Trus Joist™
Weyerhaeuser

#TJ-9003 | SPECIFIER'S GUIDE

U.S. WALL GUIDE

Featuring Trus Joist® TimberStrand® LSL and Parallam® PSL Wall Framing

- Engineered to meet code requirements for walls up to 30' tall
- Easy-to-use tables adaptable to a variety of wind conditions, surface finishes, and wall layouts
- Out-of-plane wind and vertical load information for designing walls that are stiff, 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.

Code Evaluations:
See ICC-ES ESR-1387

TABLE OF CONTENTS

Deflection Requirements	2
Conventional Construction Applications	3
Allowable Holes and Notches for Timberstrand® LSL Studs	4
Definitions	4
Engineered Design Assumptions	4
Wind Tables	5
Design Example	5
Stud Load Table	6–7
One-Hour Wall Assembly	7
Column Load Tables	8–9
Column Example	9
Header Load Table	10
Header Example	11
Multiple-Member Connections	11
Typical Tall Wall Framing	12
Wall Details	12–13
Framing Connectors	13
Allowable Holes	14
Design Properties	15

SUSTAINABLE FORESTRY INITIATIVE
Certified Sourcing
www.forests.org
SFI-00008

Choose Trus Joist® wall framing for straight, flush walls that:

- are critical for tile applications.
- allow easy countertop and cabinet installation in kitchens and bathrooms.
- give visual appeal to tall walls in great rooms and entryways.
- have the strength and stiffness to accommodate “window” walls.

Many of today’s homes have design requirements—such as walls over 10 feet tall—that exceed the code provisions for conventional construction. Trus Joist® TimberStrand® laminated strand lumber (LSL) and Parallam® parallel strand lumber (PSL) can help you meet the requirements of these challenging designs. Weyerhaeuser also offers product and design support that includes technical information, design software, and design advice from our team of skilled engineers and sales representatives.

Tall wall software solutions

ForteWEB® software is a single-member sizing solution created by Weyerhaeuser to help estimators, architects, and engineers design walls quickly and efficiently. ForteWEB® software provides the most economical solutions for studs, columns, and headers, and helps you design connections for each member. Professional calculations can be printed out for engineer sign-off or to give to building officials. Ask your Weyerhaeuser representative how you can get ForteWEB® software today.

This guide features the following Trus Joist® wall framing products:

1.3E TimberStrand® LSL

Studs: 1½" x 3½" (2x4) • 1½" x 5½" (2x6)

Columns: 3½" x 5½" • 3½" x 7¼"

Headers: 3½" x 5½" • 3½" x 7¼"

1.5E TimberStrand® LSL

Studs and Columns: 1½" x 7¼" (2x8)

1.55E TimberStrand® LSL

Studs and Columns: 1¾" x 5½" • 1¾" x 7¼"

Headers: 3½" x 9½" • 3½" x 11⅞"

1.8E Parallam® PSL

Columns: 3½" x 3½" • 3½" x 5¼"
3½" x 7" • 5¼" x 5¼"
5¼" x 7" • 7" x 7"

Headers: 5¼" x 5¼"

2.0E Parallam® PSL

Columns: 3½" x 9¼" • 5¼" x 9¼"
7" x 9¼"

Headers: 5¼" x 9¼"

Other sizes may be available in Weyerhaeuser software; however, not all products are available in all markets. Contact your Weyerhaeuser representative for the sizes available in your area.

DEFLECTION REQUIREMENTS

How stiff does a wall need to be?

While model building codes provide required deflection limits based on the type of finish supported by the wall framing, acceptable deflection limits are usually established by the design professional, finish-material provider, and/or building code authority. Typical deflection requirements are shown in table below.

Code Minimum Deflection Criteria

Type of Wall	Maximum Deflection
Exterior walls with plaster or stucco finish(1)	L/360(5)
Exterior walls with brittle finishes(1)(2)	L/240
Exterior walls with flexible finishes(1)(2)	L/120
Exterior walls with interior gypsum board finish(3)	L/180
Members supporting windows (mullions)(4)	L/175

(1) 2012/2015/2018/2021/2024 International Residential Code (IRC) Table R301.7
(2) 2012/2015/2018/2021/2024 International Building Code (IBC) Table 1604.3
(3) 2012/2015/2018/2021/2024 IRC Table R301.7, footnote *d*
(4) 2012 IRC, Section R612.8.2; 2015/2018/2021/2024 IRC Section R609.8.2; 2012/2015/2018/2021/2024 IBC Section 2403.3
(5) For finishes that require a deflection stricter than L/360, contact your Weyerhaeuser representative.

CONVENTIONAL CONSTRUCTION APPLICATIONS

Limitations of Conventional Construction

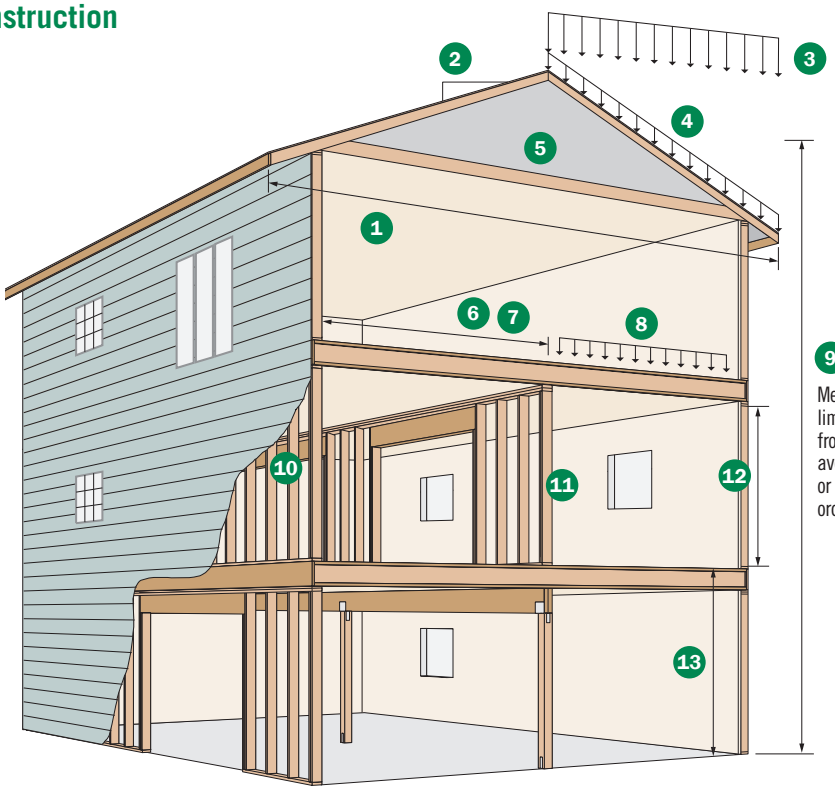
For walls up to 10' in height, 2x4 and 2x6 1.3E TimberStrand® LSL studs may be conventionally specified per the limitations described in this section. Engineered design for more demanding applications is outlined on the pages that follow.

Wind Limitations
Basic wind speed (2012/2015 IRC):
Figure R301.2(4)B

Basic wind speed (2018 IRC):
Figure R301.2(5)B

Basic wind speed (2021/2024 IRC):
Figure R301.2.1.1

Seismic Design Categories
A, B, C, D_0, D_1, and D_2. Excludes irregular portions of structures as defined by 2012/2015 IRC Section R301.2.2.2.5 and 2018/2021/2024 IRC Section R301.2.2.6



9 Mean roof height limited to 33' measured from average grade to average roof elevation, or per local zoning ordinance

Limitation Descriptions and IRC References

Description	IRC Reference
1 Maximum roof span, including overhangs, limited to 40'. Maximum tabulated rafter span (horizontal projection) and ceiling joist span of 26'.	IRC Section R802.10.2.1; footnote *a* to 2012/2015 IRC Tables R802.4(1), R802.4(2) and 2018/2021/2024 IRC Tables R802.5.1(1), R802.5.1(2); footnote *b* to 2012/2015 IRC Tables R802.5.1(1)-R802.5.1(8) and 2018/2021/2024 IRC Tables R802.4.1(1)–R802.4.1(8)
2 Roof pitch: 3:12 minimum, 12:12 maximum	
3 Maximum ground snow load: 70 psf	IRC Section R301.2.3
4 Maximum tabulated roof/ceiling dead load: 20 psf	2012/2015 IRC Tables R802.5.1(1)-R802.5.1(8) and 2018/2021/2024 Tables R802.4.1(1)–R802.4.1(8)
5 Maximum tabulated rafter and ceiling joist spacing: 24" on-center	2012/2015 IRC Tables R802.4(1), R802.4(2), R802.5.1(1)-R802.5.1(8) and 2018/2021/2024 IRC Tables R802.4.1(1)–R802.4.1(8), R802.5.1(1), R802.5.1(2)
6 Maximum tabulated joist span: 26'	IRC Tables R502.3.1(1), R502.3.1(2)
7 Maximum tabulated floor joist spacing: 24" on-center	IRC Tables R502.3.1(1), R502.3.1(2)
8 Maximum uniform floor loads: 40 psf live load, 20 psf dead load	IRC Tables R502.3.1(1), R502.3.1(2)
9 Maximum of 3 stories	IRC Section R101.2
10 Maximum stud spacing: 24" on-center	IRC Table R602.3(5)
11 With TJI® joist floor systems, load-bearing walls must stack directly over bearing walls or beams below. With rectangular joists, walls may be offset a distance equal to the joist depth.	IRC Section R502.4
12 Maximum load-bearing stud length: 10' between points of lateral support	IRC Table R602.3(5)
13 Maximum story height: 10' stud height plus 16" floor framing = 11'-4"	IRC Section R301.3

Stud Specifications for Conventional Applications per IRC Table R602.3(5)(1)

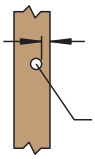
Stud Size	Bearing Walls					Nonbearing Walls	
	Laterally unsupported stud height(1)	Maximum spacing when supporting roof and ceiling only	Maximum spacing when supporting one floor, roof, and ceiling	Maximum spacing when supporting two floors, roof, and ceiling	Maximum spacing when supporting one floor only	Laterally unsupported stud height(2)	Maximum spacing
2x4	10'	24"	16"	–	24"	14'	24"
2x6	10'	24"	24"	16"	24"	20'	24"

(1) See IRC for additional requirements and limitations.
(2) Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

CONVENTIONAL CONSTRUCTION APPLICATIONS

Allowable Holes and Notches for TimberStrand® LSL Studs

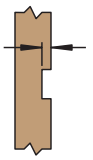
Holes may be drilled anywhere along the length of the stud, but must be at least ⅝" from the edge



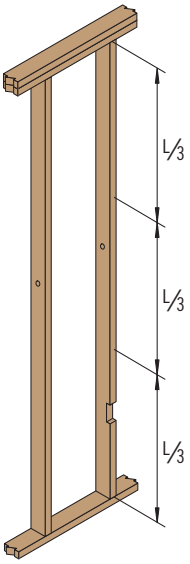
⅝" minimum edge distance

Maximum diameter:
1⅜" for 3½" thick walls
2³⁄₁₆" for 5½"–11⅞" thick walls

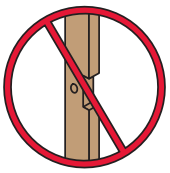
For 2x4 and 2x6 studs, one notch may be cut anywhere along the length of the stud. For larger studs, the notch may be cut anywhere except the middle ⅓ of the length of the stud.



Maximum notch:
⅞" for 3½" thick walls
1⅜" for 5½"–11⅞" thick walls



When used in conventional construction applications, both 2x4 and 2x6 TimberStrand® LSL studs may be drilled or notched in accordance with IRC Section R602.6.



DO NOT cut a notch and a hole in the same cross section

DEFINITIONS

Buckling Length—Distance along the length of a member between braced points. This length is used to calculate the buckling stability of the member.

Conventional Construction—Generally, home design based on traditional construction methods and materials that have a history of adequate structural performance for specific building types and sizes. Both conventionally specified and pre-calculated members and connections are prescriptively specified in building codes such as the IRC and IBC, and may be combined to form a structure or structural assemblage.

Components and Cladding (C&C)—Elements of the building envelope or elements of building appurtenances and rooftop structures and equipment that do not qualify as part of the MWFRS.

Design Wind Pressure—The equivalent static wind pressure applied to structures to determine wind loads for buildings.

Effective Wind Area—The area used to determine the external pressure coefficient to be used in the determination of wind loads for buildings. For C&C elements, the effective wind area is the span length multiplied by the tributary width or $L^2/3$, whichever is greater.

Lateral Loads—Loads applied to a structure in the horizontal direction. This includes loads from wind and seismic events.

Main Wind Force Resisting System (MWFRS)—An assemblage of structural elements assigned to provide support and stability for the overall building or other structure. The system generally receives wind loading from more than one surface.

Tributary Area—A calculated area of influence surrounding a structural member. Loads within this area are added together to determine the amount of load a member is required to resist. For example, the tributary area for a wall stud is the sum of ½ the distance to the adjacent wall stud on each side of the stud in question. Likewise, the tributary area for a floor joist would be the sum of ½ the distance to the adjacent joist on each side of the joist in question.

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 and column 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.
- Column lateral bracing assumed to be 8' on-center maximum; stud lateral bracing at 1' on-center maximum.
- Beams and columns must remain straight to within $^{5L^2/4}_{608}$ (in.) of true alignment. L is the unrestrained length of the member in feet.
- 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 C&C pressures adjusted for ASD (0.6W) and multiplied by 0.7 (IRC Table R301.7 and IBC Table 1604.3).
- $\Delta = \frac{270\ wL^4}{Ebd^3} + \frac{28.8\ wL^2}{Ebd}$

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

WIND TABLES

Wall Design Wind Pressure (PSF)[1][2]

Exposure Category[3]	Effective Wind Area[4] (ft^2)	Basic Wind Speed (mph)												
		2012/2015/2018/2021/2024 IRC/IBC (ASCE 7-10/7-16/7-22: 0.6W)												
		90	95	100	105	110	115	120	130	140	150	160	170	180
B	≤ 10	9.7	10.9	12.0	13.3	14.6	15.9	17.3	20.3	23.6	27.1	30.8	34.8	39.0
	50	8.8	9.8	10.9	12.0	13.2	14.4	15.7	18.4	21.3	24.5	27.8	31.4	35.2
	≥ 100	8.4	9.4	10.4	11.4	12.5	13.7	14.9	17.5	20.3	23.3	26.6	30.0	33.6
C	≤ 10	13.6	15.1	16.7	18.5	20.3	22.1	24.1	28.3	32.8	37.7	42.9	48.4	54.3
	50	12.3	13.7	15.1	16.7	18.3	20.0	21.8	25.6	29.7	34.0	38.7	43.7	49.0
	≥ 100	11.7	13.0	14.4	15.9	17.5	19.1	20.8	24.4	28.3	32.5	37.0	41.7	46.8
D	≤ 10	16.1	17.9	19.8	21.9	24.0	26.2	28.6	33.5	38.9	44.6	50.8	57.3	64.3
	50	14.5	16.2	17.9	19.8	21.7	23.7	25.8	30.3	35.1	40.3	45.9	51.8	58.1
	≥ 100	13.9	15.4	17.1	18.9	20.7	22.6	24.6	28.9	33.5	38.5	43.8	49.4	55.4

(1) Tabulated pressures are based on the Analytical Procedure defined in ASCE 7. Values assume a C&C member in the interior zone of an enclosed structure, with the following factors:
- Risk/occupancy category II
- Topographical factor of 1.0
- Elevation factor of 1.0
- Mean roof height of 33'

(2) When designing in accordance with 2012/2015/2018/2021/2024 IRC/IBC, the load combinations include a 0.6 factor for wind. Tabulated wind pressures in this table are reduced by 0.6 for direct use with the load tables in this guide.

(3) Exposure categories are generally defined as follows (see ASCE 7):

B = Urban and suburban areas, wooded areas

C = Open terrain with scattered obstructions generally less than 30' in height

D = Flat, unobstructed areas

(4) **Effective Wind Area** is the span multiplied by the tributary width **or** $L^2/3$, whichever is greater. For values of effective wind areas not listed, interpolation between 10 ft^2 and 100 ft^2 is allowed.

- Check local codes for any special wind pressures.

Effective Wind Area

Wall Height	Stud/Column Effective Wind Area (ft^2)
≥ 18'	100
16'	85
14'	65
12'	48
10'	33

- Values are based on $L^2/3$ with a maximum of 100 ft^2.
- The effective wind area should not be confused with the tributary area, which is used to determine the amount of load applied to an individual member.

DESIGN EXAMPLE

Given

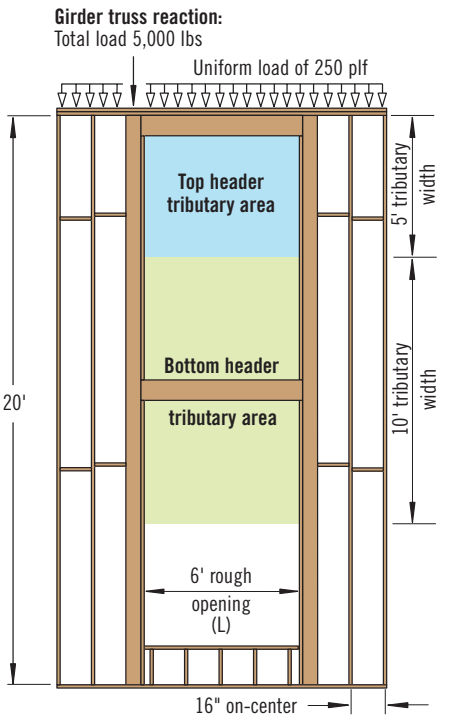
- Wall height = 20'
- Rough opening = 6'
- Exposure Category B
- 140 mph basic wind speed
- 2024 IRC/IBC
- Flexible exterior finish with interior gypsum board finish; walls support window mullions
- Maximum column vertical load = 5,000 lbs
- Maximum header vertical load = 250 plf

When designing with C&C pressures, the effective wind area ($L^2/3$) helps determine the wall design wind pressure. A smaller effective wind area results in a higher wind pressure. The effective wind area should not be confused with the tributary area, which is used to determine the amount of load applied to an individual member.

1. **Determine effective wind areas (ft^2):**
   - For the studs and columns, refer to the **Effective Wind Area** table above. A 20' stud or column will have an effective wind area of 100 ft^2.
   - For each header, consult the drawing at right and use the maximum value of the rough opening (L) multiplied by the tributary width **or** $L^2/3$, whichever is greater.
     - For the top header in our example wall, use the maximum of either (6' x 5' = 30 ft^2) or ($6^2/3$ = 12 ft^2).
     - For the bottom header in our example wall, use the maximum of either (6' x 10' = 60 ft^2) or ($6^2/3$ = 12 ft^2).

   The effective wind areas calculate to 30 ft^2 for the top header and 60 ft^2 for the bottom header, so interpolation would be required to find exact pressures. For simplicity, we will use an effective wind area of 10 ft^2 for each header. This allows us to skip the interpolation exercise, and provides a more conservative wind pressure.
2. **Determine design wind pressure:** Consult the **Wall Design Wind Pressure** table on page 5, using the example wall's criteria of Exposure B, a 140 mph basic wind speed, and an effective wind area as calculated above:
   - For studs/columns with an effective area of 100 ft^2, the wall design lateral wind pressure is 20.3 psf.
   - For headers with an effective area of 10 ft^2, the wall design wind pressure is 23.6 psf.
3. **Determine appropriate deflection criteria:** Consult the **Code Minimum Deflection Criteria** on page 2. Our example wall contains both windows (minimum L/175) and interior gypsum board (minimum L/180). Because the L/180 deflection is more restrictive, the wall should be designed using the L/180 deflection values in this guide.

Refer to stud, column, and header tables on pages 6–10 to design the components for this example wall.



A complete wall specification should include permanent bracing, safety bracing, blocking, connections, details, etc. See pages 11–14.

STUD LOAD TABLE

Studs—Maximum Allowable Lateral (Wind) and Vertical Load

Wall Ht.	Load and Deflection	1.3E TimberStrand® LSL										1.5E TimberStrand® LSL					
		1½" x 3½"				1½" x 5½"						1½" x 7¼"					
		Lateral Load (plf)				Lateral Load (plf)						Lateral Load (plf)					
		15	20	26[1]	30	15	20	26[1]	30	40	50	15	20	26[1]	30	40	50
8'	Vertical (lbs)	2,745	2,585	2,400	2,280	4,385	4,385	4,385	4385	4,385	4,385	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/677	L/508	L/391	L/339	L/2553	L/1915	L/1473	L/1277	L/958	L/766	L/6518	L/4888	L/3760	L/3259	L/2444	L/1955
9'	Vertical (lbs)	2,175	2,010	1,815	1,690	4,385	4,385	4,385	4385	4,385	4,385	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/478	L/358	L/276	L/239	L/1812	L/1359	L/1045	L/906	L/679	L/543	L/4656	L/3492	L/2686	L/2328	L/1746	L/1397
10'	Vertical (lbs)	1,730	1,560	1,360	1,230	4,385	4,385	4,385	4385	4,385	4,385	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/349	L/262	L/202	L/175	L/1330	L/998	L/767	L/665	L/499	L/399	L/3437	L/2577	L/1983	L/1718	L/1289	L/1031
11'	Vertical (lbs)	1,380	1,205	1,005	870	4,385	4,385	4,385	4385	4,230	3,775	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/263	L/197	L/152	L/132	L/1005	L/754	L/580	L/502	L/377	L/301	L/2606	L/1955	L/1503	L/1303	L/977	L/782
12'	Vertical (lbs)	1,100	925			4,385	4,375	4,085	3890	3,415	2,940	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/203	L/152			L/777	L/583	L/448	L/389	L/291	L/233	L/2022	L/1516	L/1166	L/1011	L/758	L/606
13'	Vertical (lbs)	870				3,980	3,720	3,420	3220	2,725	2,230	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/160				L/613	L/460	L/,354	L/307	L/230	L/184	L/1599	L/1199	L/922	L/799	L/600	L/480
14'	Vertical (lbs)	690				3,430	3,165	2,855	2650	2,135	1,620	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio	L/128				L/492	L/369	L/284	L/246	L/185	L/148	L/1286	L/964	L/742	L/643	L/482	L/386
15'	Vertical (lbs)					2,965	2,690	2,370	2160	1,635	1,095	5,775	5,775	5,775	5,775	5,775	5,775
	Defl. Ratio					L/401	L/301	L/231	L/201	L/150	L/120	L/1049	L/787	L/605	L/525	L/393	L/315
16'	Vertical (lbs)					2,560	2,285	1,960	1745	1,200		5,775	5,775	5,775	5,775	5,775	5,245
	Defl. Ratio					L/331	L/248	L/191	L/166	L/124		L/867	L/650	L/500	L/434	L/325	L/260
17'	Vertical (lbs)					2,210	1,930	1,600	1385			5,775	5,775	5,775	5,630	5,025	4,430
	Defl. Ratio					L/276	L/207	L/159	L/138			L/725	L/543	L/418	L/362	L/272	L/217
18'	Vertical (lbs)					1,910	1,625	1,295				5,775	5,565	5,185	4,935	4,315	3,710
	Defl. Ratio					L/233	L/175	L/135				L/612	L/459	L/353	L/306	L/229	L/184
19'	Vertical (lbs)					1,650	1,365					5,300	4,965	4,575	4,320	3,690	3,070
	Defl. Ratio					L/198	L/149					L/521	L/391	L/301	L/261	L/195	L/156
20'	Vertical (lbs)					1,420	1,135					4,770	4,430	4,035	3,775	3,140	2,505
	Defl. Ratio					L/170	L/128					L/447	L/336	L/258	L/224	L/168	L/134
21'	Vertical (lbs)					1,220						4,295	3,955	3,555	3,295	2,650	
	Defl. Ratio					L/147						L/387	L/290	L/223	L/193	L/145	
22'	Vertical (lbs)					1,040						3,875	3,530	3,125	2,865	2,215	
	Defl. Ratio					L/128						L/337	L/253	L/194	L/168	L/126	
23'	Vertical (lbs)											3,500	3,150	2,745	2,480		
	Defl. Ratio											L/295	L/221	L/170	L/148		
24'	Vertical (lbs)											3,160	2,810	2,405	2,135		
	Defl. Ratio											L/260	L/195	L/150	L/130		
25'	Vertical (lbs)											2,855	2,505	2,095			
	Defl. Ratio											L/230	L/173	L/133			
26'	Vertical (lbs)											2,580	2,230				
	Defl. Ratio											L/205	L/154				
27'	Vertical (lbs)											2,330	1,980				
	Defl. Ratio											L/183	L/137				
28'	Vertical (lbs)											2,105	1,755				
	Defl. Ratio											L/164	L/123				
29'	Vertical (lbs)											1,905					
	Defl. Ratio											L/148					
30'	Vertical (lbs)											1,715					
	Defl. Ratio											L/134					

(1) Load based on a wind pressure of 19.1 psf and studs spaced at 16" on-center.

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** on page 4.
  - 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.
- 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.

Stud Example

For the **Design Example** on page 5, design 20' studs for lateral wind pressure of 20.3 psf and a maximum vertical load of 250 plf:

- **Determine the maximum stud length:**
  The maximum stud length in this example wall is 20'.
- **Calculate the lateral load in plf:**
  This example uses 16" on-center studs, so calculate the lateral load in plf and the vertical load in lbs as follows:
  20.3 psf x 16/12 = 27.1 plf; 250 plf x 16/12 = 333 lbs.
- **Select the appropriate studs:**
  In the **Stud Load Table**, scan across the 20' row until you find a cell in the

Stud Example continued on page 7

STUD LOAD TABLE

Studs—Maximum Allowable Lateral (Wind) and Vertical Load *continued*

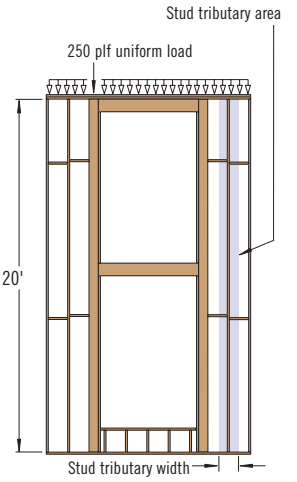
Wall Ht.	Load and Deflection	1.55E TimberStrand® LSL											
		1¾" x 5½"						1¾" x 7¼"					
		Lateral Load (plf)						Lateral Load (plf)					
		15	20	26[1]	30	40	50	15	20	26[1]	30	40	50
8'	Vertical (lbs)	4,965	4,965	4,965	4,965	4,965	4,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/3552	L/2664	L/2049	L/1776	L/1332	L/1066	L/7857	L/5893	L/4533	L/3929	L/2946	L/2357
9'	Vertical (lbs)	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/2520	L/1890	L/1454	L/1260	L/945	L/756	L/5613	L/4210	L/3238	L/2807	L/2105	L/1684
10'	Vertical (lbs)	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/1851	L/1388	L/1068	L/925	L/694	L/555	L/4143	L/3107	L/2390	L/2072	L/1554	L/1243
11'	Vertical (lbs)	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/1398	L/1048	L/806	L/699	L/524	L/419	L/3142	L/2356	L/1813	L/1571	L/1178	L/943
12'	Vertical (lbs)	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/1081	L/811	L/624	L/541	L/405	L/324	L/2437	L/1828	L/1406	L/1219	L/914	L/731
13'	Vertical (lbs)	4,965	4,965	4,965	4,965	4,950	4,500	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/853	L/640	L/492	L/427	L/320	L/256	L/1928	L/1446	L/1112	L/964	L/723	L/578
14'	Vertical (lbs)	4,965	4,965	4,790	4,600	4,130	3,670	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/685	L/514	L/395	L/342	L/257	L/205	L/1550	L/1163	L/894	L/775	L/581	L/465
15'	Vertical (lbs)	4,670	4,410	4,110	3,915	3,435	2,965	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/558	L/418	L/322	L/279	L/209	L/167	L/1265	L/949	L/730	L/632	L/474	L/379
16'	Vertical (lbs)	4,095	3,830	3,525	3,330	2,845	2,365	6,550	6,550	6,550	6,550	6,550	6,550
	Defl. Ratio	L/461	L/345	L/266	L/230	L/173	L/138	L/1045	L/784	L/603	L/523	L/392	L/314
17'	Vertical (lbs)	3,600	3,335	3,025	2,825	2,335		6,550	6,550	6,550	6,550	6,550	5,950
	Defl. Ratio	L/385	L/288	L/222	L/192	L/144		L/874	L/655	L/504	L/437	L/328	L/262
18'	Vertical (lbs)	3,170	2,905	2,595	2,395	1,900		6,550	6,550	6,550	6,335	5,710	5,095
	Defl. Ratio	L/324	L/243	L/187	L/162	L/122		L/737	L/553	L/425	L/369	L/277	L/221
19'	Vertical (lbs)	2,795	2,530	2,220	2,020			6,550	6,260	5,860	5,600	4,965	4,340
	Defl. Ratio	L/276	L/207	L/159	L/138			L/628	L/471	L/362	L/314	L/236	L/188
20'	Vertical (lbs)	2,470	2,205	1,895				5,965	5,615	5,215	4,950	4,305	3,675
	Defl. Ratio	L/237	L/178	L/137				L/539	L/405	L/311	L/270	L/202	L/162
21'	Vertical (lbs)	2,185	1,920					5,400	5,045	4,640	4,375	3,720	3,080
	Defl. Ratio	L/205	L/154					L/467	L/350	L/269	L/233	L/175	L/140
22'	Vertical (lbs)	1,935	1,665					4,890	4,535	4,125	3,860	3,200	2,550
	Defl. Ratio	L/178	L/134					L/406	L/305	L/234	L/203	L/152	L/122
23'	Vertical (lbs)	1,710						4,440	4,080	3,670	3,400	2,740	
	Defl. Ratio	L/156						L/356	L/267	L/205	L/178	L/133	
24'	Vertical (lbs)	1,515						4,030	3,675	3,260	2,985		
	Defl. Ratio	L/137						L/313	L/235	L/181	L/157		
25'	Vertical (lbs)	1,340						3,665	3,305	2,890	2,620		
	Defl. Ratio	L/122						L/278	L/208	L/160	L/139		
26'	Vertical (lbs)							3,335	2,975	2,560	2,285		
	Defl. Ratio							L/247	L/185	L/142	L/123		
27'	Vertical (lbs)							3,035	2,675	2,260			
	Defl. Ratio							L/221	L/165	L/127			
28'	Vertical (lbs)							2,765	2,405				
	Defl. Ratio							L/198	L/148				
29'	Vertical (lbs)							2,515	2,160				
	Defl. Ratio							L/178	L/134				
30'	Vertical (lbs)							2,295	1,935				
	Defl. Ratio							L/161	L/121				

(1) Load based on a wind pressure of 19.1 psf and studs spaced at 16" on-center.

Stud Example
continued from page 6

30 plf **Lateral Load** column that meets the L/180 deflection and the 333 lbs vertical load criteria. According to the table, a 1.3E TimberStrand® LSL 2x6 stud is not an option. If the stud spacing is changed to 12" on-center (for a plf of 20.3), it still would not meet the L/180 requirement. However, a 1.5E TimberStrand® LSL 2x8 stud (at 3,775 lbs and L/224) spaced at 16" on-center meets the requirements, making it the best option for this wall.

- **Design stud connections:** Convert 27.1 plf into a reaction (uniform load x length/2): 27.1 (20'/2) = 271 lbs. Use the **Lateral Connections** tables on page 13 to select a nail or angle clip connection that meets or exceeds 271 lbs. For this example a nailed connection can be calculated as 271/104 = 2.61, so three 16d (0.131" x 3¼") nails (nailed through the plate into the end grain) would work. For an angle clip connection, one Simpson Strong-Tie® A34 angle clip at the top and bottom plate is sufficient.



ONE-HOUR WALL ASSEMBLY WITH TIMBERSTRAND® LSL STUDS

For IBC and IRC Applications: TimberStrand® LSL 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 TimberStrand® LSL assemblies may also be calculated inaccordance with Chapter 3 of the ANSI/AWC *Fire Design Specification® for Wood Construction (FDS).*

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

COLUMN LOAD TABLE

Columns—Maximum Allowable Lateral (Wind) Load (PLF)/Vertical Load (lbs)

Defl. Ratio	Wall Ht.	Max. Defl.	3½" Wall Thickness						5½" Wall Thickness						
			TimberStrand® LSL			Parallam® PSL			TimberStrand® LSL			Parallam® PSL			
			1.3E			1.8E			1.3E		1.55E	1.8E			2.0E
			Double 2x4[1]	5½" x 3½" (Plank)	7¼" x 3½" (Plank)	3½" x 3½"	5¼" x 3½" (Plank)	7" x 3½" (Plank)	Double 2x6[1]	3½" x 5½"	Double 1¾" x 5½"[1]	3½" x 5¼"	5¼" x 5¼"	7" x 5¼" (Plank)	9¼" x 5¼" (Plank)
L/360	30'	1.00"													
	28'	0.93"													
	26'	0.87"													
	24'	0.80"												23/8,160	33/11,370
	22'	0.73"											22/7,070	30/9,380	44/13,050
	20'	0.67"											29/8,230	39/10,955	58/15,225
	18'	0.60"								22/5,105	27/6,025	27/6,465	40/9,655	54/12,830	80/17,895
	16'	0.53"						23/5,510	27/3,615	32/5,975	38/6,400	38/7,700	58/11,400	77/15,220	113/20,640
	14'	0.47"			25/5,070		25/5,160	34/6,850	41/3,630	47/6,885	57/6,620	57/7,810	86/11,715	115/15,620	169/20,640
	12'	0.40"		31/4,840	40/6,415	27/4,350	40/6,540	54/8,695	64/3,620	75/7,290	90/6,715	91/7,810	136/11,715	182/15,620	267/20,640
	10'	0.33"	29/2,340	53/6,300	70/8,300	47/5,205	70/7,810	94/10,415	110/3,510	129/7,435	154/6,650	156/7,810	234/11,715	300/15,620	300/20,640
	8'	0.27"	56/2,360	103/8,180	136/10,785	91/5,205	136/7,810	182/10,415	212/3,275	248/7,200	295/6,380	300/7,810	300/11,715	300/15,620	300/20,640
L/240	30'	1.50"													
	28'	1.40"													
	26'	1.30"													
	24'	1.20"											26/5,535	34/7,420	50/10,330
	22'	1.10"									22/4,215	22/4,275	33/6,360	45/8,420	66/11,750
	20'	1.00"							21/2,965	24/3,850	29/4,865	29/4,940	44/7,315	59/9,730	87/13,580
	18'	0.90"							29/3,060	34/4,365	40/5,345	40/5,720	61/8,435	81/11,270	120/15,725
	16'	0.80"			25/3,720		26/3,750	34/5,030	41/3,115	48/5,050	57/5,605	58/6,630	87/9,825	116/13,100	170/18,405
	14'	0.70"		29/3,425	38/4,525	25/3,100	38/4,630	51/6,160	61/3,100	71/5,650	85/5,740	86/7,750	129/11,525	173/15,315	254/20,640
	12'	0.60"	25/1,980	46/4,260	61/5,605	40/3,860	61/5,755	81/7,685	97/2,980	113/5,765	135/5,695	136/7,810	205/11,715	273/15,620	300/20,640
	10'	0.50"	43/2,050	80/5,355	105/7,075	70/4,870	105/7,310	141/9,710	166/2,740	194/5,530	231/5,445	234/7,810	300/11,715	300/15,620	300/20,640
	8'	0.40"	84/2,000	155/6,755	204/8,915	136/5,205	205/7,810	267/10,415	300/2,455	300/6,200	300/6,330	300/7,810	300/11,715	300/15,620	300/20,640
L/180	30'	2.00"													
	28'	1.87"													
	26'	1.73"													
	24'	1.60"									22/3,380	23/3,365	34/5,030	46/6,670	67/9,340
	22'	1.47"							21/2,475	24/2,980	29/3,800	30/3,800	45/5,635	60/7,515	88/10,510
	20'	1.33"							28/2,580	33/3,290	39/4,300	39/4,365	59/6,445	79/8,575	117/11,945
	18'	1.20"							38/2,650	45/3,710	54/4,645	54/4,955	81/7,330	109/9,720	160/13,625
	16'	1.07"		26/2,525	34/3,345	23/2,270	34/3,425	46/4,545	55/2,610	64/4,145	76/4,830	77/5,645	116/8,300	155/11,050	227/15,535
	14'	0.93"	21/1,630	39/3,035	51/4,015	34/2,755	51/4,130	68/5,510	82/2,505	95/4,420	114/4,815	115/6,345	173/9,335	230/12,480	300/19,335
	12'	0.80"	33/1,740	62/3,675	81/4,870	54/3,360	81/5,040	109/6,685	129/2,290	151/4,185	180/4,620	182/6,350	273/10,210	300/15,620	300/20,640
	10'	0.67"	58/1,735	106/4,470	140/5,880	94/4,080	141/6,120	188/8,165	221/1,825	258/3,435	300/4,245	300/6,150	300/11,715	300/15,620	300/20,640
	8'	0.53"	112/1,615	206/5,170	267/6,955	182/4,370	267/7,430	267/10,415	300/2,455	300/6,200	300/6,330	300/7,810	300/11,715	300/15,620	300/20,640

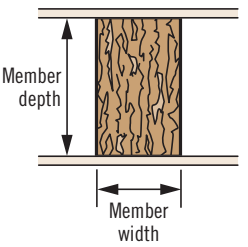
(1) For 3-ply and 4-ply built-up columns, multiply table values by 1.5 and 2.0, respectively. See page 11 for connection requirements.

- Green numbers refer to lateral (wind) load (PLF). Black numbers refer to vertical load (lbs).

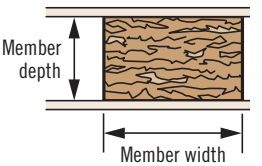
General Notes

- Tables are 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** on page 4.
  - 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.
- Tabulated vertical loads apply to combined lateral (wind) + vertical loading and vertical loading only.
- Solid sections required where specified. Built-up columns require reductions. Contact your Weyerhaeuser representative for assistance.
- Maximum allowable lateral (wind) loads reflect 0.6W as required by ASD load combinations in ASCE 7.

Beam Orientation



Plank Orientation



Some columns are listed in both beam and plank orientation. The first dimension is for member width, and the second dimension is for member depth (wall thickness).

TimberStrand® LSL and untreated Parallam® PSL are intended for dry-use applications

Not all products are available in all markets. Contact your Weyerhaeuser representative for information.

COLUMN LOAD TABLE

Columns—Maximum Allowable Lateral (Wind) Load (PLF)/Vertical Load (lbs)

Defl. Ratio	Wall Ht.	Max. Defl.	7¼" Wall Thickness							9¼" Wall Thickness	
			TimberStrand® LSL			Parallam® PSL				Parallam® PSL	
			1.5E	1.3E	1.55E	1.8E			2.0E	2.0E	
			Double 2x8(1)	3½" x 7¼"	Double 1¾" x 7¼"(1)	3½" x 7"	5¼" x 7"	7" x 7"	9¼" x 7" (Plank)	3½" x 9¼"	5¼" x 9¼"
L/360	30'	1.00"					21/9,050	28/11,955	41/16,330	35/11,670	53/19,040
	28'	0.93"					25/10,170	34/13,370	50/18,285	43/12,760	65/20,640
	26'	0.87"			20/7,250	21/7,540	32/11,350	43/14,945	63/20,510	54/13,760	82/20,640
	24'	0.80"	21/5,495	21/6,545	26/7,790	27/8,485	40/12,865	54/16,900	80/23,195	69/13,760	104/20,640
	22'	0.73"	28/5,585	28/7,340	33/8,210	35/9,635	53/14,530	70/19,180	103/26,445	90/13,760	135/20,640
	20'	0.67"	37/5,675	37/8,345	44/8,495	47/10,415	70/15,620	94/20,825	138/27,520	119/13,760	179/20,640
	18'	0.60"	50/5,720	51/8,990	61/8,655	64/10,415	96/15,620	128/20,825	188/27,520	162/13,760	237/20,640
	16'	0.53"	72/5,670	73/9,355	87/8,720	91/10,415	136/15,620	182/20,825	267/27,520	230/13,760	267/20,640
	14'	0.47"	107/5,580	108/9,565	129/8,675	135/10,415	202/15,620	270/20,825	300/27,520	300/13,760	300/20,640
	12'	0.40"	168/5,415	170/9,495	203/8,485	212/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	10'	0.33"	286/5,125	289/9,060	300/8,625	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	8'	0.27"	300/6,000	300/10,785	300/9,955	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
L/240	30'	1.50"			20/5,190	21/5,385	31/8,180	42/10,720	61/14,745	53/10,055	80/16,490
	28'	1.40"	20/4,550	20/4,590	24/5,795	25/6,025	38/9,080	51/11,915	75/16,360	65/10,880	98/18,005
	26'	1.30"	25/4,730	25/5,080	30/6,450	32/6,645	48/10,060	64/13,220	94/18,190	82/11,685	123/19,585
	24'	1.20"	32/4,850	32/5,625	39/6,850	40/7,465	61/11,240	81/14,775	120/20,300	104/12,390	156/20,640
	22'	1.10"	42/4,915	42/6,220	50/7,165	53/8,290	79/12,615	106/16,470	155/22,810	135/12,740	194/20,640
	20'	1.00"	55/4,975	56/6,900	67/7,325	70/9,335	105/14,185	141/18,465	207/25,575	179/12,960	214/20,640
	18'	0.90"	76/4,925	77/7,250	92/7,395	96/10,180	144/15,620	192/20,760	237/27,520	237/13,305	237/20,640
	16'	0.80"	108/4,815	109/7,355	130/7,355	136/10,415	205/15,620	267/20,825	267/27,520	267/13,760	267/20,640
	14'	0.70"	160/4,615	162/7,170	193/7,130	202/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	12'	0.60"	252/4,260	255/6,575	300/6,740	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	10'	0.50"	300/4,995	300/8,800	300/8,625	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	8'	0.40"	300/6,000	300/10,785	300/9,955	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
L/180	30'	2.00"	22/3,815	22/3,650	26/4,705	28/4,805	42/7,290	56/9,560	82/13,155	71/8,485	107/14,055
	28'	1.87"	27/4,025	27/3,990	32/5,170	34/5,305	51/8,050	68/10,545	101/14,430	87/9,045	131/15,120
	26'	1.73"	34/4,130	34/4,330	41/5,615	43/5,790	64/8,840	86/11,505	126/15,875	109/9,535	164/16,130
	24'	1.60"	43/4,225	43/4,735	52/5,955	54/6,420	81/9,765	109/12,660	160/17,480	139/9,805	178/19,585
	22'	1.47"	56/4,245	56/5,125	67/6,145	70/7,060	106/10,695	141/13,925	194/20,140	180/9,785	194/20,640
	20'	1.33"	74/4,225	75/5,475	89/6,215	94/7,670	141/11,730	188/15,175	214/25,110	214/10,965	214/20,640
	18'	1.20"	101/4,120	103/5,500	122/6,145	128/8,135	192/12,805	237/17,745	237/27,520	237/13,305	237/20,640
	16'	1.07"	144/3,880	146/5,220	174/5,875	182/8,000	267/13,960	267/20,825	267/27,520	267/13,760	267/20,640
	14'	0.93"	214/3,490	216/4,550	258/5,385	270/7,430	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	12'	0.80"	300/3,500	300/4,825	300/6,740	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	10'	0.67"	300/4,995	300/8,800	300/8,625	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640
	8'	0.53"	300/6,000	300/10,785	300/9,955	300/10,415	300/15,620	300/20,825	300/27,520	300/13,760	300/20,640

(1) For 3-ply and 4-ply built-up columns, multiply table values by 1.5 and 2.0, respectively. See page 11 for connection requirements.

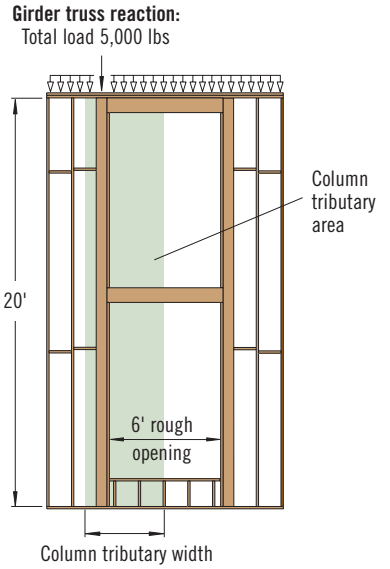
- Green numbers refer to lateral (wind) load (PLF). Black numbers refer to vertical load (lbs).

COLUMN EXAMPLE

For the **Design Example** wall on page 5, design 20' columns for lateral wind pressure of 20.3 psf and vertical loading of 5,000 lbs:

Note: Vertical load is the load applied to the top of the column, excluding the header reaction. The header reaction is assumed to transfer directly to the trimmers.

- **Calculate the lateral load in plf:**
  The calculated wind pressure in the example is 20.3 psf, so 20.3 x 3.67' tributary width = 74.5 plf.
- **Select an appropriate column:**
  Scan the L/180 section of the **Column Load Tables** to find a 20' column that meets or exceeds the 74.5 plf lateral load and the 5,000 lbs vertical load. For this example, a 7" x 5¼" 1.8E Parallam® PSL column (at 79/8,575), used in plank orientation, will work for a 2x6 wall. Alternatively, a double 1¾" x 7¼" 1.55E TimberStrand® LSL column (at 89/6,230) would work for a 2x8 wall.
- **Design the column to wall plate connections:**
  Convert 74.5 plf into a reaction (uniform load x length/2): 74.5 (20'/2) = 745 lbs. Use the **Lateral Connections** tables on page 13 to select a connection that meets or exceeds 745 lbs. For this example 745/545 = 1.37; so according to the **Angle Clips** table, two Simpson Strong-Tie® A34 connectors would be required—one on each side of the column, at both the top and bottom plates.



HEADER LOAD TABLE

Headers—Maximum Allowable Lateral (Wind) Load (PLF)/Vertical Load (PLF)

Lateral Defl. Ratio	Rough Opening	Max. Defl.	3½" Wall Thickness				5½" Wall Thickness			7¼" Wall Thickness
			TimberStrand® LSL				TimberStrand® LSL	Parallam® PSL		TimberStrand® LSL
			1.3E		1.55E		1.3E	1.8E	2.0E	1.3E
			3½" x 5½"	3½" x 7¼"	3½" x 9½"	3½" x 11⅞"	5½" x 3½" (Plank)	5¼" x 5¼"	5¼" x 9¼"	7¼" x 3½" (Plank)
L/360	12'	0.41"	30/30	40/80	60/215	75/335		130/60	250/385	
	10'	0.34"	50/70	65/165	***100/435***	***130/535***	120/25	220/130	***425/785***	270/35
	9'	0.31"	65/110	90/250	***140/575***	***175/695***	165/40	295/200	***490/1,170***	365/55
	8'	0.28"	95/175	125/395	***195/765***	***245/925***	225/70	410/320	***500/1,605***	500/90
	7'	0.24"	140/295	***180/650***	***285/1,040***	***310/1,220***	330/120	500/535	***500/1,830***	500/160
	6'	0.21"	215/525	***280/895***	***360/1,420***	***360/1,415***	500/220	500/955	***500/2,125***	500/290
	5'	0.18"	355/690	***430/1,230***	***430/1,690***	***430/1,685***	500/370	***500/1,525***	***500/2,535***	500/485
	4'	0.14"	***500/1,125***	***500/1,995***	***500/2,090***	***500/2,085***	500/685	***500/2,060***	***500/3,135***	500/900
	3'	0.11"	***500/2,020***	***500/2,740***	***500/2,735***	***500/2,735***	500/1,340	***500/2,930***	***500/4,105***	500/1,770
L/240	12'	0.61"	45/30	60/80	90/215	115/295		195/60	370/385	
	10'	0.51"	75/70	100/165	155/380	***190/460***	180/25	325/130	***440/785***	405/35
	9'	0.46"	100/110	135/250	***210/485***	***245/605***	245/40	440/200	***490/1,170***	490/55
	8'	0.41"	140/175	185/395	***275/655***	***275/885***	340/70	500/320	***500/1,605***	500/90
	7'	0.36"	210/295	275/540	***310/1,000***	***310/1,220***	495/95	500/535	***500/1,830***	500/160
	6'	0.31"	320/380	***360/750***	***360/1,420***	***360/1,415***	500/220	500/955	***500/2,125***	500/290
	5'	0.26"	430/580	***430/1,230***	***430/1,690***	***430/1,685***	500/370	500/1,525	***500/2,535***	500/485
	4'	0.21"	***500/1,125***	***500/1,995***	***500/2,090***	***500/2,085***	500/685	500/2,060	***500/3,135***	500/900
	3'	0.16"	***500/2,020***	***500/2,740***	***500/2,735***	***500/2,735***	500/1,340	500/2,930	***500/4,105***	500/1,770
L/180	12'	0.82"	60/30	75/80	120/210	150/255		255/60	370/385	
	10'	0.68"	100/70	130/165	205/325	220/430	240/25	435/130	***440/785***	440/35
	9'	0.62"	135/110	175/250	245/440	***245/605***	325/40	490/200	***490/1,170***	490/55
	8'	0.55"	190/175	250/340	***275/655***	***275/885***	455/25	500/320	***500/1,605***	500/90
	7'	0.48"	275/225	310/470	***310/1,000***	***310/1,220***	500/90	500/535	***500/1,830***	500/160
	6'	0.42"	360/320	***360/750***	***360/1,420***	***360/1,415***	500/220	500/955	***500/2,125***	500/290
	5'	0.35"	430/580	***430/1,230***	***430/1,690***	***430/1,685***	500/370	***500/1,525***	***500/2,535***	500/485
	4'	0.28"	***500/1,125***	***500/1,995***	***500/2,090***	***500/2,085***	500/685	***500/2,060***	***500/3,135***	500/900
	3'	0.22"	***500/2,020***	***500/2,740***	***500/2,735***	***500/2,735***	500/1,340	***500/2,930***	***500/4,105***	500/1,770

- ***Bold italic*** values require two trimmers (3" bearing) at ends. Single trimmers may work for lightly loaded ***bold italic*** sections; see table below.
- Green numbers refer to lateral (wind) load (PLF). Black numbers refer to vertical load (PLF).

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.
  - Uniform lateral (wind) and vertical loads (beam weight considered).
  - For vertical deflection, the more restrictive of L/240 or 5/16".
  - Maximum lateral (wind) load of 500 plf.
- 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.

Bearing Requirements

- Trimmers must support the full width of the header.
- Minimum header support to be one trimmer (1½") at ends.

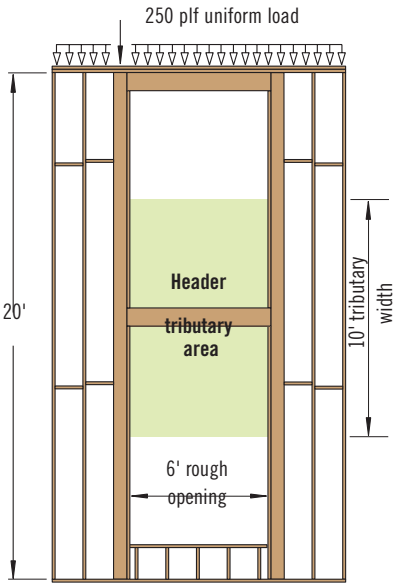
Maximum Allowable Vertical Load (PLF) with One Trimmer

Rough Opening	Wall Thickness	
	3½"	5½"
12'	355	536
10'	428	646
9'	476	718
8'	536	808
7'	613	924
6'	716	1,077
5'	858	1,290
4'	1,069	1,607
3'	1,415	2,126

HEADER EXAMPLE

The **Design Example** on page 5 assumes that both headers will be the same size, and considers worst-case loading. Design the headers for lateral wind pressure of 23.6 psf based on the lower header's 6' rough opening and 10' tributary width, and a vertical load based on the upper header's maximum 250 plf.

- **Calculate the lateral load in plf:**
  The calculated wind pressure in the example is 23.6 psf, so 23.6 x 10' tributary width = 236 plf.
- **Select the appropriate header:**
  Scan the L/180 section of the **Header Load Table** to find a header that meets your requirements (236 plf lateral and 250 plf vertical). For this example, a 6' header of 5¼" x 5¼" 1.8E Parallam® PSL (at 500/955) will work for a 2x6 wall. Alternatively, a 7¼" x 3½" 1.3E TimberStrand® LSL header (at 500/290), used in plank orientation, will work for a 2x8 wall. Since the table numbers for these selections are not bold, only one trimmer stud is required for bearing. Headers that do not match the wall thickness must be directly attached to a plate that matches the wall thickness to provide lateral bracing. See detail L13 on page 12.
- **Design header to column connections:**
  Convert 236 plf into a reaction (uniform load x length/2): 236 (6'/2) = 708 lbs. Use the **Lateral Connections** tables on page 13 to select a connection that meets or exceeds 708 lbs. For this example 708/545 = 1.29; so according to the **Angle Clips** connections table on page 13, two Simpson Strong-Tie® A34 connectors are sufficient—one on top and bottom at each end of both headers.



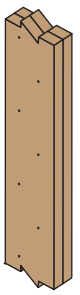
MULTIPLE-MEMBER CONNECTIONS

2-Ply Nailing Recommendations

- **For 2x4, 1¾" x 5½", 2x6, 1¾" x 7¼", and 2x8:** Minimum of **two rows** of 16d (0.131" x 3¼") nails at 10" on-center, staggered.
- Nail from one side.

3-Ply Nailing Recommendations

- **For 2x4:** Minimum of **two rows** of 16d (0.131" x 3¼") nails at 8" on-center, staggered.
- **For 1¾" x 5½", 2x6, 1¾" x 7¼", and 2x8:** Minimum of **three rows** of 16d (0.131" x 3¼") nails at 5" on-center, staggered.
- Nail from both sides.

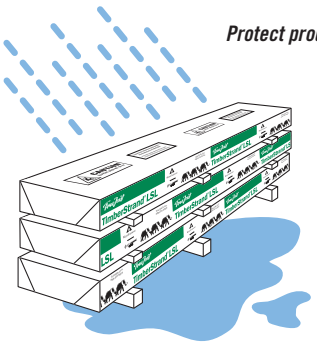


4-Ply Fastening Recommendations

- **For 2x4:** Nail each ply to the other with a minimum of **two rows** of 16d (0.131" x 3¼") pneumatic nails at 5" on-center. When connecting each ply, offset nail rows by 2" from the ply below.
- **For 1¾" x 5½", 2x6, 1¾" x 7¼", and 2x8:**
  - Nail each ply to the other with a minimum of **three rows** of 16d (0.131" x 3¼") pneumatic nails at 5" on-center. When connecting each ply, offset nail rows by 2" from the ply below.

    or,
  - Minimum of **two rows** of ½" diameter bolts spaced at 8" on-center.

PRODUCT STORAGE



Protect product from sun and water

CAUTION:
Wrap is slippery when wet or icy

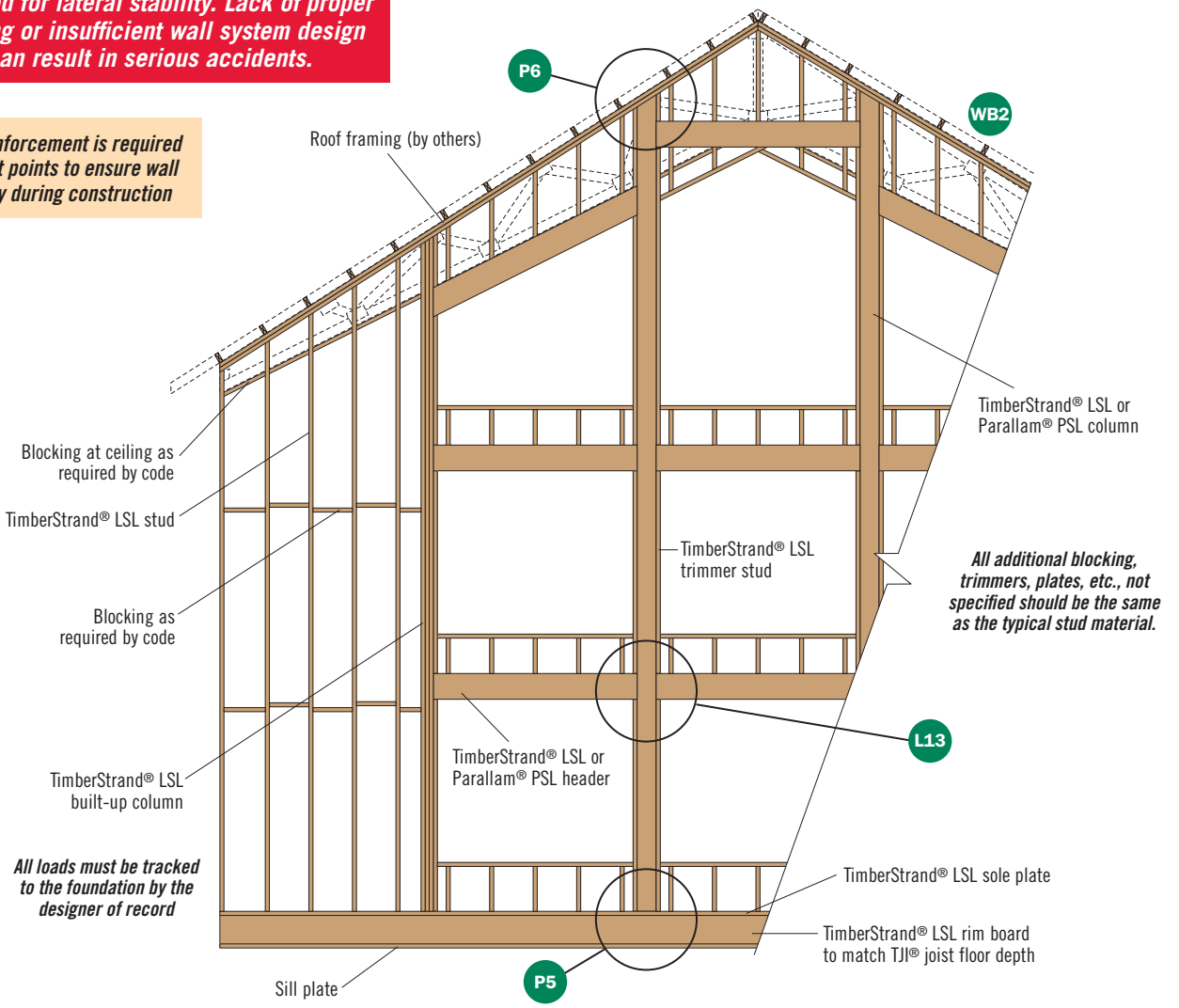
Align stickers (2x3 or larger) directly over support blocks

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

TYPICAL TALL WALL FRAMING

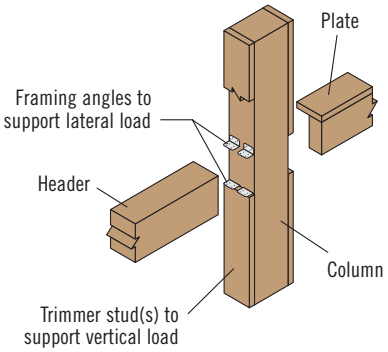
WARNING
Safety bracing during construction is required for lateral stability. Lack of proper bracing or insufficient wall system design can result in serious accidents.

Wall reinforcement is required at all lift points to ensure wall stability during construction



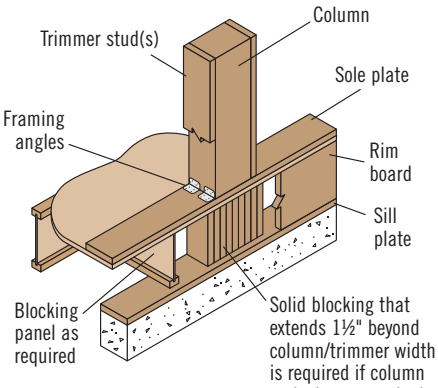
WALL DETAILS

Header to Column



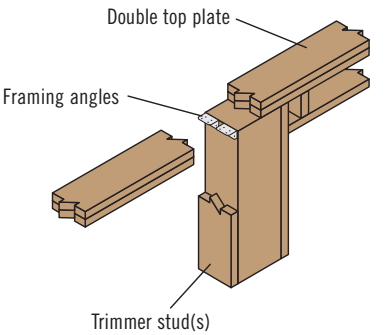
L13 ***Plate width must equal the wall thickness to provide lateral bracing. (Plate not required if header width equals the wall thickness.)***

Column or Stud to Bottom Plate



P5

Column or Stud to Top Plate

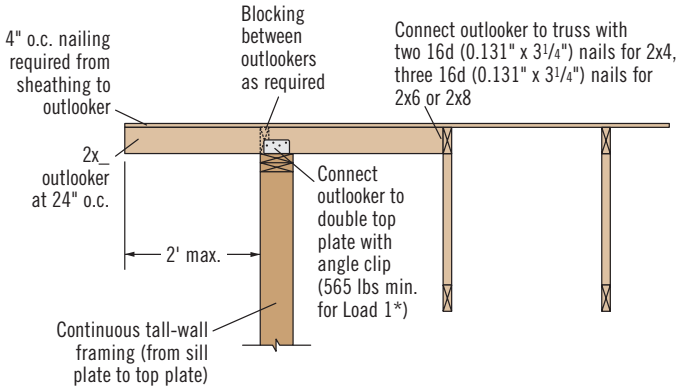


P6

WALL DETAILS

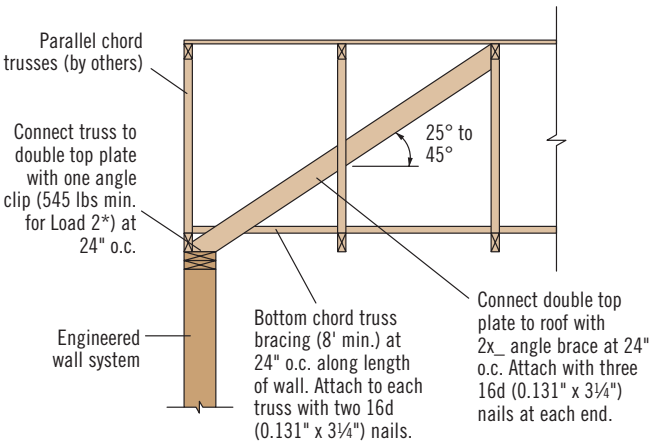
Wind Brace

Details shown are applicable for 115 mph basic wind speeds and the exposure categories and maximum wall heights shown in the table below. For other conditions, contact your Weyerhaeuser representative.



WB2

**** Load 1 value from* Lateral Connections—Angle Clips *table below.***



WB3

**** Load 2 value from* Lateral Connections—Angle Clips *table below.***

Wind Brace Detail Applicability

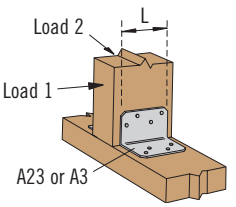
Detail	Exposure	Max. Wall Height
WB2	D	25'
	B, C	29'
WB3	B, C	20'(1)

(1) Maximum wall height shown includes depth of truss.

FRAMING CONNECTORS

Lateral Connections—Nails

Nail Size	End Grain	Toe Nail
8d (0.113" x 2½")	77 lbs	96 lbs
10d (0.128" x 3")	99 lbs	123 lbs
12d (0.128" x 3¼")	99 lbs	123 lbs
16d (0.135" x 3½")	110 lbs	137 lbs
16d (0.131" x 3¼")	104 lbs	129 lbs

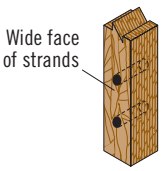


Lateral Connections—Angle Clips

Type	Nails	Length of Connector (L)	Load 1: Allowable Load (lbs)	Load 2: Allowable Load (lbs)
Simpson Strong-Tie®				
A21	Four 10d (0.148" x 1½")	1⅜"	150	330
A34	Eight 8d (0.131" x 1½")	2½"	545	430
A35	Twelve 8d (0.131" x 1½")	4½"	650	670
A23	Eight 10d (0.148" x 1½")	2¾"	535	680
USP Structural Connectors®				
AC5	Six 10d (0.148" x 1½")	4⅞"	565	565
A3	Eight 10d (0.148" x 1½")	2¾"	740	605
AC7	Eight 10d (0.148" x 1½")	6$^{15}/_{16}$"	755	755
AC9	Ten 10d (0.148" x 1½")	8⅞"	945	900

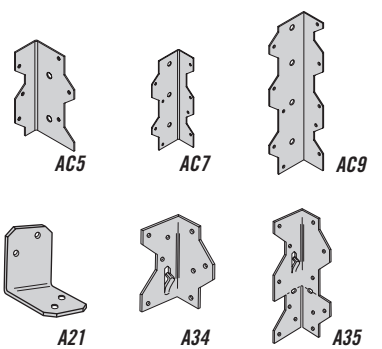
General Notes

- Tables are based on a load duration factor of 1.60.
- Connection values based on a specific gravity of 0.50.
- For end-grain connections, a 0.67 factor was used (based on NDS®).
- For toenail connections, a 0.83 factor was used (based on NDS®).



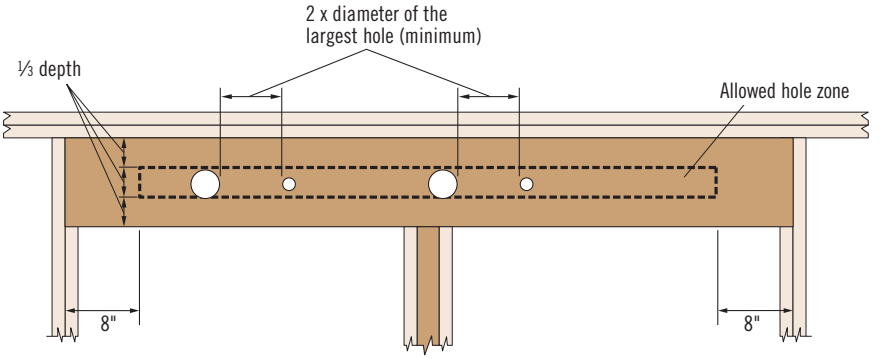
In order to use the manufacturer's published capacities when designing column caps, bases, or holdowns for uplift, the bolts or screws must be installed perpendicular to the wide face of strands as shown at left.

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



ALLOWABLE HOLES

1.55E TimberStrand® LSL Headers and Beams



General Notes

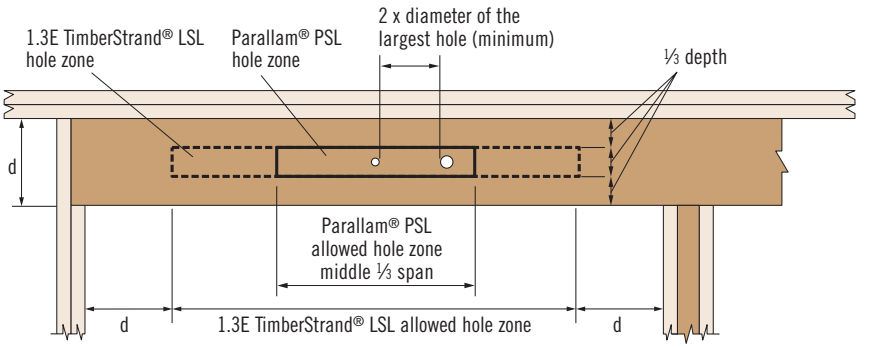
- Allowed hole zone suitable for headers and beams with **uniform and/or concentrated loads** anywhere along the member.
- Round holes only.
- No holes in headers or beams in plank orientation.

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.

Other Trus Joist® Headers and Beams



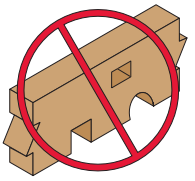
General Notes

- 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.

Other Trus Joist® Beams

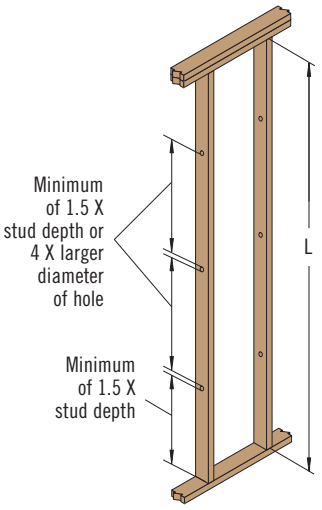
Header or Beam Depth	Maximum Round Hole Size
5½"	1¾"
7¼"–20"	2"

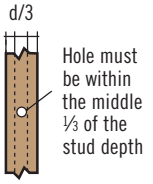
- See illustration for allowed hole zone.



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

TimberStrand® LSL Studs





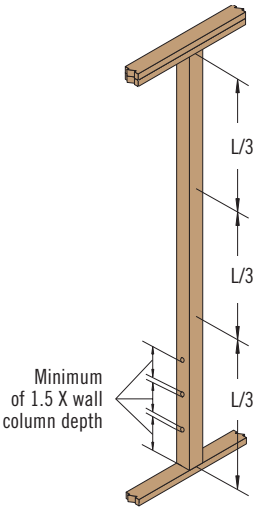
Maximum hole diameter:
1⅛" for 3½" thick walls
1⅞" for 5½"–11⅞" thick walls

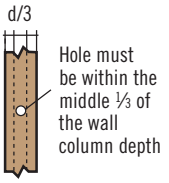
Maximum of three (3) round holes may be drilled anywhere along the length of the stud

When using the load tables in this guide for studs or wall columns, holes may be drilled in accordance with the illustrations shown.

DO NOT notch studs and wall columns.

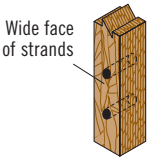
TimberStrand® LSL and Parallam® PSL Wall Columns



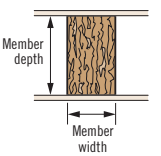


Maximum 1" hole diameter

Maximum of three (3) round holes may be drilled within the lower ⅓ of the length of the wall column



Beam Orientation



DESIGN PROPERTIES

Allowable Design Stresses (100% Load Duration)

Grade MOE (x10⁶) (psi)	E_{min}[1] (x10⁶) (psi)	Axial		Joist/Beam			Plank			Equivalent Specific Gravity for Connections			Min. Shear Wall Nail Spacing[5] (in)
		F_{cII} (psi)	F_t[2] (psi)	F_b[3] (psi)	F_v (psi)	$F_{c\perp}$[4] (psi)	F_b (psi)	F_v (psi)	$F_{c\perp}$[4] (psi)	Lateral	Withdrawal	Shear Walls[5]	
TimberStrand® LSL													
1.3	0.661	1,835	1,300	1,700[6]	425	710	1,900	150	670	0.50	0.42	0.42[7]	6[7]
1.5	0.762	2,105	1,815	2,250[6]	505	860	2,525	150	750			0.42	2
1.55	0.788	2,170	1,290[8]	2,325[6]	310[8]	900	2,615	150	775			0.42	2
Parallam® PSL													
1.8	0.915	2,500	1,995	2,500[9]	230	545	2,400[9]	190	545	0.50	0.50	N.A.	N.A.
2.0	1.017	2,900[10]	2,300	2,900[9]	290	625	2,650[9]	210	635				

(1) Reference modulus of elasticity for beam and column stability calculations per NDS®.

(2) Referenced tension design values are based on a standard 4 foot length. For lengths longer than 4 foot, multiply F_t by the following adjustment (where L is length in feet):
– TimberStrand® LSL $(4/L)^{0.083}$ – Parallam® PSL: $(4/L)^{0.056}$

(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 increases permitted in Footnotes 6 and 9.

(4) $F_{c\perp}$ may not be increased for duration of load.

(5) Design shear wall applications per AWC SDPWS. When using StrandGuard® TimberStrand® LSL sill plate, see the *Trus Joist® Treated Sill Plates, Columns, and Studs Technical Brief*, TJ-8100.

(6) For 12" depth. For depths < 3½", use the 3½" factor; for other depths, multiply by $\left[\frac{12}{d}\right]^{0.092}$.

(7) 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.)

(8) Value accounts for large hole capabilities. See **Allowable Holes** on page 14.

(9) For 12" depth. For depths < 3½", use the 3½" factor; for other depths, multiply by $\left[\frac{12}{d}\right]^{0.111}$.

(10) For column and stud applications, use F_{cII} of 500 psi. Alternatively, refer to ESR-1387, Table 1, footnote 13.

Allowable Design Properties (100% Load Duration)

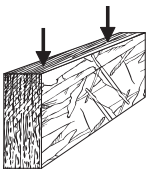
1½" TimberStrand® LSL Studs

Design Property	Beam Orientation		
	1.3E		1.5E
	3½"	5½"	7¼"
Moment (ft-lbs)	485	1,150	2,580
Shear (lbs)	1,490	2,340	3,660
Moment of Inertia (in.⁴)	5	21	48
Weight (plf)	1.5	2.4	3.3

1¾" TimberStrand® LSL Studs

Design Property	Beam Orientation	
	1.55E	
	5½"	7¼"
Moment (ft-lbs)	1,835	3,110
Shear (lbs)	1,990	2,620
Moment of Inertia (in.⁴)	24	56
Weight (plf)	3	4.0

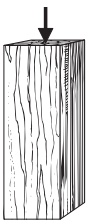
Beam Orientation



3½" TimberStrand® LSL Columns and Headers

Design Property	1.3E				1.55E			
	Beam Orientation		Plank Orientation		Beam Orientation			
	5½"	7¼"	5½"	7¼"	5½"	7¼"	9½"	11⅞"
Moment (ft-lbs)	2,685	4,550	1,780	2,345	3,675	6,225	10,420	15,955
Shear (lbs)	5,455	7,190	1,925	2,540	3,980	5,245	6,870	8,590
Moment of Inertia (in.⁴)	49	111	20	26	49	111	250	488
Weight (plf)	5.6	7.4	5.6	7.4	6	7.9	10.4	13.0

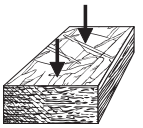
Column Orientation



3½" Parallam® PSL Columns

Design Property	1.8E					2.0E
	Beam Orientation			Plank Orientation		Beam Orientation
	3½"	5¼"	7"	5¼"	7"	9¼"
Moment (ft-lbs)	1,640	3,670	6,320	2,460	3,275	12,415
Shear (lbs)	1,550	2,820	3,755	2,330	3,105	6,260
Moment of Inertia (in.⁴)	13	42	100	19	25	231
Weight (plf)	3.8	5.7	7.7	5.7	7.7	10.1

Plank Orientation



5¼" Parallam® PSL Columns and Headers

Design Property	1.8E			2.0E	
	Beam Orientation		Plank Orientation	Beam Orientation	Plank Orientation
	5¼"	7"	7"	9¼"	9¼"
Moment (ft-lbs)	5,285	9,485	7,050	18,625	10,285
Shear (lbs)	3,490	5,635	4,655	9,390	6,800
Moment of Inertia (in.⁴)	63	150	84	346	112
Weight (plf)	8.6	11.5	11.5	15.2	15.2

7" Parallam® PSL Columns

Design Property	1.8E	2.0E
	Beam Orientation	Plank Orientation
	7"	9¼"
Moment (ft-lbs)	12,140	17,710
Shear (lbs)	6,205	9,065
Moment of Inertia (in.⁴)	200	264
Weight (plf)	15.3	20.2

WE CAN HELP YOU BUILD SMARTER

You want to build solid and durable structures—we want to help. Weyerhaeuser provides high-quality building products and unparalleled technical and field assistance to support you and your project from start to finish.

Floors and Roofs: Start with the best framing components in the industry: our Trus Joist® TJI® joists; TimberStrand® LSL rim board; and TimberStrand® LSL, Microllam® LVL, and Parallam® PSL headers and beams. Pull them all together with our self-gapping and self-draining Weyerhaeuser Edge Gold™ floor panels and durable Weyerhaeuser roof sheathing.

Walls: Get the best value out of your framing package—use TimberStrand® LSL studs for tall walls, kitchens, and bathrooms, and our traditional, solid-sawn lumber everywhere else. Cut down installation time by using TimberStrand® LSL headers for doors and windows, and Weyerhaeuser wall sheathing with its handy two-way nail lines.

Software Solutions: Whether you are a design professional or lumber dealer, Weyerhaeuser offers an array of software packages to help you specify individual framing members, create cut lists, manage inventories—even help you design a complete structural frame. Contact your Weyerhaeuser representative to find out how to get the software you need.

Technical Support: Need technical help? Weyerhaeuser has one of the largest networks of engineers and sales representatives in the business. Call us for help, and a skilled member from our team of experts will answer your questions and work with you to develop solutions that meet all your structural framing needs.

Visit **weyerhaeuser.com/woodproducts/warranty** for copies of this and other Trus Joist® Engineered Wood Product warranties.

CONTACT US

1.888.453.8358 • weyerhaeuser.com/woodproducts/contact

Contact your local representative or dealer at:

February 2025 • Reorder TJ-9003

This document supersedes all previous versions. If this is more than one year old, contact your dealer or Weyerhaeuser rep.

, Weyerhaeuser, Forte, Microllam, Parallam, TimberStrand, and Trus Joist are registered trademarks and Edge Gold is a trademark of Weyerhaeuser NR.
© 2025 Weyerhaeuser NR Company. All rights reserved. Printed in the USA.