	158	258		19	148	161	269	316	515
	Total Factored Resistance			212	223	307	339	463		267	424	446	613	679	925
	Min. End/Int. Bearing (in.)			1.5/3.5	1.5/3.5	1.5/3.8	1.7/4.2	2.3/5.7		1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.8	1.7/4.2	2.3/5.7
20'	Unfactored Resistance (LL)			42	45	74	87	141		19	84	90	149	174	282
	Unfactored Resistance (TL)			58	63	106	125	204		12	116	126	212	249	408
	Total Factored Resistance			180	190	261	289	395		227	361	380	522	579	789
	Min. End/Int. Bearing (in.)			1.5/3.5	1.5/3.5	1.5/3.5	1.6/3.9	2.1/5.3		1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.6/3.9	2.1/5.3
24'	Unfactored Resistance (LL)					43	51	83			49	53	87	102	166
	Unfactored Resistance (TL)					59	70	117			64	69	119	141	234
	Total Factored Resistance					179	199	271			247	260	358	397	543
	Min. End/Int. Bearing (in.)					1.5/3.5	1.5/3.5	1.8/4.4			1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.8/4.4
28'	Unfactored Resistance (LL)							53			31	33	55	65	105
	Unfactored Resistance (TL)							72			37	40	71	85	144
	Total Factored Resistance							197			178	188	260	288	394
	Min. End/Int. Bearing (in.)							1.5/3.8			1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.8

\* Indicates Total Factored Resistance value controls.

# FLOOR AND/OR SNOW LOAD TABLES

## General Notes

- Table is based on:
  - Uniform loads (beam weight considered).
  - More restrictive of simple or continuous span.
  - Deflection criteria of L/360 live load (LL) and L/240 total load (TL).
- For a live load deflection limit of L/480, multiply **Unfactored Resistance (LL)** by 0.75. For a total load limit of Lr/180 multiply **Unfactored Resistance (TL)** by 1.33. The resulting loads must not exceed the **Total Factored Resistance** shown.
- For continuous spans, ratio of short span to long span should be 0.4 or greater to prevent uplift.

Also see **How to Use This Table** on page 6 and **General Assumptions** on page 3.

## 2.OE Microllam® LVL: Floor and/or Snow—Standard Term (PLF) *continued*

Span	Condition	3½" Width (2-ply)			5¼" Width (3-ply)										
		16"	18"	20"	5½"	7¼"	9¼"	9½"	11¼"	11½"	14"	16"	18"	20"	
6'	Unfactored Resistance (LL)	*	*	*	916	1,979	*	*	*	*	*	*	*	*	*
	Unfactored Resistance (TL)	*	*	*	1,366	*	*	*	*	*	*	*	*	*	*
	Total Factored Resistance	5,713	5,713	5,713	2,346	3,834	5,166	5,343	6,656	7,159	8,569	8,569	8,569	8,569	
	Min. End/Int. Bearing (in.)	4.5/11.3	4.5/11.3	4.5/11.3	1.5/3.5	2/5	2.7/6.8	2.8/7	3.5/8.7	3.8/9.4	4.5/11.3	4.5/11.3	4.5/11.3	4.5/11.3	
8'	Unfactored Resistance (LL)	*	*	*	401	887	1,754	1,887	2,977	*	*	*	*	*	
	Unfactored Resistance (TL)	*	*	*	462	1,028	*	*	*	*	*	*	*	*	
	Total Factored Resistance	4,279	4,279	4,279	1,315	2,205	3,476	3,654	4,602	4,921	6,071	6,419	6,419	6,419	
	Min. End/Int. Bearing (in.)	4.5/11.3	4.5/11.3	4.5/11.3	1.5/3.5	1.5/3.9	2.4/6.1	2.6/6.4	3.2/8.1	3.4/8.6	4.3/10.6	4.5/11.3	4.5/11.3	4.5/11.3	
9'-6"	Unfactored Resistance (LL)	*	*	*	240	535	1,087	1,171	1,873	2,170	*	*	*	*	
	Unfactored Resistance (TL)	*	*	*	231	524	1,616	1,742	*	*	*	*	*	*	
	Total Factored Resistance	3,600	3,600	3,600	930	1,560	2,460	2,586	3,547	3,924	4,872	5,401	5,401	5,401	
	Min. End/Int. Bearing (in.)	4.5/11.3	4.5/11.3	4.5/11.3	1.5/3.5	1.5/3.5	2.1/5.1	2.2/5.4	3/7.4	3.3/8.2	4.1/10.1	4.5/11.3	4.5/11.3	4.5/11.3	
10'	Unfactored Resistance (LL)	*	*	*	196	439	940	1,014	1,626	1,887	2,942	*	*	*	
	Unfactored Resistance (TL)	*	*	*	187	427	1,396	1,506	*	*	*	*	*	*	
	Total Factored Resistance	3,419	3,419	3,419	838	1,406	2,218	2,332	3,199	3,540	4,571	5,129	5,129	5,129	
	Min. End/Int. Bearing (in.)	4.5/11.3	4.5/11.3	4.5/11.3	1.5/3.5	1.5/3.5	2/4.9	2/5.1	2.8/7	3.1/7.8	4/10	4.5/11.3	4.5/11.3	4.5/11.3	
12'	Unfactored Resistance (LL)	*	*	*	95	215	558	603	977	1,137	1,798	2,583	*	*	
	Unfactored Resistance (TL)	*	*	*	87	204	823	890	1,448	1,688	*	*	*	*	
	Total Factored Resistance	2,846	2,846	2,846	579	972	1,535	1,614	2,215	2,451	3,336	4,269	4,269	4,269	
	Min. End/Int. Bearing (in.)	4.5/11.3	4.5/11.3	4.5/11.3	1.5/3.5	1.5/3.5	1.6/4.1	1.7/4.3	2.3/5.9	2.6/6.5	3.5/8.8	4.5/11.3	4.5/11.3	4.5/11.3	
14'	Unfactored Resistance (LL)	1,132	1,561	*	52	117	357	386	629	735	1,171	1,698	2,342	*	
	Unfactored Resistance (TL)	*	*	*	43	106	522	565	927	1,084	*	*	*	*	
	Total Factored Resistance	2,092	2,437	2,437	422	711	1,123	1,181	1,622	1,795	2,443	3,138	3,655	3,655	
	Min. End/Int. Bearing (in.)	3.9/9.7	4.5/11.3	4.5/11.3	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.7	2/5	2.2/5.5	3/7.5	3.9/9.7	4.5/11.3	4.5/11.3	
16'-6"	Unfactored Resistance (LL)	716	996	1,331	27	61	221	239	391	458	735	1,074	1,493	1,996	
	Unfactored Resistance (TL)	*	*	*	19	50	317	344	570	669	1,082	*	*	*	
	Total Factored Resistance	1,500	1,871	2,064	301	508	804	845	1,162	1,286	1,752	2,250	2,807	3,096	
	Min. End/Int. Bearing (in.)	3.3/8.2	4.1/10.2	4.5/11.3	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.7/4.3	1.9/4.7	2.6/6.4	3.3/8.2	4.1/10.2	4.5/11.3	
18'-6"	Unfactored Resistance (LL)	518	723	971	17	39	158	171	280	328	529	777	1,084	1,456	
	Unfactored Resistance (TL)	760	*	*	9	28	223	242	403	474	773	1,140	*	*	
	Total Factored Resistance	1,189	1,484	1,808	237	401	636	668	920	1,018	1,388	1,784	2,226	2,712	
	Min. End/Int. Bearing (in.)	2.9/7.3	3.6/9.1	4.4/11.1	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.8	1.7/4.2	2.3/5.7	2.9/7.3	3.6/9.1	4.4/11.1	
20'	Unfactored Resistance (LL)	414	580	781	13	29	125	136	223	262	423	621	870	1,171	
	Unfactored Resistance (TL)	605	851	*	4	17	174	189	318	374	612	907	1,277	*	
	Total Factored Resistance	1,015	1,266	1,543	202	341	541	569	784	868	1,184	1,522	1,899	2,315	
	Min. End/Int. Bearing (in.)	2.7/6.8	3.4/8.4	4.1/10.3	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.6/3.9	2.1/5.3	2.7/6.8	3.4/8.4	4.1/10.3	
24'	Unfactored Resistance (LL)	244	344	466	14	73	79	130	153	248	367	516	698		
	Unfactored Resistance (TL)	350	498	678	3	95	104	178	211	351	526	746	1,017		
	Total Factored Resistance	698	872	1,064	233	371	390	538	596	814	1,048	1,308	1,596		
	Min. End/Int. Bearing (in.)	2.3/5.6	2.8/7.0	3.4/8.6	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.8/4.4	2.3/5.6	2.8/7.0	3.4/8.6	
28'	Unfactored Resistance (LL)	156	220	299			46	50	83	97	158	234	330	448	
	Unfactored Resistance (TL)	217	311	428			55	60	107	127	215	326	467	641	
	Total Factored Resistance	508	635	775			268	282	389	432	591	761	952	1,162	
	Min. End/Int. Bearing (in.)	1.9/4.8	2.4/6.0	2.9/7.3			1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.8	1.9/4.8	2.4/6.0	2.9/7.3	

\* Indicates Total Factored Resistance value controls.

# FLOOR AND/OR SNOW LOAD TABLES

## How to Use This Table

1. Calculate the factored and unfactored total load (TL) (neglect beam weight) and the unfactored live load (LL) on the beam or header in pounds per linear foot (plf).
2. Select appropriate **Span** (centre-to-centre of bearing).
3. Scan horizontally to find the proper width and a depth that has a capacity that meets or exceeds actual loads.
4. Review bearing length requirements to ensure adequacy.

Also see **General Notes** on page 9.

## 2.2E Parallam® PSL: Floor and/or Snow—Standard Term (PLF)

Span	Condition	3½" Width							5¼" Width						
		9¼"	9½"	11¼"	11⅝"	14"	16"	19"	9¼"	9½"	11¼"	11⅝"	14"	16"	19"
8'	Unfactored Resistance (LL)	1,286	1,383	*	*	*	*	*	1,929	2,075	*	*	*	*	*
	Unfactored Resistance (TL)	*	*	*	*	*	*	*	*	*	*	*	*	*	
	Total Factored Resistance	2,467	2,546	3,124	3,341	3,554	3,554	3,554	3,701	3,820	4,687	5,012	5,331	5,331	5,331
	Min. End/Int. Bearing (in.)	3.1/7.8	3.2/8.1	4/9.9	4.2/10.6	4.5/11.3	4.5/11.3	4.5/11.3	3.1/7.8	3.2/8.1	4/9.9	4.2/10.6	4.5/11.3	4.5/11.3	4.5/11.3
9'-6"	Unfactored Resistance (LL)	796	858	1,373	1,591	*	*	*	1,195	1,288	2,059	2,387	*	*	*
	Unfactored Resistance (TL)	1,185	1,278	*	*	*	*	*	1,777	1,917	*	*	*	*	
	Total Factored Resistance	1,818	1,912	2,536	2,705	2,989	2,989	2,989	2,727	2,868	3,804	4,058	4,484	4,484	4,484
	Min. End/Int. Bearing (in.)	2.7/6.8	2.9/7.2	3.8/9.5	4.1/10.2	4.5/11.3	4.5/11.3	4.5/11.3	2.7/6.8	2.9/7.2	3.8/9.5	4.1/10.2	4.5/11.3	4.5/11.3	4.5/11.3
10'	Unfactored Resistance (LL)	689	743	1,192	1,383	*	*	*	1,034	1,115	1,788	2,075	*	*	*
	Unfactored Resistance (TL)	1,024	1,104	*	*	*	*	*	1,536	1,657	*	*	*	*	
	Total Factored Resistance	1,639	1,724	2,376	2,543	2,839	2,839	2,839	2,459	2,586	3,564	3,815	4,259	4,259	4,259
	Min. End/Int. Bearing (in.)	2.6/6.5	2.7/6.8	3.8/9.4	4/10.1	4.5/11.3	4.5/11.3	4.5/11.3	2.6/6.5	2.7/6.8	3.8/9.4	4/10.1	4.5/11.3	4.5/11.3	4.5/11.3
12'	Unfactored Resistance (LL)	409	442	716	834	1,318	*	*	614	663	1,074	1,251	1,977	*	*
	Unfactored Resistance (TL)	604	652	1,061	1,238	*	*	*	906	979	1,592	1,857	*	*	*
	Total Factored Resistance	1,134	1,193	1,645	1,823	2,362	2,362	2,362	1,702	1,790	2,467	2,734	3,544	3,544	3,544
	Min. End/Int. Bearing (in.)	2.2/5.4	2.3/5.7	3.1/7.8	3.5/8.7	4.5/11.3	4.5/11.3	4.5/11.3	2.2/5.4	2.3/5.7	3.1/7.8	3.5/8.7	4.5/11.3	4.5/11.3	4.5/11.3
14'	Unfactored Resistance (LL)	261	283	461	538	858	1,245	*	392	424	692	808	1,288	1,868	*
	Unfactored Resistance (TL)	382	414	679	795	*	*	*	574	621	1,019	1,192	*	*	*
	Total Factored Resistance	830	873	1,204	1,335	1,825	2,022	2,022	1,245	1,310	1,807	2,002	2,737	3,033	3,033
	Min. End/Int. Bearing (in.)	1.9/4.6	2/4.9	2.7/6.7	3/7.4	4.1/10.2	4.5/11.3	4.5/11.3	1.9/4.6	2/4.9	2.7/6.7	3/7.4	4.1/10.2	4.5/11.3	4.5/11.3
16'-6"	Unfactored Resistance (LL)	162	175	287	335	539	787	*	243	262	430	503	808	1,181	*
	Unfactored Resistance (TL)	232	252	418	490	793	*	*	349	378	627	736	1,190	*	*
	Total Factored Resistance	594	625	862	956	1,308	1,686	1,712	891	937	1,294	1,434	1,962	2,530	2,569
	Min. End/Int. Bearing (in.)	1.6/3.9	1.7/4.1	2.3/5.7	2.5/6.3	3.4/8.6	4.4/11.1	4.5/11.3	1.6/3.9	1.7/4.1	2.3/5.7	2.5/6.3	3.4/8.6	4.4/11.1	4.5/11.3
18'-6"	Unfactored Resistance (LL)	115	125	205	240	388	569	925	173	187	308	361	582	854	1,388
	Unfactored Resistance (TL)	163	177	296	348	567	836	*	245	266	444	522	850	1,255	*
	Total Factored Resistance	470	494	683	757	1,036	1,337	1,525	705	742	1,025	1,136	1,555	2,005	2,287
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.7	2/5.1	2.3/5.6	3.1/7.7	4/9.9	4.5/11.3	1.5/3.5	1.5/3.7	2/5.1	2.3/5.6	3.1/7.7	4/9.9	4.5/11.3
20'	Unfactored Resistance (LL)	91	99	163	191	309	455	743	137	149	245	287	464	683	1,115
	Unfactored Resistance (TL)	127	138	233	274	449	665	*	191	208	349	412	674	998	*
	Total Factored Resistance	400	421	582	645	884	1,141	1,409	600	632	873	968	1,326	1,711	2,113
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.9/4.7	2.1/5.2	2.8/7.1	3.7/9.1	4.5/11.3	1.5/3.5	1.5/3.5	1.9/4.7	2.1/5.2	2.8/7.1	3.7/9.1	4.5/11.3
24'	Unfactored Resistance (LL)	53	57	95	112	182	268	442	80	86	143	168	273	403	663
	Unfactored Resistance (TL)	70	76	131	155	257	385	642	105	114	196	233	386	578	963
	Total Factored Resistance	274	288	399	443	608	785	1,091	411	433	599	665	912	1,178	1,636
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.6/3.9	1.7/4.3	2.4/5.9	3/7.6	4.2/10.5	1.5/3.5	1.5/3.5	1.6/3.9	1.7/4.3	2.4/5.9	3/7.6	4.2/10.5
28'	Unfactored Resistance (LL)	33	36	60	71	115	171	283	50	55	90	106	173	257	424
	Unfactored Resistance (TL)	40	44	78	93	158	239	403	61	66	117	140	237	359	605
	Total Factored Resistance	198	208	289	321	441	571	794	297	312	434	482	662	857	1,192
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.7	2/5.1	2.6/6.5	3.6/9	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.7	2/5.1	2.6/6.5	3.6/9
32'	Unfactored Resistance (LL)			40	47	78	115	191	34	36	61	71	117	173	287
	Unfactored Resistance (TL)			48	58	101	156	266	36	39	73	88	152	234	400
	Total Factored Resistance			218	242	333	432	602	223	235	327	363	500	648	903
	Min. End/Int. Bearing (in.)			1.5/3.5	1.5/3.5	1.8/4.4	2.3/5.7	3.2/7.9	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.8/4.4	2.3/5.7	3.2/7.9

\* Indicates Total Factored Resistance value controls.

# FLOOR AND/OR SNOW LOAD TABLES

## General Notes

- Table is based on:
  - Uniform loads (beam weight considered).
  - More restrictive of simple or continuous span.
  - Deflection criteria of L/360 live load (LL) and L/240 total load (TL).
- For a live load deflection limit of L/480, multiply **Unfactored Resistance (LL)** by 0.75. For a total load limit of L/180 multiply **Unfactored Resistance (TL)** by 1.33. The resulting loads must not exceed the **Total Factored Resistance** shown.
- For continuous spans, ratio of short span to long span should be 0.4 or greater to prevent uplift.

Also see **How to Use This Table** on page 8 and **General Assumptions** on page 3.

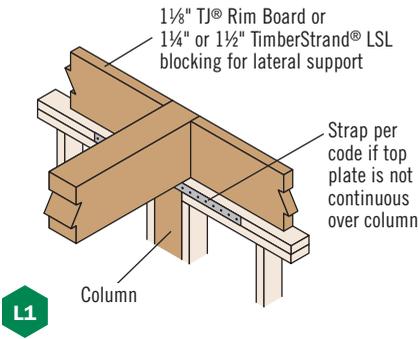
## 2.2E Parallam® PSL: Floor and/or Snow— Standard Term (PLF) *continued*

Span	Condition	7" Width						
		9¼"	9½"	11¼"	11⅝"	14"	16"	19"
8'	Unfactored Resistance (LL)	2,572	2,767	*	*	*	*	*
	Unfactored Resistance (TL)	*	*	*	*	*	*	*
	Total Factored Resistance	4,935	5,093	6,249	6,683	7,108	7,108	7,108
	Min. End/Int. Bearing (in.)	3.1/7.8	3.2/8.1	4/9.9	4.2/10.6	4.5/11.3	4.5/11.3	4.5/11.3
9'-6"	Unfactored Resistance (LL)	1,593	1,717	2,746	3,182	*	*	*
	Unfactored Resistance (TL)	2,370	2,556	*	*	*	*	*
	Total Factored Resistance	3,636	3,824	5,072	5,410	5,979	5,979	5,979
	Min. End/Int. Bearing (in.)	2.7/6.8	2.9/7.2	3.8/9.5	4.1/10.2	4.5/11.3	4.5/11.3	4.5/11.3
10'	Unfactored Resistance (LL)	1,378	1,486	2,385	2,767	*	*	*
	Unfactored Resistance (TL)	2,048	2,209	*	*	*	*	*
	Total Factored Resistance	3,279	3,449	4,752	5,087	5,678	5,678	5,678
	Min. End/Int. Bearing (in.)	2.6/6.5	2.7/6.8	3.8/9.4	4/10.1	4.5/11.3	4.5/11.3	4.5/11.3
12'	Unfactored Resistance (LL)	818	884	1,432	1,668	2,636	*	*
	Unfactored Resistance (TL)	1,208	1,305	2,123	2,476	*	*	*
	Total Factored Resistance	2,269	2,387	3,290	3,646	4,725	4,725	4,725
	Min. End/Int. Bearing (in.)	2.2/5.4	2.3/5.7	3.1/7.8	3.5/8.7	4.5/11.3	4.5/11.3	4.5/11.3
14'	Unfactored Resistance (LL)	523	566	922	1,077	1,717	2,490	*
	Unfactored Resistance (TL)	765	828	1,359	1,590	*	*	*
	Total Factored Resistance	1,660	1,747	2,409	2,670	3,650	4,044	4,044
	Min. End/Int. Bearing (in.)	1.9/4.6	2/4.9	2.7/6.7	3/7.4	4.1/10.2	4.5/11.3	4.5/11.3
16'-6"	Unfactored Resistance (LL)	324	350	574	671	1,078	1,575	*
	Unfactored Resistance (TL)	465	504	836	981	1,587	*	*
	Total Factored Resistance	1,188	1,250	1,725	1,913	2,617	3,373	3,425
	Min. End/Int. Bearing (in.)	1.6/3.9	1.7/4.1	2.3/5.7	2.5/6.3	3.4/8.6	4.4/11.1	4.5/11.3
18'-6"	Unfactored Resistance (LL)	231	250	411	481	776	1,139	1,851
	Unfactored Resistance (TL)	326	354	592	696	1,134	1,673	*
	Total Factored Resistance	940	989	1,366	1,515	2,073	2,674	3,050
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.7	2/5.1	2.3/5.6	3.1/7.7	4/9.9	4.5/11.3
20'	Unfactored Resistance (LL)	183	198	327	383	619	911	1,486
	Unfactored Resistance (TL)	255	277	466	549	898	1,331	*
	Total Factored Resistance	800	842	1,164	1,291	1,769	2,282	2,818
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.9/4.7	2.1/5.2	2.8/7.1	3.7/9.1	4.5/11.3
24'	Unfactored Resistance (LL)	107	115	191	224	364	537	884
	Unfactored Resistance (TL)	140	153	262	310	515	771	1,284
	Total Factored Resistance	548	577	799	887	1,216	1,571	2,182
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.6/3.9	1.7/4.3	2.4/5.9	3/7.6	4.2/10.5
28'	Unfactored Resistance (LL)	67	73	121	142	231	342	566
	Unfactored Resistance (TL)	81	89	157	187	316	479	807
	Total Factored Resistance	396	417	579	643	883	1,142	1,589
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.7	2/5.1	2.6/6.5	3.6/9
32'	Unfactored Resistance (LL)	45	49	81	95	156	231	383
	Unfactored Resistance (TL)	48	53	97	117	203	312	533
	Total Factored Resistance	297	313	436	484	667	864	1,204
	Min. End/Int. Bearing (in.)	1.5/3.5	1.5/3.5	1.5/3.5	1.5/3.5	1.8/4.4	2.3/5.7	3.2/7.9

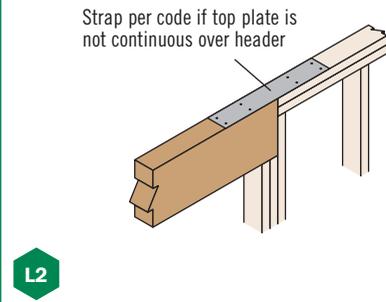
\* Indicates **Total Factored Resistance** value controls.

# BEAM DETAILS

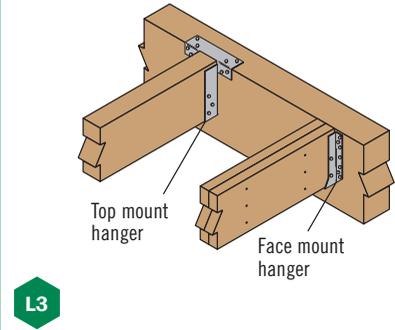
## Bearing at Wall



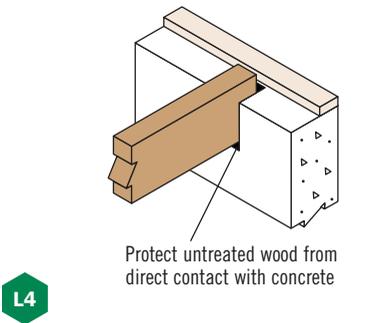
## Bearing for Door or Window Header



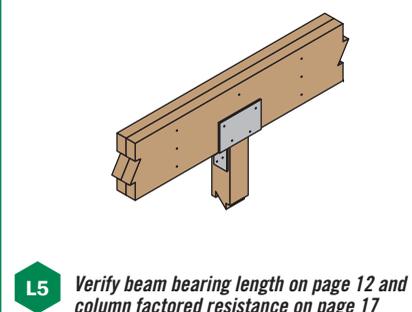
## Beam to Beam Connection



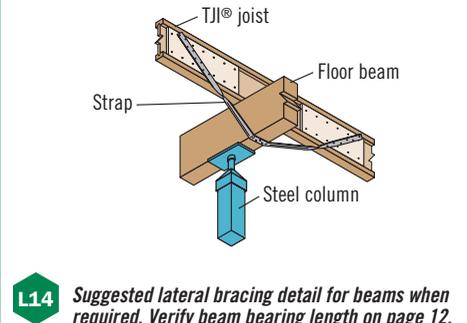
## Bearing at Concrete Wall



## Bearing at Column



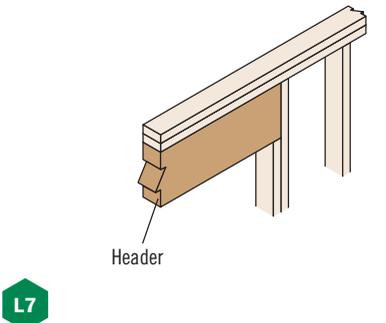
## Beam to Column Lateral Brace



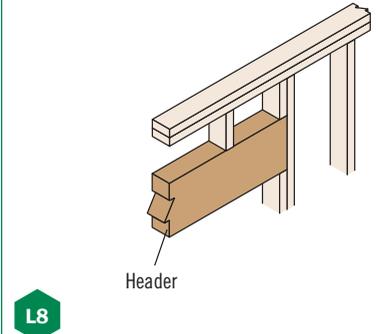
# WINDOW AND DOOR HEADER DETAILS

## 2x4 Wall Framing

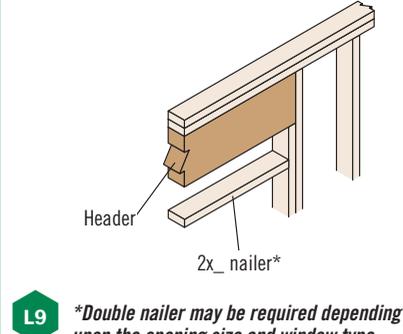
### Full Depth Header



### Low Header



### High Header

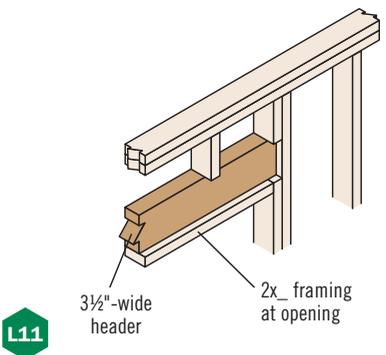


\*Double nailer may be required depending upon the opening size and window type

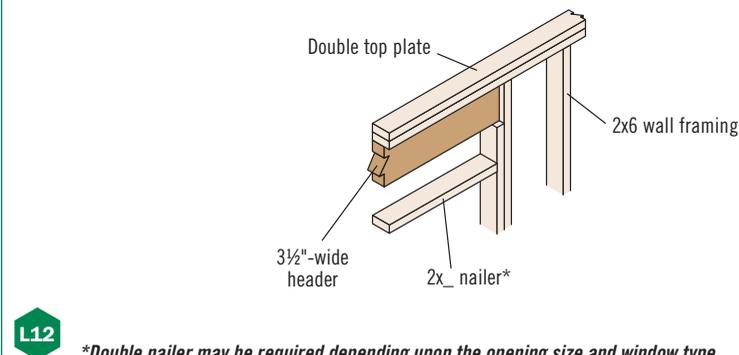
## 2x6 Wall Framing

Headers not matching wall thickness may be installed flush to the inside or outside of the wall depending upon sheathing and trim attachment requirements

### Low Header



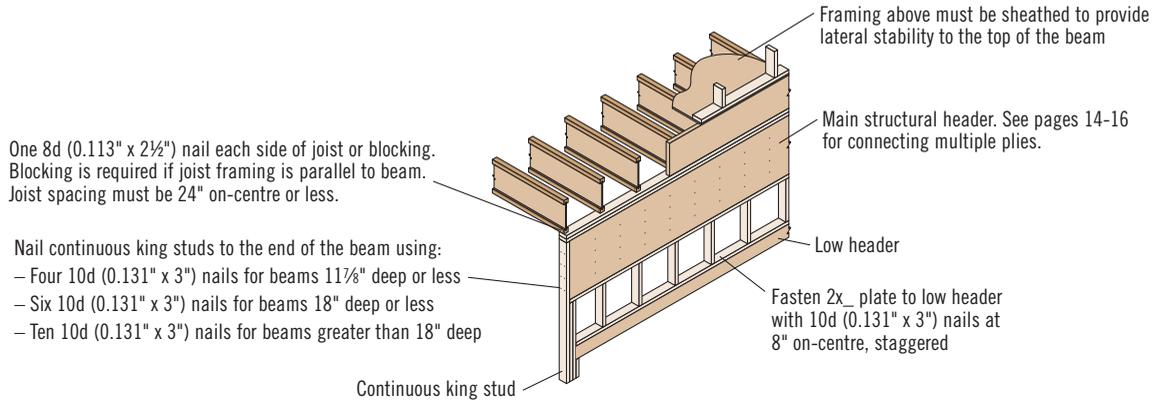
### High Header



\*Double nailer may be required depending upon the opening size and window type

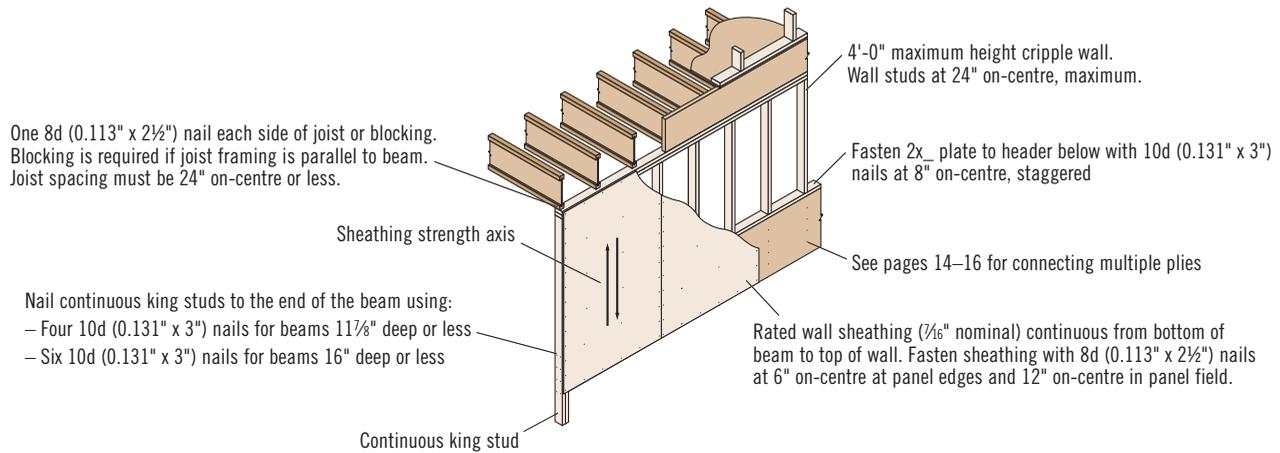
# WINDOW AND DOOR HEADER DETAILS

## Dropped Header with Full Lateral Bracing



L15

## Dropped Header with Acceptable Lateral Bracing



L16

When framed as shown above, the following dropped headers are considered fully braced under uniform-load, simple-span conditions:

### Single-ply:

- 1¾" wide headers, 11 7/8" deep or less
- 3½" wide headers, 16" deep or less, with a maximum span of 18'-6"

### Multiple-ply:

- Headers up to four 1¾" plies, 11 7/8" deep or less
- Headers up to four 1¾" x 14" plies, with a maximum span of 8'-6"

## NAILING ON NARROW FACE

### Nails Installed on the Narrow Face

Nail Size	Closest On-Centre Spacing Per Row		
	TimberStrand® LSL	Microllam® LVL	Parallam® PSL
8d (0.131" x 2½") or 10d (0.128" x 3")	3"	4"	4"
10d (0.148" x 3") or 12d (0.148" x 3¼")	3"	5"	4"
16d (0.162" x 3½")	6" <sup>(1)</sup>	8" <sup>(2)</sup>	6"
(0.131" x 3"-3½")	3"	4"	4"

Fastener spacing not applicable for shear wall applications. See CCMC 12627-R report for grade specific TimberStrand® LSL nailing requirements for shear walls.

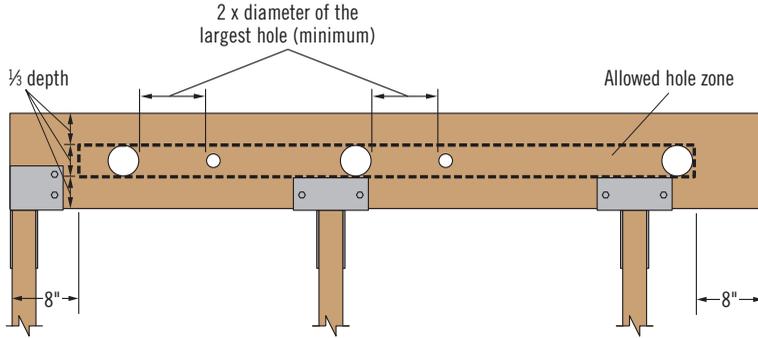
(1) Can be reduced to 3½" on-centre if nail penetration into the narrow edge is no more than 1¼" (to minimize splitting).

(2) Can be reduced to 5" on-centre if nail penetration into the narrow edge is no more than 1¼" (to minimize splitting).

- To minimize splitting, member edge distance and spacing between rows shall be 2.5 x nail diameter or ¾", whichever is greater. Where multiple rows are used, fasteners in adjacent rows must be staggered and the rows must be equally spaced from the centreline of the narrow face axis.

# ALLOWABLE HOLES

## 1.55E TimberStrand® LSL Headers and Beams



## General Notes

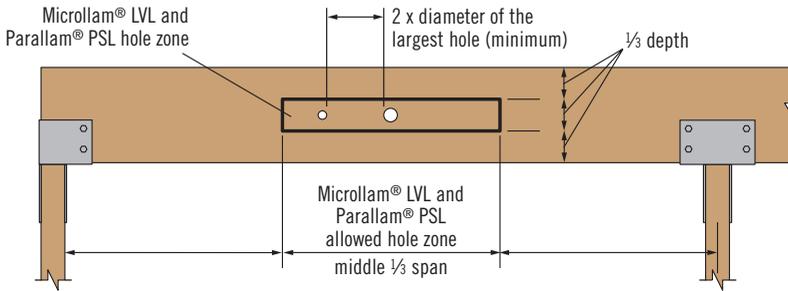
- Allowed hole zone suitable for headers and beams with **uniform and/or concentrated loads** anywhere along member.
- Round holes only.
- No holes in headers or beams in plank orientation.

## 1.55E TimberStrand® LSL

Header or Beam Depth	Maximum Round Hole Size
9½"	3"
11⅞"	3⅝"
14"–16"	4⅝"

- See illustration for allowed hole zone.

## Microllam® LVL and Parallam® PSL Headers and Beams



## General Notes

- Allowed hole zone suitable for headers and beams with **uniform loads only**.
- Round holes only.
- No holes in cantilevers.
- No holes in headers or beams in plank orientation.

## Microllam® LVL and Parallam® PSL

Header or Beam Depth	Maximum Round Hole Size
5½"	1¾"
7¼"–20"	2"

- See illustration for allowed hole zone.

Larger holes in Trus Joist® structural composite lumber may be possible; refer to ForteWEB® or Javelin® software.



**DO NOT** cut, notch, or drill holes in headers or beams except as indicated in the illustrations and tables

Safety data sheets for all Weyerhaeuser wood products can be found on our website at: [weyerhaeuser.com/sustainability/environment/product-stewardship/safety-data-sheets](http://weyerhaeuser.com/sustainability/environment/product-stewardship/safety-data-sheets).

# BEARING LENGTH REQUIREMENTS

Factored Reaction (lbs)	1.55E TimberStrand® LSL			2.0E Microllam® LVL			2.2E Parallam® PSL		
	Beam Orientation			Beam Orientation			Beam Orientation		
	Width			Width			Width		
	1¾"	3½"	5¼"	1¾"	3½"	5¼"	3½"	5¼"	7"
6,000	2 ¾"	1 ½"	1 ½"	3¼"	1¾"	1½"	2"	1½"	1½"
8,000	3 ½"	1 ¾"	1 ½"	4¼"	2¼"	1½"	2¾"	1¾"	1½"
10,000	4 ½"	2 ¼"	1 ½"	5¼"	2¾"	1¾"	3¼"	2¼"	1¾"
12,000	5 ¼"	2 ¾"	1 ¾"	6½"	3¼"	2¼"	4"	2¾"	2"
14,000	6 ¼"	3 ¼"	2 ¼"	7½"	3¾"	2½"	4½"	3"	2¼"
16,000	7"	3 ½"	2 ½"		4¼"	3"	5¼"	3½"	2¾"
18,000	8"	4"	2 ¾"		4¾"	3¼"	5¾"	4"	3"
20,000		4 ½"	3"		5¼"	3½"	6½"	4¼"	3¾"
22,000		5"	3 ¾"		6"	4"	7"	4¾"	3½"
24,000		5 ¼"	3 ½"		6½"	4¼"	7¾"	5¼"	4"
26,000		5 ¾"	4"		7"	4¾"		5½"	4¼"
28,000		6 ¼"	4 ¼"		7½"	5"		6"	4½"
30,000		6 ¾"	4 ½"		8"	5¼"		6½"	4¾"
32,000		7"	4 ¾"			5¾"		6¾"	5¼"
34,000		7 ½"	5"			6"		7¼"	5½"

## General Notes

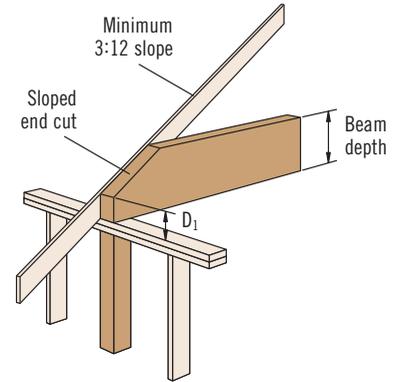
- Minimum bearing length:** 1½" at ends, 3½" at intermediate supports.
- Bearing across full beam width required.
- Interpolation between reaction loads is permitted for determining bearing lengths.
- Bearing lengths based on the following factored bearing resistances:
  - 1.55E TimberStrand® LSL: 1,165 psi.
  - 2.0E Microllam® LVL: 1,090 psi.
  - 2.2E Parallam® PSL: 905 psi.

# TAPERED END CUTS

## Factored Reactions for 3½"(1) TimberStrand® LSL Headers and Beams (lbs)

Bearing	Beam Depth	Outside Heel Height D <sub>1</sub>							
		4½"	5"	5½"	6"	6½"	7"	7½"	8"
3½" Wood Plate <sup>(2)</sup>	9½"–11½"	7,535	7,535	7,535	7,535	7,535	7,535	7,535	7,535
	14"		7,535	7,535	7,535	7,535	7,535	7,535	7,535
	16"				7,535	7,535	7,535	7,535	7,535
5¼" Wood Plate <sup>(2)</sup>	9½"	8,775	9,530	10,285	11,035	11,300	11,300	11,300	11,300
	11½"–14"	8,775	9,530	10,285	11,035	11,300	11,300	11,300	11,300
	16"			10,285	11,035	11,300	11,300	11,300	11,300
3½" Column <sup>(3)</sup>	9½"	8,115	8,870	9,620	10,375	11,130	11,470	11,470	11,470
	11½"	8,115	8,870	9,620	10,375	11,130	11,885	12,640	13,395
	14"		8,870	9,620	10,375	11,130	11,885	12,640	13,395
	16"				10,375	11,130	11,885	12,640	13,395

- (1) For 1¾" and 5¼" beams, multiply by 0.5 and 1.5, respectively.  
 (2) Bearing lengths are based on factored bearing resistance of 615 psi.  
 (3) Bearing lengths are based on factored bearing resistance of 1,165 psi.



*Tapered end cut detailed above is not allowed with TJI® joists*

## Factored Reactions for 3½"(1) Microllam® LVL and Parallam® PSL Headers and Beams (lbs)

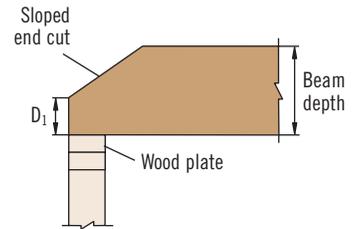
Bearing	Beam Depth	Outside Heel Height D <sub>1</sub>									
		4½"	5"	5½"	6"	6½"	7"	7½"	8"	10"	
3½" Wood Plate <sup>(2)</sup>	7¼"	7,480	7,535	7,535	7,535						
	9¼"	7,480	7,535	7,535	7,535	7,535	7,535	7,535	7,535		
	9½"	7,480	7,535	7,535	7,535	7,535	7,535	7,535	7,535		
	11¼"	7,480	7,535	7,535	7,535	7,535	7,535	7,535	7,535	7,535	
	11½"	7,480	7,535	7,535	7,535	7,535	7,535	7,535	7,535	7,535	
	14"		7,535	7,535	7,535	7,535	7,535	7,535	7,535	7,535	
	16"				7,535	7,535	7,535	7,535	7,535	7,535	
	18"					7,535	7,535	7,535	7,535	7,535	
	19"						7,535	7,535	7,535	7,535	
	20"							7,535	7,535	7,535	
5¼" Wood Plate <sup>(2)</sup>	7¼"	8,070	8,070	8,070							
	9¼"	8,085	8,780	9,480	10,175	10,295	10,295	10,295			
	9½"	8,085	8,780	9,480	10,175	10,575	10,575	10,575	10,575		
	11¼"	8,085	8,780	9,480	10,175	10,870	11,300	11,300	11,300		
	11½"	8,085	8,780	9,480	10,175	10,870	11,300	11,300	11,300	11,300	
	14"	8,085	8,780	9,480	10,175	10,870	11,300	11,300	11,300	11,300	
	16"			9,480	10,175	10,870	11,300	11,300	11,300	11,300	
	18"				10,175	10,870	11,300	11,300	11,300	11,300	
	19"					10,870	11,300	11,300	11,300	11,300	
	20"						11,300	11,300	11,300	11,300	
3½" Column <sup>(3)</sup>	7¼"	7,480	8,070	8,070	8,070						
	9¼"	7,480	8,175	8,870	9,565	10,260	10,295	10,295	10,295		
	9½"	7,480	8,175	8,870	9,565	10,260	10,575	10,575	10,575		
	11¼"	7,480	8,175	8,870	9,565	10,260	10,955	11,125	11,125	11,125	
	11½"	7,480	8,175	8,870	9,565	10,260	10,955	11,125	11,125	11,125	
	14"		8,175	8,870	9,565	10,260	10,955	11,125	11,125	11,125	
	16"				9,565	10,260	10,955	11,125	11,125	11,125	
	18"					10,260	10,955	11,125	11,125	11,125	
	19"						10,955	11,125	11,125	11,125	
	20"							11,125	11,125	11,125	

- (1) For 1¾", 5¼", and 7" beams, multiply by 0.5, 1.5, and 2.0, respectively.  
 (2) Bearing lengths based on a factored bearing resistance of 620 psi.  
 (3) Bearing lengths based on factored bearing resistance of 905 psi for Microllam® LVL and Parallam® PSL.

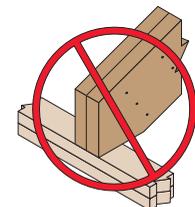
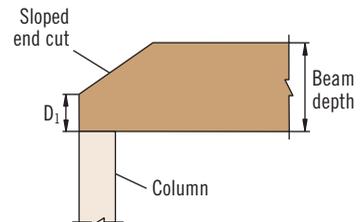
### General Notes

- No increase for duration of load is permitted above standard term.
- No holes or concentrated load within tapered cut.
- Table considers only downward loading. Contact your Weyerhaeuser representative for assistance with uplift loading or other conditions.

### Wood Plate Connection



### Column Connection



**DO NOT** overhang seat cuts on beams beyond inside face of support member

# MULTIPLE-MEMBER CONNECTIONS FOR SIDE-LOADED BEAMS

## L17 Factored Uniform Load—Maximum Factored Uniform Load Applied to Either Outside Member (PLF)

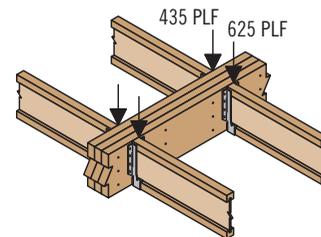
Fastener Type	Placement	Number of Rows	Fastener On-Center Spacing	Fastener Pattern					
				Assembly A 3½" wide, 2-ply	Assembly B 5¼" wide, 3-ply	Assembly C 5¼" wide, 2-ply	Assembly D 7" wide, 3-ply	Assembly E 7" wide, 2-ply	Assembly F 7" wide, 4-ply
10d (0.128" x 3") or (0.131" x 3") Nail <sup>(1)</sup>	As shown	2 <sup>(5)</sup>	12"	575	<b>430</b>	430	<b>385</b>		
		3	12"	865	<b>650</b>	650	<b>575</b>		
½" A307 Through Bolt <sup>(2)(3)</sup>	—	2	24"	780	585	880	780	1,560	520
			19.2"	975	730	1,095	975	1,950	650
			16"	1,170	880	1,315	1,170	2,340	780
Screw Length ▶				3½"	3½"	3½"	3½"	6"	6"
Simpson Strong-Tie® SDS <sup>(3)</sup>	As shown	2	24"	870	<b>655</b>	655	<b>580</b>	<b>2,325</b>	<b>680</b>
			19.2"	1,090	<b>815</b>	815	<b>725</b>	<b>2,905</b>	<b>850</b>
			16"	1,305	<b>980</b>	980	<b>870</b>	<b>3,485</b>	<b>1,020</b>
MiTek® WS <sup>(3)</sup>	As shown	2	24"	905	<b>680</b>	680	<b>605</b>		<b>765<sup>(6)</sup></b>
			19.2"	1,130	<b>850</b>	850	<b>755</b>		<b>960<sup>(6)</sup></b>
			16"	1,355	<b>1,015</b>	1,015	<b>905</b>		<b>1,150<sup>(6)</sup></b>
Screw Length ▶				3¾"	5"	3¾"	6¾"	6¾"	6¾"
Simpson Strong-Tie® SDW22 <sup>(3)(4)</sup>	One face	2	24"	680	625	585	555	1,140	555
			19.2"	850	780	730	690	1,425	690
			16"	1,020	935	880	830	1,710	830

- (1) Nailed connection values may be doubled for 6" on-centre or tripled for 4" on-centre nail spacing.
- (2) Washers required. Bolt holes to be ⅛" maximum.
- (3) Factored resistance for 24" on-centre bolted or screwed connection values may be doubled for 12" on-centre spacing.
- (4) When loading the head side of a SDW22 screw, assemblies A, B, D, and F can be increased by 15%.
- (5) For beams up to 14" deep, maximum.
- (6) Assembly F is not recommended for TimberStrand® LSL or Parallam® PSL.
- **Bold italic** loads indicate assemblies that require fastener placement on both faces. Stagger fasteners on the second face so they fall halfway between fasteners on the first face.

### General Notes for Side-Loaded Beam Tables

- Connections are based on Limit States Design per CSA O86
- Use specific gravity of 0.5 for design of lateral connections
- Values listed are for standard term loading.
- Minimum end distance for bolts and screws is 6".
- Verify adequacy of beam in allowable load tables on pages 5–9.
- 7" wide beams should be side-loaded only when loads are applied to both sides of the members (to minimize rotation).
- Beams wider than 7" require special consideration by the design professional of record.

### Uniform Load Design Example

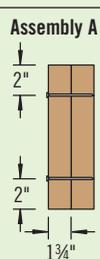
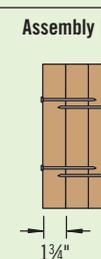
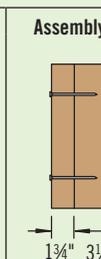
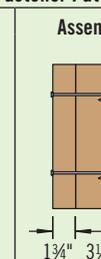
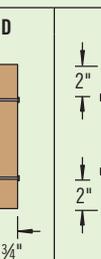
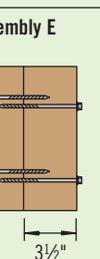


First, check load tables on pages 5-9 to verify that three pieces can carry the total factored load of 1,060 plf with proper live load deflection criteria. Total factored load = (1.25 x dead load) + (1.5 x live load). Maximum factored load applied to either outside member is 625 plf. For an assembly of three 1½" plies (Assembly B), two rows of (0.131" x 3") nails on both faces at 12" on-centre is good for only 430 plf. Therefore, use three rows of (0.131" x 3") nails on both faces at 12" on-centre (good for 650 plf).

**Alternatives:** Two rows of ½" A307 bolts at 19.2" on-centre or two rows of 5" SDW22 screws on one face at 24" on-centre.

# MULTIPLE-MEMBER CONNECTIONS FOR SIDE-LOADED BEAMS

## L18 Factored Point Load—Maximum Factored Point Load Applied to Either Outside Member (lbs)

Fastener Type	Placement	Number of Fasteners per Face	Fastener Pattern					
			Assembly A 	Assembly B 	Assembly C 	Assembly D 	Assembly E 	Assembly F 
10d (0.128" x 3") or (0.131" x 3") Nail	As shown	6	1,730	<b>1,295</b>	1,295	<b>1,150</b>		
		12	3,455	<b>2,590</b>	2,590	<b>2,305</b>		
		18	5,185	<b>3,890</b>	3,890	<b>3,455</b>		
		24	6,910	<b>5,185</b>	5,185	<b>4,610</b>		
		Screw Length ▶	3 1/2"	3 1/2"	3 1/2"	3 1/2"	6"	6"
Simpson Strong-Tie® SDS	As shown	4	3,480	<b>2,610</b>	2,610	<b>2,320</b>	<b>9,295</b>	<b>2,720</b>
		6	5,220	<b>3,915</b>	3,915	<b>3,480</b>	<b>13,945</b>	<b>4,080</b>
		8	6,960	<b>5,220</b>	5,220	<b>4,640</b>	<b>18,590</b>	<b>5,440</b>
MiTek® WS	As shown	4	3,615	<b>2,710</b>	2,710	<b>2,410</b>		<b>3,065<sup>(2)</sup></b>
		6	5,425	<b>4,070</b>	4,070	<b>3,615</b>		<b>4,600<sup>(2)</sup></b>
		8	7,230	<b>5,425</b>	5,425	<b>4,820</b>		<b>6,135<sup>(2)</sup></b>
		Screw Length ▶	3 3/8"	5"	3 3/8"	6 3/4"	6 3/4"	6 3/4"
Simpson Strong-Tie® SDW22 <sup>(1)</sup>	One face	4	2,720	2,490	2,340	2,215	4,560	2,215
		6	4,080	3,735	3,510	3,320	6,840	3,320
		8	5,440	4,980	4,680	4,425	9,120	4,425

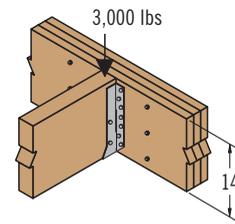
(1) When loading the head side of a SDW22 screw, assemblies A, B, D, and F can be increased by 15%.

(2) Assembly F is not recommended for TimberStrand® LSL or Parallam® PSL.

• **Bold italic** loads indicate assemblies that require fastener placement on both faces. For screws required on both faces, refer to screw manufacturer's guidelines for minimum spacing requirements.

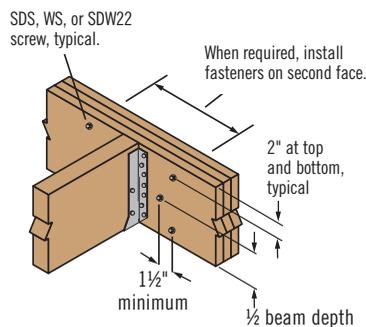
### Point Load Design Example

First, verify that a 3-ply, 1 3/4" x 14" beam can support the factored 3,000 lb point load and all other loads applied. The factored 3,000 lb point load is being transferred to the beam with a face mount hanger. For an assembly of three 1 3/4" plies (Assembly B), six 5" SDW22 screws on one face are good for 3,735 lbs with a face mount hanger.



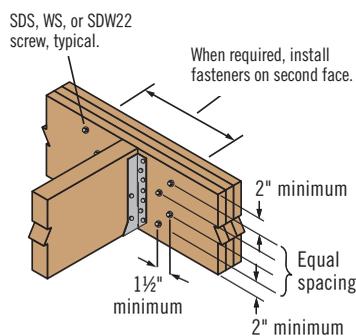
### Point Load Fastener Spacing

#### 4- or 6-Screw Connection



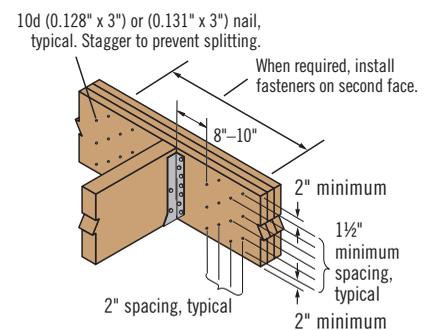
L19

#### 8-Screw Connection



L20

#### Nail Connection



L21

There must be an equal number of nails on each side of the point load

See table above for placement and number of fasteners per face.

# MULTIPLE-MEMBER CONNECTIONS FOR TOP-LOADED BEAMS

## Fastener Installation Requirements

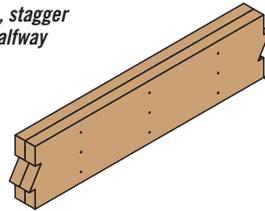
Piece Width	Number of Plies	Fastener				
		Type <sup>(1)</sup>	Min. Length	Placement	# Rows	O.C. Spacing
1 3/4"	2	10d nails	3"	One face	3 <sup>(2)</sup>	12"
		12d-16d nails	3 3/4"		2 <sup>(2)</sup>	
		Screws	3 3/8" or 3 1/2"	One face	2	24"
	3	10d nails	3"	Both faces	3 <sup>(2)</sup>	12"
		12d-16d nails	3 3/4"		2 <sup>(2)</sup>	
		Screws	3 3/8" or 3 1/2"	Both faces	2	24"
			5"	One face		
	4	10d nails <sup>(3)</sup>	3"	One face (per ply)	3 <sup>(2)</sup>	12"
		12d-16d nails <sup>(3)</sup>	3 3/4"		2 <sup>(2)</sup>	
		Screws	5" or 6"	Both faces	2	24"
6 3/4"			One face			
3 1/2"	2	Screws	5" or 6"	Both faces	2	24"
		6 3/4"	One face			
	1/2" bolts	8"	—	2	24"	

(1) 10d nails are 0.128"–0.131" diameter; 12d–16d nails are 0.148"–0.162" diameter; screws are SDS, WS, or SDW22.

(2) An additional row of nails is required with depths of 14" or greater.

(3) When connecting 4-ply members, nail each ply to the other and offset nail rows by 2" from the rows in ply below.

When fasteners are required on both faces, stagger fasteners on the second face so they fall halfway between fasteners on the first face.



Load must be applied evenly across entire beam width. Otherwise, use connections for side-loaded beams

**L6** Multiple pieces can be nailed or bolted together to form a header or beam of the required size, up to a maximum width of 7"

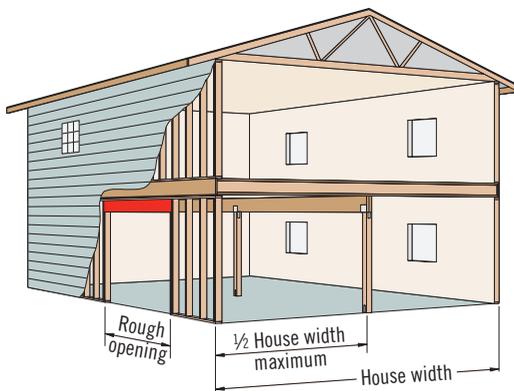
## Metric to Imperial Conversions

Metric Unit	Imperial Conversion
1 kN	0.2248 kip
1 N	0.2248 lb
1 m	3.281 ft
1 mm	0.0394 in.
1 kg	2.205 lb mass
1 N • m	0.7376 lb • ft
1 N • m	8.851 lb • in.
1 mm <sup>4</sup>	2.402 x 10 <sup>-6</sup> in. <sup>4</sup>
1 Pa	0.0209 lb/ft <sup>2</sup>
1 kPa	0.1450 lb/in. <sup>2</sup>

## Imperial to Metric Conversions

Imperial Unit	Metric Conversion
1 kip	4.448 kN
1 lb	4.448 N
1 ft	0.3048 m
1 in.	25.40 mm
1 lb mass	0.4536 kg
1 lb • ft	1.356 N • m
1 lb • in.	0.1130 N • m
1 in. <sup>4</sup>	0.4162 x 10 <sup>6</sup> mm <sup>4</sup>
1 lb/ft <sup>2</sup>	47.88 Pa
1 lb/in. <sup>2</sup>	6.895 kPa

## HEADER DESIGN EXAMPLE PROBLEM



Determine the size of 1.55E TimberStrand® LSL header required for a 10' rough opening for the given loads and assumptions:

- House width = 36'
- Trussed roof with 24" roof truss overhangs
- Roof Load = 30 psf snow + 15 psf dead
- Floor Load = 40 psf live + 12 psf dead

Calculated unfactored plf loads acting on the beam (20' roof and 9' floor tributary):

- Snow = 600 plf
- Floor = 360 plf
- Dead = 490 plf (includes wall load at 80 plf)

Next, calculate design loads per 2010 NBCC load combinations (primary load and companion load action).

### 1. Unfactored live load:

Case 2:  $1.0 \times 360 + 0.5 \times 600 = 660$  plf

Case 3:  $1.0 \times 600 + 0.5 \times 360 = 780$  plf

Therefore use Case 3 at 780 plf

### 2. Unfactored total load:

For Cases 2 and 3:

Unfactored dead load =  $1.0 \times 490 = 490$  plf

Unfactored total load =  $780 \text{ plf} + 490 \text{ plf} = 1,270$  plf

### 3. Factored total load:

Case 2:  $1.5 \times 360 + 0.5 \times 600 = 840$  plf

Case 3:  $1.5 \times 600 + 0.5 \times 360 = 1,080$  plf

Therefore use Case 3 at 1,080 plf

Factored dead load =  $1.25 \times 490 = 613$  plf

Factored total load =  $1,080 + 613 = 1,693$  plf

Try using a 3 1/2" x 11 3/8" 1.55E TimberStrand® LSL header. See page 5 of this guide.

Span	Condition	1.55E Grade							
		1 3/4" Width				3 1/2" Width			
		9 1/2"	11 3/8"	14"	16"	9 1/2"	11 3/8"	14"	16"
10'	Unfactored Resistance (LL)	261	487	760	523	974	1,520	2,154	785
	Unfactored Resistance (TL)	387	724	*	775	1,449	*	*	1,16
	Total Factored Resistance	686	1,052	1,442	1,373	2,105	2,885	3,725	2,055
	Min. End/Int. Bearing (in.)	1.5/3.8	2.3/5.8	3.2/9.7	1.5/3.8	2.3/5.8	3.2/7.9	4.1/10.2	1.5/3.8
	Résistance non pondérée (S)	155	293	464	311	587	928	1,334	486
		228			456	868	1,277		

### Summary:

1. Unfactored Resistance (LL) = 974 > 780 OK

2. Unfactored Resistance (TL) = 1,449 > 1,270 OK

3. Total Factored Resistance = 2,106 > 1,693 OK

Therefore, a 3 1/2" x 11 3/8" 1.55E TimberStrand® LSL header is acceptable. The beam requires 2.6" of bearing at end supports and 6.5" of bearing at intermediate support.

# PARALLAM® PSL COLUMNS

## Axial Factored Resistances (lbs) for 1.8E Parallam® PSL

Column Bearing Type	Effective Column Length	Column Size					
		3½" x 3½"	3½" x 5¼"	3½" x 7"	5¼" x 5¼"	5¼" x 7"	7" x 7"
On Column Base	6'	19,365	29,020	38,435	54,735	72,980	100,000
	7'	16,245	24,365	32,490	51,350	68,470	100,000
	8'	13,305	19,955	26,610	47,425	63,230	96,390
	9'	10,875	16,315	21,750	43,155	57,540	92,070
	10'	8,900	13,350	17,800	38,740	51,655	87,170
	12'	6,015	9,025	12,030	29,760	39,680	76,175
	14'	4,145	6,215	8,275	22,775	30,370	64,230
	16'	Slenderness ratio exceeds 50			17,480	23,310	52,685
	18'				13,500	17,995	43,130
	20'				10,510	14,010	35,345
	22'						29,040
	24'					23,945	

The column values listed are for dry-service conditions ONLY. When wet-service conditions exist, contact your Weyerhaeuser representative for other product solutions.

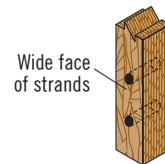


DO NOT install bolts or screws into the narrow face of strands

### General Notes

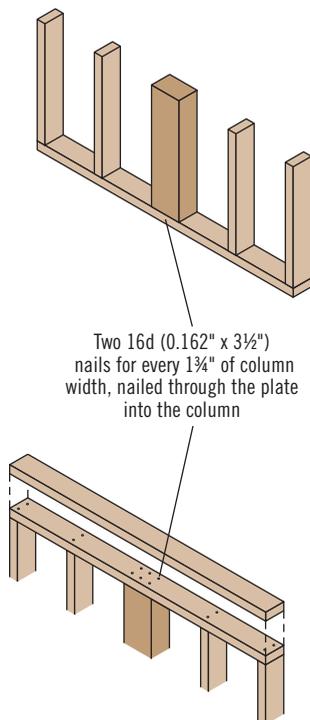
- Tables are based on:
  - Solid, one-piece column members used in dry-service conditions.
  - Bracing in both directions at column ends.
  - CSA O86.
  - Simple columns with axial loads only. For side loads or other combined bending and axial loads, see the CSA O86 provisions.
  - $K_b = 1.0$ , where the specified snow or live load is greater than the specified dead load. For other load cases, use Weyerhaeuser software.
- Factored resistances have been adjusted to accommodate the worst case of the following eccentric conditions: 1/6 of column thickness (first dimension) or 1/6 of column width.
- Beams and columns must remain straight to within  $5L^2/4608$  (in.) of true alignment. L is the unrestrained length of the member in feet.

For column specified strengths see page 4.

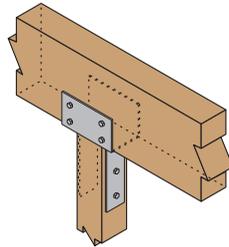


In order to use the manufacturer's published capacities when designing column caps, bases, or holdowns for uplift, the bolts or screws must be installed perpendicular to the wide face of strands, as shown above.

### Top or Bottom Plate Connection

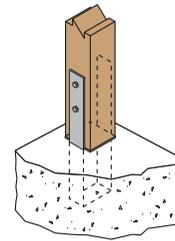


### Beam on Column Cap



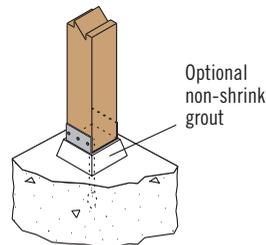
P1

### Column Base



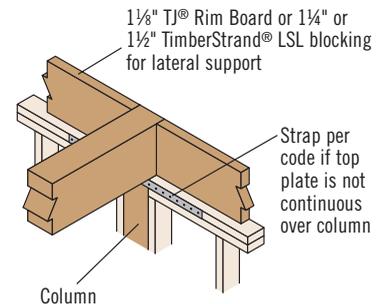
P2

### Elevated Column Base



P3

### Beam on Column



L1





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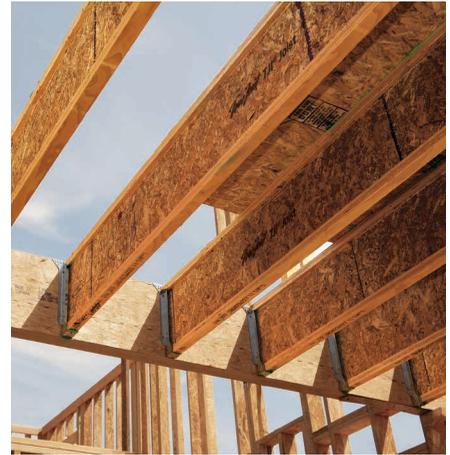
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