Supplemental Guide for 1¾″ 2.0E Microllam® LVL Wall Framing

This technical bulletin is a supplement to *Trus Joist® U.S. Wall Specifier's Guide* (TJ-9003 / California, Nevada, Arizona: TJ-9004). The information below applies to 1¾″ 2.0E Microllam® LVL wall framing. See TJ-9003/TJ-9004 for additional design and installation information (e.g., multiple-member connections, framing connectors, allowable holes).

ALLOWABLE DESIGN STRESSES (100% LOAD DURATION)

Grade MOE	E_{min}[1]	Axial		Joist/Beam			Face/Plank			Equivalent Specific Gravity for Connections[5]	
		$F_{c\|\|}$	F_t[2]	F_b[3]	F_v	$F_{c\perp}$[4]	F_b	F_v	$F_{c\perp}$[4]		
(x 10^6 psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	Lateral	Withdrawal
2.0	1,016,535	2,510	1,895	2,600[6]	285	750	2,690	190	680	0.50	0.50

[1] Reference modulus of elasticity for beam and column stability calculations per NDS®.
[2] Reference tension design values are based on a standard length of 4 feet. For lengths longer than 4 feet, multiply F_t by the following adjustment (where L is length in feet):
- Microllam® LVL: $(4/L)^{0.085}$
[3] When structural members qualify as repetitive members in accordance with the applicable building code, a 4% increase is permitted for F_b in addition to the increase permitted in footnote 6.
[4] $F_{c\perp}$ may not be increased for duration of load.
[5] For lateral connection design only.
[6] For 12″ depth. For other depths, multiply by $(12/d)^{0.136}$.

SHEAR WALL FRAMING APPLICATIONS[1][2]

Sheathing Nail			Min. Shear Wall Nail Spacing[3]	Equivalent Specific Gravity
Type	Length	Diameter	(in.)	
6d common	2″	0.113″	6	0.50
8d common	2½″	0.131″	6	0.50
10d common	3″	0.148″	6	0.45

[1] Design shear wall applications per AWC SDPWS. When using StrandGuard® TimberStrand® LSL sill plate, see *Specifier's Guide for StrandGuard® TimberStrand® LSL Sill Plates, Columns and Studs* (TJ-8100).
[2] Limited to shear walls sheathed on one side.
[3] Do not use AWC SDPWS with nail spacings less than 6″ on-center. Studs at boundary locations, where two panels abut, are allowed two rows at 6″ on-center.

ALLOWABLE DESIGN PROPERTIES (100% LOAD DURATION)

Design Property	Beam Orientation	
	2.0E	
	5½″	7¼″
Moment (ft-lb)	2,125	3,555
Shear (lb)	1,830	2,410
Moment of Inertia (in.⁴)	24	56
Weight (plf)	2.8	3.7

For walls up to 10′ in height, 1¾″ x 5½″ 2.0E Microllam® LVL studs may be conventionally specified per the limitations described in TJ-9003/TJ-9004. Engineered design for more demanding applications is outlined on the pages that follow.

When used in conventional construction applications, 1¾″ x 5½″ 2.0E Microllam® LVL studs may be drilled or notched in accordance with IRC Section R602.6.

Engineered Design Assumptions

Design applications are limited to vertical loads and to lateral (wind) loads that are perpendicular to the wall framing. Table information is based on the strength calculations and deflection limits of wall framing members, and was generated with the following assumptions:

- Member design is based on the *National Design Specification® (NDS®) for Wood Construction*.
- Stud tables assume structural sheathing on one side of the wall, or a combination of gypsum wallboard and non-structural sheathing or siding applied to each side of the wall, or equivalent.
- Stud lateral bracing assumed to be 1′ on-center maximum.
- If stud spacing is greater than 16″ on-center, trusses or rafters must be installed within 3″ of the stud locations.
- Deflections are based on Components and Cladding (C&C) pressures adjusted for ASD (0.6W) and multiplied by 0.7 (2024 IRC Table R301.7 and 2024 IBC Table 1604.3).
- $\Delta = \frac{270wL^4}{Ebd^3} + \frac{28.8wL^2}{Ebd}$

  Δ = deflection
  w = uniform load (plf)
  L = span (ft)
  b = member width (in.)
  d = member depth (in.)
  E = modulus of elasticity (psi)

Stud Load Table

General Notes

Table is based on:

- Load duration factor of 1.6 for combined lateral (wind) and vertical load.
- Load duration factor of 1.0 for vertical load only.
- Stud lateral bracing in **Engineered Design Assumptions** above.
- Full-width blocking as required by code.
- Vertical load eccentricity of ⅙ of the member depth.
- Reference compression perpendicular-to-grain stress of 425 psi adjusted per NDS® Section 3.10.4.
- Repetitive-member bending strength increase of 4% per NDS® Section 8.3.7.

One-Hour Wall Assembly with Microllam® LVL Studs

For IBC and IRC Applications: Microllam® LVL of equivalent size may be substituted for sawn lumber in fire-rated assemblies, as specified in Tables 721.1(2) and 721.1(3) of the IBC. The fire resistance of protected Microllam® LVL assemblies may also be calculated in accordance Chapter 3 of the ANSI/AWC *Fire Design Specification® for Wood Construction (FDS)*.

Note: For additional information on fire rated assemblies, see *Weyerhaeuser Fire-Rated Assemblies and Sprinkler Systems Guide* (TJ-1500)

Column Load Table

General Notes

Table is based on:

- Load duration factor of 1.6 for combined lateral (wind) and vertical load.
- Load duration factor of 1.0 for vertical load only.
- Column lateral bracing in **Engineered Design Assumptions** above.
- Full-width blocking at a maximum vertical spacing of 8′ on-center.
- Vertical load eccentricity of ⅙ of the member depth.
- Reference compression perpendicular-to-grain stress of 425 psi.

STUDS – MAXIMUM ALLOWABLE LATERAL (WIND) AND VERTICAL LOAD

Wall Ht.	Load and Deflection	2.0E Microllam® LVL											
		1¾" x 5½"						1¾" x 7¼"					
		Lateral Load (PLF)						Lateral Load (PLF)					
		15	20	26[1]	30	40	50	15	20	26[1]	30	40	50
8′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/4,583	L/3,437	L/2,644	L/2,292	L/1,719	L/1,375	L/10,138	L/7,604	L/5,849	L/5,069	L/3,802	L/3,042
9′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/3,252	L/2,439	L/1,876	L/1,626	L/1,219	L/975	L/7,243	L/5,432	L/4,179	L/3,621	L/2,716	L/2,173
10′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/2,388	L/1,791	L/1,378	L/1,194	L/895	L/716	L/5,346	L/4,009	L/3,084	L/2,673	L/2,005	L/1,604
11′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/1,804	L/1,353	L/1,041	L/902	L/676	L/541	L/4,054	L/3,040	L/2,339	L/2,027	L/1,520	L/1,216
12′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/1,395	L/1,046	L/805	L/698	L/523	L/419	L/3,145	L/2,359	L/1,814	L/1,572	L/1,179	L/943
13′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/1,101	L/826	L/635	L/550	L/413	L/330	L/2,487	L/1,865	L/1,435	L/1,244	L/933	L/746
14′	Vertical (lb)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/884	L/663	L/510	L/442	L/331	L/265	L/2,000	L/1,500	L/1,154	L/1,000	L/750	L/600
15′	Vertical (lb)	4,965	4,965	4,965	4,965	4,685	4,165	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/720	L/540	L/415	L/360	L/270	L/216	L/1,632	L/1,224	L/942	L/816	L/612	L/490
16′	Vertical (lb)	4,965	4,965	4,700	4,480	3,945	3,420	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/594	L/446	L/343	L/297	L/223	L/178	L/1,349	L/1,012	L/778	L/674	L/506	L/405
17′	Vertical (lb)	4,710	4,415	4,075	3,855	3,310	2,775	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/496	L/372	L/286	L/248	L/186	L/149	L/1,127	L/845	L/650	L/564	L/423	L/338
18′	Vertical (lb)	4,175	3,875	3,530	3,310	2,760	2,220	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/418	L/314	L/241	L/209	L/157	L/126	L/952	L/714	L/549	L/476	L/357	L/285
19′	Vertical (lb)	3,705	3,405	3,060	2,835	2,285		6,550	6,550	6,550	6,550	6,550	5,980
	Defl. Ratio	L/356	L/267	L/205	L/178	L/134		L/811	L/608	L/468	L/405	L/304	L/243
20′	Vertical (lb)	3,295	2,995	2,650	2,425			6,550	6,550	6,550	6,550	5,855	5,150
	Defl. Ratio	L/306	L/229	L/176	L/153			L/696	L/522	L/402	L/348	L/261	L/209
21′	Vertical (lb)	2,935	2,635	2,285	2,060			6,550	6,550	6,150	5,855	5,130	4,415
	Defl. Ratio	L/264	L/198	L/152	L/132			L/602	L/451	L/347	L/301	L/226	L/181
22′	Vertical (lb)	2,615	2,315	1,970				6,370	5,975	5,515	5,215	4,480	3,760
	Defl. Ratio	L/230	L/172	L/133				L/524	L/393	L/302	L/262	L/197	L/157
23′	Vertical (lb)	2,335	2,035					5,805	5,405	4,940	4,640	3,900	3,170
	Defl. Ratio	L/201	L/151					L/459	L/344	L/265	L/230	L/172	L/138
24′	Vertical (lb)	2,085	1,785					5,295	4,895	4,425	4,125	3,380	2,640
	Defl. Ratio	L/177	L/133					L/404	L/303	L/233	L/202	L/152	L/121
25′	Vertical (lb)	1,860						4,840	4,430	3,965	3,660	2,910	
	Defl. Ratio	L/157						L/358	L/269	L/207	L/179	L/134	
26′	Vertical (lb)	1,660						4,420	4,015	3,545	3,240		
	Defl. Ratio	L/140						L/319	L/239	L/184	L/159		
27′	Vertical (lb)							4,045	3,640	3,170	2,860		
	Defl. Ratio							L/285	L/213	L/164	L/142		
28′	Vertical (lb)							3,705	3,295	2,825	2,515		
	Defl. Ratio							L/255	L/192	L/147	L/128		
29′	Vertical (lb)							3,390	2,985	2,515			
	Defl. Ratio							L/230	L/172	L/133			
30′	Vertical (lb)							3,105	2,700				
	Defl. Ratio							L/208	L/156				

[1] Load based on a wind pressure of 19.1 psf and studs spaced at 16″ on-center.

- Tabulated vertical loads apply to combined lateral (wind) + vertical loading and vertical loading only.
- Maximum allowable lateral (wind) loads reflect 0.6W as required by ASD load combinations in ASCE 7.
- See **Engineered Design Assumptions** and **General Notes** on page 2.

TECHNICAL BULLETIN

COLUMNS – MAXIMUM ALLOWABLE LATERAL (WIND) LOAD (PLF)/VERTICAL LOAD (lb)

Defl. Ratio	Wall Ht.	Max. Defl.	5½" Wall Thickness Microllam® LVL 2.0E Double 1¾" x 5½"[1]	7¼" Wall Thickness Microllam® LVL 2.0E Double 1¾" x 7¼"[1]
L/360	30′	1.00″		
	28′	0.93″		21/7,990
	26′	0.87″		26/8,955
	24′	0.80″		33/9,640
	22′	0.73″		43/10,075
	20′	0.67″	25/6,760	57/10,425
	18′	0.60″	34/7,510	79/10,590
	16′	0.53″	49/7,910	112/10,660
	14′	0.47″	73/8,180	166/10,565
	12′	0.40″	116/8,180	262/10,235
	10′	0.33″	198/8,140	300/10,785
	8′	0.27″	300/8,180	300/10,785
L/240	30′	1.50″		25/6,445
	28′	1.40″		31/7,095
	26′	1.30″		39/7,830
	24′	1.20″	22/4,560	50/8,315
	22′	1.10″	28/5,220	65/8,605
	20′	1.00″	38/5,935	86/8,810
	18′	0.90″	52/6,495	118/8,835
	16′	0.80″	74/6,785	168/8,665
	14′	0.70″	110/6,910	250/8,250
	12′	0.60″	174/6,800	300/9,485
	10′	0.50″	298/6,375	300/10,785
	8′	0.40″	300/8,180	300/10,785
L/180	30′	2.00″		34/5,655
	28′	1.87″		42/6,155
	26′	1.73″	23/3,650	53/6,680
	24′	1.60″	29/4,100	67/7,035
	22′	1.47″	38/4,590	87/7,160
	20′	1.33″	50/5,205	115/7,185
	18′	1.20″	69/5,575	158/6,965
	16′	1.07″	99/5,665	224/6,510
	14′	0.93″	147/5,605	300/6,725
	12′	0.80″	232/5,230	300/9,485
	10′	0.67″	300/6,340	300/10,785
	8′	0.53″	300/8,180	300/10,785

[1] For 3-ply and 4-ply built-up columns, multiply table values by 1.5 and 2.0, respectively. See TJ-9003/TJ-9004 for connection requirements.

- Green numbers refer to lateral (wind) load (PLF). Black numbers refer to vertical load (lb).
- Tabulated vertical loads apply to combined lateral (wind) + vertical loading and vertical loading only.
- Maximum allowable lateral (wind) loads reflect 0.6W as required by ASD load combinations in ASCE 7.
- See **Engineered Design Assumptions** and **General Notes** on page 2.

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