

## Beam Design Guide for 22" and 24" Depth 2.0E Microllam® LVL

The following is a supplement to *Trus Joist® Beam, Header and Column Specifier's Guide* (Canada-East: [TJ-9500](#) / Canada-West: [TJ-9505](#)) and includes critical information for 22" and 24" depth 2.0E Microllam® LVL beams. For additional design and installation guidance, reference [TJ-9500](#) or [TJ-9505](#).

### FACTORED RESISTANCES<sup>[1]</sup> (STANDARD TERM)

Grade	Width	Design Property	Depth	
			22"	24"
2.0E	1¾"	Moment (ft-lbs)	46,845	55,095
		Shear (lbs)	12,245	13,355
		Moment of Inertia (in. <sup>4</sup> )	1,553	2,016
		Weight (plf)	11.2	12.3

[1] For product in beam orientation.

### SPECIFIED STRENGTHS AND MODULUS OF ELASTICITY<sup>[1]</sup> (STANDARD TERM)

Grade	Orientation	E Modulus of Elasticity <sup>[2]</sup> (psi)	f <sub>b</sub> Flexural Stress <sup>[3]</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)
2.0E	Beam	2.0 x 10 <sup>6</sup>	4,805	1,365	4,005	530

[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. For additional information, reference [TJ-9500](#) or [TJ-9505](#).

[3] For 12" depth. For other depths, multiply F<sub>b</sub> by (12/d)<sup>0.136</sup>.

### ForteWEB®

To evaluate 22" and 24" depth 2.0E Microllam® LVL beams using [ForteWEB®](#), enter the member design information (i.e., member type, spans, supports, loads, etc.), then click on the "Product Selection" tab and select Microllam® LVL under the "Product" list.

### Bracing Considerations

Deep depth 2.0E Microllam® LVL beams must be used as multiple plies and require special attention to installation details. Lateral bracing is essential to prevent buckling of the beam. The compression edge must be laterally braced at intervals of 24" on-center or less. See page 5 for lateral bracing examples that prevent buckling of the beam and develop full design capacity.

### Multiple-Member Connections for Side-Loaded Beams

#### 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".
- 7" wide beams should be side-loaded only when loads are applied to both faces of the members (to minimize rotation).
- Beams wider than 7" require special consideration by the design professional of record.

**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  3 1/2" wide, 2-ply	Assembly B  5 1/2" wide, 3-ply	Assembly F  7" wide, 4-ply
10d (0.128" x 3") or (0.131" x 3") Nail <sup>[1]</sup>	As shown	3	12"	865	<b>650</b>	
		4	12"	1,150	<b>865</b>	
1/2" A307 Through Bolt <sup>[2][3]</sup>	-	3	24"	1,170	880	780
			19.2"	1,465	1,095	975
			16"	1,755	1,315	1,170
		4	24"	1,560	1,170	1,040
			19.2"	1,950	1,465	1,300
			16"	2,340	1,755	1,560
<b>Screw Length →</b>				<b>3 1/2"</b>	<b>3 1/2"</b>	<b>6"</b>
Simpson Strong-Tie® SDS <sup>[3]</sup>	As shown	3	24"	1,305	<b>980</b>	<b>1,020</b>
			19.2"	1,630	<b>1,225</b>	<b>1,275</b>
			16"	1,960	<b>1,470</b>	<b>1,530</b>
		4	24"	1,740	<b>1,305</b>	<b>1,360</b>
			19.2"	2,175	<b>1,630</b>	<b>1,700</b>
MiTek® WS <sup>[3]</sup>	As shown	3	24"	1,355	<b>1,015</b>	<b>1,150</b>
			19.2"	1,695	<b>1,270</b>	<b>1,440</b>
			16"	2,035	<b>1,525</b>	<b>1,725</b>
		4	24"	1,810	<b>1,355</b>	<b>1,535</b>
			19.2"	2,260	<b>1,695</b>	<b>1,915</b>
			16"	2,710	<b>2,035</b>	<b>2,300</b>
<b>Screw Length →</b>				<b>3 3/8"</b>	<b>5"</b>	<b>6 3/4"</b>
Simpson Strong-Tie® SDW22 <sup>[3][4]</sup>	One face	3	24"	1,020	935	830
			19.2"	1,275	1,165	1,040
			16"	1,530	1,400	1,245
		4	24"	1,360	1,245	1,105
			19.2"	1,700	1,555	1,385
				2,040	1,870	1,660

[1] Nailed connection values may be doubled for 6" on-centre or tripled for 4" on-centre nail spacing.  
 [2] Bolt holes to be 9/16" maximum. Washer required. Bolted connection values are not applicable to bolts installed in counter-bored holes.  
 [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 B and F can be increased by 15%.

- **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.

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**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 F 
10d (0.128" x 3") or (0.131" x 3") Nail	As shown	6	1,730	<b>1,295</b>	
		12	3,455	<b>2,590</b>	
		18	5,185	<b>3,890</b>	
		24	6,910	<b>5,185</b>	
		Screw Length →	3 1/2"	3 1/2"	6"
Simpson Strong-Tie® SDS	As shown	4	3,480	<b>2,610</b>	<b>2,720</b>
		6	5,220	<b>3,915</b>	<b>4,080</b>
		8	6,960	<b>5,220</b>	<b>5,440</b>
MiTek® WS	As shown	4	3,615	<b>2,710</b>	<b>3,065</b>
		6	5,425	<b>4,070</b>	<b>4,600</b>
		8	7,230	<b>5,425</b>	<b>6,135</b>
		Screw Length →	3 3/8"	5"	6 3/4"
Simpson Strong-Tie® SDW22 <sup>[1]</sup>	One face	4	2,720	2,490	2,215
		6	4,080	3,735	3,320
		8	5,440	4,980	4,425

[1] When loading the head side of a SDW22 screw, assemblies B and F can be increased by 30%.

- **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.

**Multiple-Member Connections for Top-Loaded Beams**

**FASTENER INSTALLATION REQUIREMENTS**

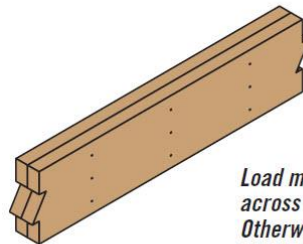
Piece Width	Number of Plies	Fastener				
		Type <sup>[1]</sup>	Min. Length	Placement	# Rows	O.C. Spacing
1 3/4"	2	10d nails	3"	One face	4	12"
		12d-16d nails	3 1/4"			
		Screws	3 3/8" or 3 1/2"		3	24"
	3	10d nails	3"	Both faces	4	12"
		12d-16d nails	3 1/4"			
		Screws	3 3/8" or 3 1/2"	Both faces	3	24"
			5"	One face		
	1/2" bolts <sup>[3]</sup>	6"	-	3	24"	
	4	10d nails <sup>[2]</sup>	3"	One face (per ply)	4	12"
		12d-16d nails <sup>[2]</sup>	3 1/4"			
		Screws	5" or 6"	Both face	3	24"
			6 3/4"	One face		
1/2" bolts <sup>[3]</sup>	8"	-	3	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] When connecting 4-ply members, nail each ply to the other and offset nail rows by 2" from rows in the ply below.

[3] Bolt holes to be 9/16" maximum. Washer required. Bolted connection values are not applicable to bolts installed in counter-bored holes.

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

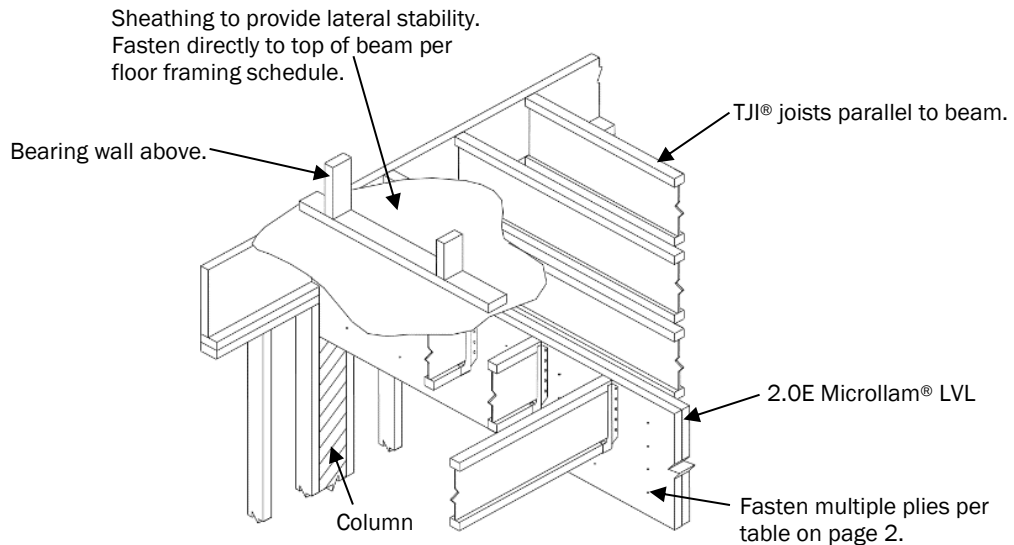


*Load must be applied evenly across entire beam width. Otherwise, use connections for side-loaded beams*

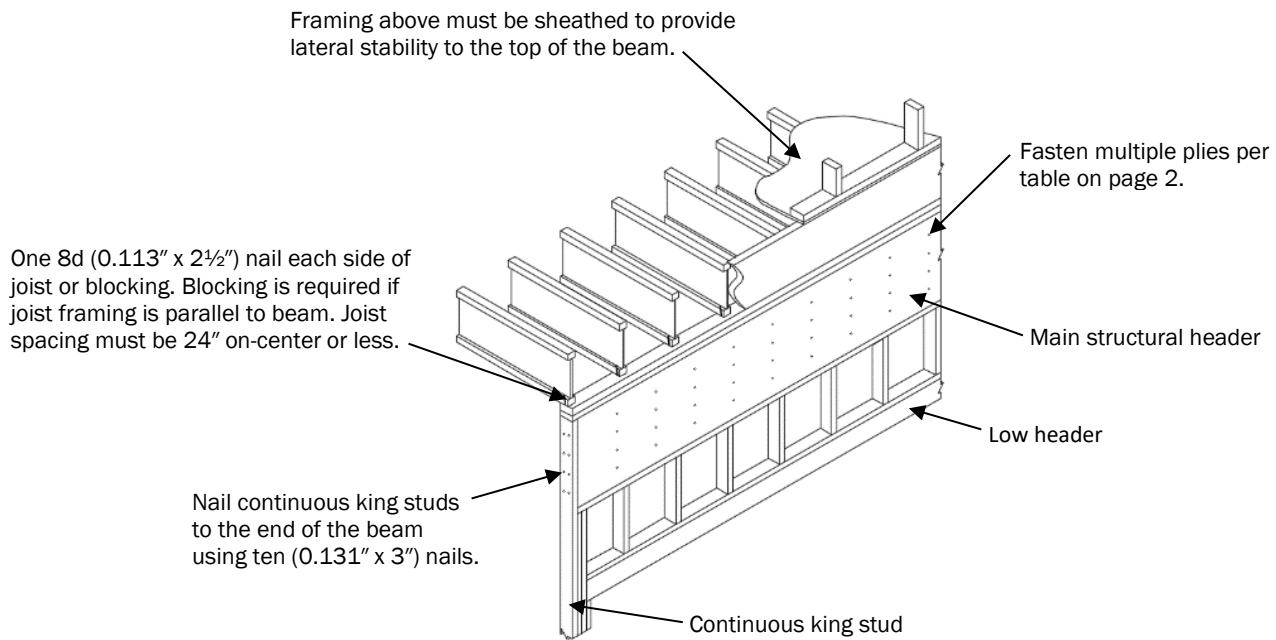


*Multiple pieces can be nailed or bolted together to form a header or beam of the required size, up to a maximum width of 7"*

**Lateral Bracing Examples**



**Detail 1: Fully Braced Flush Beam**



**Detail 2: Fully Braced Alternative for Dropped Header Applications**

***If you have any questions, please contact your Weyerhaeuser representative.***

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