

PACIFIC
WOODTECH

1.6E PWLVL

USER GUIDE

Technical Data for
Joists, Headers, Beams,
Rim Board, and Dimension



ENGINEERED WOOD PRODUCTS

1.6E Product Line



You've probably been building with traditional sawn lumber beams and headers for as long as you've been building. Now through advances in technology and design, there is a better choice—Pacific Woodtech LVL headers and beams. They are simply a better alternative than traditional sawn lumber pieces.

Work with a stronger, stiffer, more consistent and more predictable building material. Compared with similar sized sections, our PWLVL headers and beams can support heavier loads and allows greater spans than conventional lumber.


Each piece of PWLVL is pressure sprayed with a UV inhibitor and sealed with emulsified wax.

Handling & Installation

- PWLVL should be stored lying flat and protected from the weather.
- Keep the material above ground to minimize the absorption of ground moisture and allow circulation of air.
- PWLVL is for use in covered, dry conditions only. Protect from the weather on the job site both before and after installation.
- Except for cutting to length, PWLVL shall not be cut, drilled or notched. Heel cuts may be possible. Contact your Pacific Woodtech representative.
- **Do not install any damaged LVL.**

Product Identification

Inspection Agency Trademark

PACIFIC WOODTECH 08.B.23 08:06:20		 MILL 1047	1.6E ASTM D5456 PR-L233	ESR 2909 CCMC 13006-R	
Manufacture Date Code		Mill Number	Code Report Numbers		

For more information about our complete line of products, please visit pacificwoodtech.com.

PWLVL Dimension

Laminated Veneer Lumber Engineered for Structural Framing

Extra-long PWLVL Dimension offers a stronger, stiffer, and straighter product than dimension lumber for all your structural applications. PWLVL Dimension is competitive in materials cost and is easy to handle and install, which can result in shorter construction schedules, saving you time and money. Build with confidence.

Use beam-calculating software for better optimization of material selection and on-center spacing.

PWLVL Dimension is available in virtually any length.

PWLVL DIMENSION DESIGN PROPERTY COMPARISON⁽¹⁾⁽²⁾

Product		Modulus of Elasticity E (psi)	Bending F _b (psi) ⁽³⁾	Horizontal Shear F _v (psi)	Compression Parallel to Grain F _c (psi) ⁽⁴⁾
2 x 4	1.5" x 3.5" x 1.6E PWLVL	1600000	2995	230	1950
	2x4 Douglas Fir-Larch No. 2	1600000	1555	180	1550
	2x4 Spruce-Pine-Fir No. 1 / No. 2	1400000	1510	135	1325
	2x4 Hem-Fir No. 2	1300000	1465	150	1495
	2x4 Western Woods No. 2	1000000	1165	135	1035
2 x 6	1.5" x 5.5" x 1.6E PWLVL	1600000	2735	230	1950
	2x6 Douglas Fir-Larch No. 2	1600000	1345	180	1485
	2x6 Spruce-Pine-Fir No. 1 / No. 2	1400000	1310	135	1265
	2x6 Hem-Fir No. 2	1300000	1270	150	1430
	2x6 Western Woods No. 2	1000000	1010	135	990
2 x 8	1.5" x 7.25" x 1.6E PWLVL	1600000	2590	230	1950
	2x8 Douglas Fir-Larch No. 2	1600000	1240	180	1420
	2x8 Spruce-Pine-Fir No. 1 / No. 2	1400000	1205	135	1210
	2x8 Hem-Fir No. 2	1300000	1175	150	1365
	2x8 Western Woods No. 2	1000000	930	135	945
2 x 10	1.5" x 9.25" x 1.6E PWLVL	1600000	2465	230	1950
	2x10 Douglas Fir-Larch No. 2	1600000	1140	180	1350
	2x10 Spruce-Pine-Fir No. 1 / No. 2	1400000	1105	135	1150
	2x10 Hem-Fir No. 2	1300000	1075	150	1300
	2x10 Southern Pine No. 2	1400000	920	175	1300
2 x 12	1.5" x 11.25" x 1.6E PWLVL	1600000	2370	230	1950
	2x12 Douglas Fir-Larch No. 2	1600000	1035	180	1350
	2x12 Spruce-Pine-Fir No. 1 / No. 2	1400000	1005	135	1150
	2x12 Hem-Fir No. 2	1300000	975	150	1300
	2x12 Southern Pine No. 2	1400000	860	175	1250

1. Refer to APA [PR-L233](#) for PWLVL adjustment factors and other design properties.
2. Refer to the *2015 NDS* for lumber adjustment factors and other design properties.
3. Load applied to the narrow face of the member. Repetitive member and size factors have been applied where applicable.
4. Size factors have been applied to lumber values where applicable.
5. MOE is a True (Shear-Free MOE) and it does not account for shear deformation.

For information about our complete line of products, please visit pacificwoodtech.com.



Reference Design Values

1 1/4" PWLVL REFERENCE DESIGN VALUES

Depth (in)	MOI (in ⁴)	1.6E PWLVL					
		Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)		
		100%	115%	125%	100%	115%	125%
3 1/2	6.3	939	1080	1174	857	986	1071
5 1/2	24.3	1476	1697	1845	1934	2224	2417
7 1/4	55.6	1945	2237	2432	3179	3656	3974
9 1/4	115.4	2482	2854	3103	4929	5669	6162
9 1/2	125.0	2549	2932	3186	5172	5947	6465
11 1/4	207.6	3019	3472	3773	7011	8063	8764
11 1/2	244.2	3186	3664	3983	7728	8887	9660
14	400.2	3757	4320	4696	10393	11952	12992
16	597.3	4293	4937	5367	13217	15200	16522
18	850.5	4830	5555	6038	16339	18789	20423
20	1166.7	5367	6172	6708	19751	22713	24688
22	1552.8	5903	6789	7379	23447	26964	29309
24	2016.0	6440	7406	8050	27422	31536	34278

1.6E PWLVL REFERENCE DESIGN VALUES⁽¹⁾

True (Shear-Free) Modulus of Elasticity, E =	1,600,000 psi ⁽²⁾⁽⁵⁾⁽⁶⁾
Bending (beam), F _b =	2,250 psi ⁽³⁾⁽⁴⁾
Horizontal Shear (beam), F _v =	230 psi
Compression Perpendicular to Grain (beam), F _{c⊥} =	750 psi ⁽²⁾

- Values apply to dry service conditions
- Do not adjust for load duration
- Adjust by (12/d)^{1/5}, where d is the depth of the member [inches]
- Adjust by 1.04 for repetitive members as defined in the ANS/AWC NDS
- True or shear-free modulus of elasticity does not account for shear deformation
- See APA Product Report [PR-L233](#).

TWO PLY x 1 1/4" PWLVL REFERENCE DESIGN VALUES

Depth (in)	MOI (in ⁴)	1.6E PWLVL					
		Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)		
		100%	115%	125%	100%	115%	125%
3 1/2	12.5	1878	2160	2348	1714	1971	2143
5 1/2	48.5	2952	3394	3690	3867	4447	4834
7 1/4	111.1	3891	4474	4864	6359	7312	7948
9 1/4	230.8	4964	5709	6205	9858	11337	12323
9 1/2	250.1	5098	5863	6373	10343	11895	12929
11 1/4	415.3	6038	6943	7547	14023	16126	17528
11 1/2	488.4	6373	7329	7966	15456	17774	19320
14	800.3	7513	8640	9392	20787	23905	25983
16	1194.7	8587	9875	10733	26434	30400	33043
18	1701.0	9660	11109	12075	32677	37579	40846
20	2333.3	10733	12343	13417	39501	45426	49376
22	3105.7	11807	13578	14758	46894	53928	58617
24	4032.0	12880	14812	16100	54845	63071	68556

EQUIVALENT SPECIFIC GRAVITY FOR FASTENER DESIGN

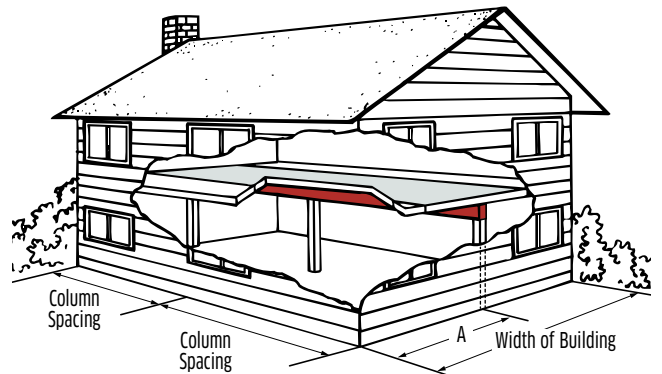
Nails & Wood Screws	Face	Lateral	0.50
		Withdrawal	0.50
Bolts & Lag Screws	Edge	Lateral	0.50
		Withdrawal	0.47
	Face	Lateral	0.50
	Edge	Lateral	NA

AVAILABLE SIZES (INCHES)

1 1/4" 1.6E PWLVL						
9 1/2	11 1/2	14	16	18		
1 1/2" 1.6E PWLVL						
3 1/2	5 1/2	7 1/4	9 1/4	9 1/2	11 1/4	11 1/2

Floor Beams

This table provides PWLVL beam sizes for center support of one level of floor framing over various column spacings. Where floor joists are continuous over the beam, this table applies only when the 'A' span is between 45% and 55% of the building width.



1 1/4" x 1.6E PWLVL

Width of Building	Column Spacing									
	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
24'	2-11 1/8"	2-11 1/8"	2-14"	2-14"	2-16"	2-16"	2-18"	2-18"		
	3-9 1/2"	3-11 1/8"	3-11 1/8"	3-14"	3-14"	3-14"	3-16"	3-16"	3-18"	3-18"
28'	2-11 1/8"	2-14"	2-14"	2-16"	2-16"	2-18"	2-18"	2-18"		
	3-11 1/8"	3-11 1/8"	3-11 1/8"	3-14"	3-14"	3-16"	3-16"	3-18"	3-18"	3-18"
32'	2-11 1/8"	2-14"	2-16"	2-16"	2-18"	2-18"				
	3-11 1/8"	3-11 1/8"	3-14"	3-14"	3-16"	3-16"	3-16"	3-18"	3-18"	3-18"
36'	2-14"	2-14"	2-16"	2-18"	2-18"					
	3-11 1/8"	3-11 1/8"	3-14"	3-14"	3-16"	3-16"	3-18"	3-18"		
40'	2-14"	2-16"	2-18"							
	3-11 1/8"	3-14"	3-14"	3-16"	3-16"	3-18"	3-18"			

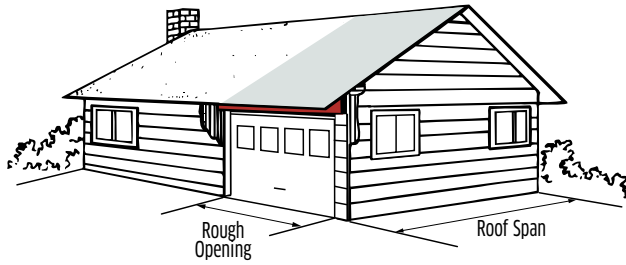
+ see note 3

Notes:

- PWLVL beam sizes are listed as the number of 1 1/4" thick pieces by the beam depth. e.g. 2 - 9 1/2" indicates two 1 1/4" pieces by 9 1/2" deep.
- All PWLVL beams require support across their full width.
- The minimum required end and intermediate bearing lengths (based on 575 psi) are 3" and 7 1/2" respectively unless the + symbol is shown. In that case, 4 1/2" and 10 1/2" end and intermediate bearing lengths are required.

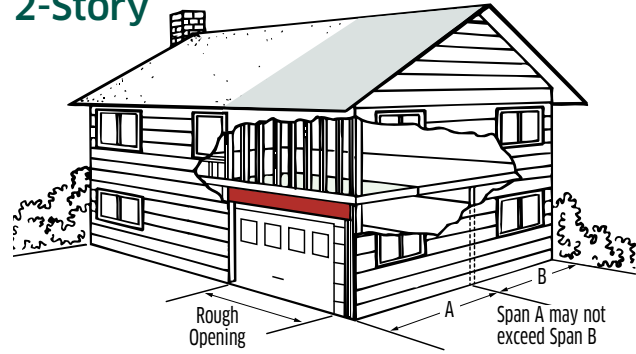
Garage Door Headers

1-Story



This table provides PWLVL header sizes for the support of roof trusses over various rough openings. A 2-foot maximum roof overhang is assumed.

2-Story



This table provides PWLVL header sizes for the support of one level of floor framing, an exterior wall and roof trusses over various rough openings. A 2-foot maximum roof overhang and center support for the floor framing are assumed.

1-STORY – 1 3/4" x 1.6E PWLVL

Roof Span	Roof Load																	
	Snow (115%)									Non-Snow (125%)								
	25 psf LL + 20 psf DL			30 psf LL + 20 psf DL			40 psf LL + 20 psf DL			20 psf LL + 15 psf DL			20 psf LL + 20 psf DL			20 psf LL + 25 psf DL		
	Rough Opening																	
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-7/4"	2-14"	2-14"	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-16"	2-16"	2-7/4"	2-11 7/8"	2-14"	2-7/4"	2-11 7/8"	2-14"	2-7/4"	2-14"	2-14"
	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-11 1/8"	3-11 7/8"	3-7/4"	3-11 7/8"	3-11 7/8"	3-7/4"	3-11 7/8"	3-14"
24'	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-16"	2-18"	2-7/4"	2-14"	2-14"	2-7/4"	2-14"	2-14"	2-9 1/2"	2-14"	2-16"
	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-14"	3-14"	3-7/4"	3-11 1/8"	3-11 7/8"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-11 7/8"	3-14"
28'	2-9 1/2"	2-16"	2-16"	2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-18"	-	2-7/4"	2-14"	2-14"	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-14"	2-16"
	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-14"	3-14"	3-9 1/2"	3-14"	3-16"	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-11 7/8"	3-14"
32'	2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-16"	2-18"	2-11 7/8"	2-18"	-	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-16"	2-18"
	3-7/4"	3-14"	3-14"	3-9 1/2"	3-14"	3-16"	3-14"	3-16"	3-16"	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-11 7/8"	3-14"	3-7/4"	3-14"	3-14"
36'	2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-18"	-	2-11 7/8"	-	-	2-9 1/2"	2-14"	2-16"	2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-16"	2-18"
	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-16"	3-18"	3-7/4"	3-11 1/8"	3-14"	3-7/4"	3-14"	3-14"	3-9 1/2"	3-14"	3-16"

+ see note 3

Notes:

- PWLVL header sizes are listed as the number of 1 3/4" thick pieces by the header depth. e.g. 2 - 9 1/2" indicates two 1 3/4" pieces by 9 1/2" deep.
- All PWLVL headers require support across their full width.
- The minimum required bearing length (based on 575 psi) is 3" unless the + symbol is shown. In that case, 4 1/2" is required.
- The roof framing is assumed to be trusses supported by the exterior walls only.
- Deflection is limited to L/240 at live load and L/180 at total load.

2-STORY – 1 3/4" x 1.6E PWLVL

Roof Span	Roof Load																	
	Snow (115%)									Non-Snow (125%)								
	25 psf LL + 20 psf DL			30 psf LL + 20 psf DL			40 psf LL + 20 psf DL			20 psf LL + 15 psf DL			20 psf LL + 20 psf DL			20 psf LL + 25 psf DL		
	Rough Opening																	
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-9 1/2"	2-18"	2-18"	2-9 1/2"	2-18"		2-11 7/8"	2-18"		2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-16"	2-18"	2-9 1/2"	2-18"	2-18"
	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-14"	3-16"
24'	2-11 7/8"	2-18"		2-11 7/8"			2-11 7/8"			2-9 1/2"	2-18"	2-18"	2-9 1/2"	2-18"		2-11 7/8"	2-18"	
	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-14"	3-16"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"
28'	2-11 7/8"			2-11 7/8"			2-11 7/8"			2-11 7/8"	2-18"		2-11 7/8"	2-18"		2-11 7/8"		
	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-18"		3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"
32'	2-11 7/8"			2-11 7/8"			2-14"			2-11 7/8"			2-11 7/8"			2-11 7/8"		
	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-18"		3-11 7/8"	3-18"		3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"
36'	2-11 7/8"			2-11 7/8"			2-14"			2-11 7/8"			2-11 7/8"			2-11 7/8"		
	3-9 1/2"	3-18"		3-11 7/8"	3-18"		3-11 7/8"			3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"	3-9 1/2"	3-16"	3-18"

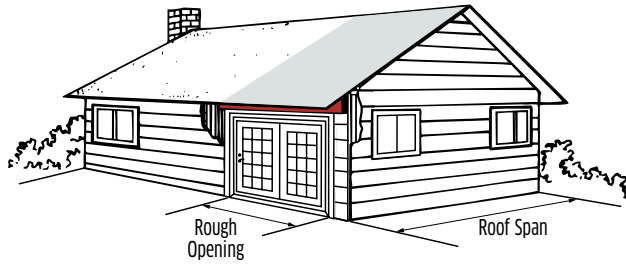
+ see note 3

Notes:

- PWLVL header sizes are listed as the number of 1 3/4" thick pieces by the header depth. e.g. 2 - 9 1/2" indicates two 1 3/4" pieces by 9 1/2" deep.
- All PWLVL headers require support across their full width.
- The minimum required bearing length (based on 575 psi) is 3" unless the + symbol is shown. In that case, 4 1/2" is required.
- PWLVL header sizes are based on residential floor loading of 40 psf live load and 10 psf dead load, and an exterior wall weight of 100 plf. The roof framing is assumed to be trusses supported by the exterior walls only.
- Deflection is limited to L/360 at live load and L/240 at total load.
- PWLVL header sizes are based on the assumption that the floor joists are supported in the middle of the building by a beam or wall.

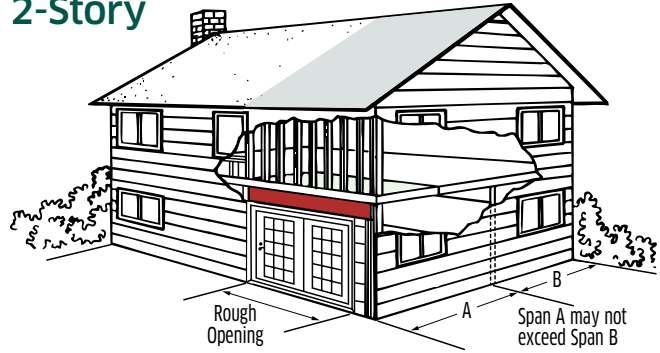
Window & Patio Door Headers

1-Story



This table provides PWLVL header sizes for the support of roof trusses over various rough openings. A 2-foot maximum roof overhang is assumed.

2-Story



This table provides PWLVL header sizes for the support of one level of floor framing, an exterior wall and roof trusses over various rough openings. A 2-foot maximum roof overhang and center support for the floor framing are assumed.

1-STORY - 1 3/4" x 1.6E PWLVL

Roof Span	Roof Load																			
	Snow (115%)										Non-Snow (125%)									
	25 psf LL + 20 psf DL					40 psf LL + 20 psf DL					20 psf LL + 15 psf DL					20 psf LL + 25 psf DL				
	Rough Opening										Rough Opening									
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-14"	2-7 1/4"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"
	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"
24'	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"
	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"
28'	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-14"
	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"
32'	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"
	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-14"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"
36'	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-7 1/4"	2-9 1/2"	2-9 1/2"	2-11 3/8"	2-14"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"
	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"

+ see note 3

Notes:

- PWLVL header sizes are listed as the number of 1 3/4" thick pieces by the header depth. e.g. 2 - 9 1/2" indicates two 1 3/4" pieces by 9 1/2" deep.
- All PWLVL headers require support across their full width.
- The minimum required bearing length (based on 575 psi) is 3" **unless the + symbol is shown. In that case, 4 1/2" is required.**
- The roof framing is assumed to be trusses supported by the exterior walls only.
- Deflection is limited to L/240 at live load and the lesser of L/180 or 5/16" at total load.

2-STORY - 1 3/4" x 1.6E PWLVL

Roof Span	Roof Load																			
	Snow (115%)										Non-Snow (125%)									
	25 psf LL + 20 psf DL					40 psf LL + 20 psf DL					20 psf LL + 15 psf DL					20 psf LL + 25 psf DL				
	Rough Opening										Rough Opening									
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"
	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"
24'	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-11 3/8"	2-16"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"
	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"
28'	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-7 1/4"	2-11 3/8"	2-14"	2-14"	2-18"	2-7 1/4"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"
	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-16"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-14"	3-7 1/4"	3-9 1/2"	3-9 1/2"	3-11 3/8"	3-16"
32'	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-18"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"
	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-16"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"
36'	2-9 1/2"	2-11 3/8"	2-14"	2-14"	2-18"	2-9 1/2"	2-11 3/8"	2-14"	2-16"	2-18"	2-7 1/4"	2-11 3/8"	2-11 3/8"	2-14"	2-18"	2-7 1/4"	2-11 3/8"	2-14"	2-14"	2-18"
	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-16"	3-7 1/4"	3-11 3/8"	3-11 3/8"	3-14"	3-18"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-11 3/8"	3-16"	3-7 1/4"	3-9 1/2"	3-11 3/8"	3-14"	3-16"

+ see note 3

Notes:

- PWLVL header sizes are listed as the number of 1 3/4" thick pieces by the header depth. e.g. 2 - 9 1/2" indicates two 1 3/4" pieces by 9 1/2" deep.
- All PWLVL headers require support across their full width.
- The minimum required bearing length (based on 575 psi) is 3" **unless the + symbol is shown. In that case, 4 1/2" is required.**
- PWLVL header sizes are based on residential floor loading of 40 psf live load and 10 psf dead load, and an exterior wall weight of 100 plf. The roof framing is assumed to be trusses supported by the exterior walls only.
- Deflection is limited to L/360 at live load and the lesser of L/240 or 5/16" at total load.
- PWLVL header sizes are based on the assumption that the floor joists are supported in the middle of the building by a beam or wall.

Beams: Floor–100%

ALLOWABLE UNIFORM LOADS* – POUNDS PER LINEAL FOOT ONE PLY x 1¾" 1.6E PWLVL

Span (ft)	Key	3½"	5½"	7¼"	9¼"	9½"	11¼"	11½"	14"
6	LL	64	250	572	-	-	-	-	-
	TL	95	372	615	829	857	1068	1149	1448
	BRG	1.5/3	1.5/3	1.5/3.5	1.9/4.8	2/4.9	2.5/6.1	2.6/6.6	3.3/8.3
7	LL	41	157	360	-	-	-	-	-
	TL	53	208	479	684	707	873	936	1165
	BRG	1.5/3	1.5/3	1.5/3.2	1.8/4.6	1.9/4.7	2.3/5.9	2.5/6.3	3.1/7.8
8	LL	-	105	241	501	543	-	-	-
	TL	-	121	279	583	601	738	789	974
	BRG	-	1.5/3	1.5/3	1.8/4.5	1.8/4.6	2.3/5.7	2.4/6.1	3/7.5
9	LL	-	74	169	352	381	633	-	-
	TL	-	75	173	483	506	639	682	836
	BRG	-	1.5/3	1.5/3	1.7/4.2	1.7/4.4	2.2/5.5	2.4/5.9	2.9/7.2
10	LL	-	-	-	256	278	461	543	-
	TL	-	48	112	381	409	556	600	733
	BRG	-	1.5/3	1.5/3	1.5/3.7	1.6/3.9	2.1/5.3	2.3/5.8	2.8/7.7
11	LL	-	-	-	193	209	347	408	-
	TL	-	32	76	285	309	458	506	652
	BRG	-	1.5/3	1.5/3	1.5/3	1.5/3.3	1.9/4.9	2.1/5.4	2.8/6.9
12	LL	-	-	-	148	161	267	314	515
	TL	-	-	-	53	218	237	384	424
	BRG	-	-	-	1.5/3	1.5/3	1.5/3	1.8/4.4	2/4.9

Notes:

* Can be applied to the beam in addition to its own weight.
Simple or multiple beam spans.
Wax-based sealer applied to mitigate moisture issues associated with wood products during storage and construction.

Key to Table:

LL = Maximum live load - limits deflection to L/360
TL = Maximum total load - limits deflections to L/240 (or a maximum of 0.3125" for beams 7¼" deep or less)
BRG = Required end / intermediate bearing length (inches), based on bearing stress of 750 psi.

Beams: Roof–Snow 115%

ALLOWABLE UNIFORM LOADS* – POUNDS PER LINEAL FOOT ONE PLY x 1¾" 1.6E PWLVL

Span (ft)	Key	3½"	5½"	7¼"	9¼"	9½"	11¼"	11½"	14"
6	LL	96	374	-	-	-	-	-	-
	TL	99	388	708	954	987	1229	1322	1666
	BRG	1.5/3	1.5/3	1.6/4.1	2.2/5.5	2.3/5.7	2.8/7.1	3/7.6	3.8/9.6
7	LL	-	-	-	-	-	-	-	-
	TL	53	208	479	788	814	1005	1077	1340
	BRG	1.5/3	1.5/3	1.5/3.2	2.1/5.3	2.2/5.5	2.7/6.7	2.9/7.2	3.6/9.9
8	LL	-	-	-	-	-	-	-	-
	TL	-	121	279	671	692	849	908	1121
	BRG	-	1.5/3	1.5/3	2.1/5.1	2.1/5.3	2.6/6.5	2.8/7	3.4/8.6
9	LL	-	-	-	528	572	-	-	-
	TL	-	75	173	556	583	735	785	963
	BRG	-	1.5/3	1.5/3	1.9/4.8	2/5	2.5/6.3	2.7/6.8	3.3/8.3
10	LL	-	-	-	385	417	-	-	-
	TL	-	48	112	449	471	640	691	844
	BRG	-	1.5/3	1.5/3	1.7/4.3	1.8/4.5	2.5/6.1	2.7/6.6	3.2/8.1
11	LL	-	-	-	289	313	520	-	-
	TL	-	32	76	371	389	528	582	750
	BRG	-	1.5/3	1.5/3	1.6/3.9	1.6/4.1	2.2/5.6	2.5/6.2	3.2/7.9
12	LL	-	-	-	223	241	401	471	-
	TL	-	-	53	293	317	443	488	658
	BRG	-	-	1.5/3	1.5/3.4	1.5/3.7	2/5.1	2.3/5.6	3/7.6

Notes:

* Can be applied to the beam in addition to its own weight.
Simple or multiple beam spans.
Wax-based sealer applied to mitigate moisture issues associated with wood products during storage and construction.

Key to Table:

LL = Maximum live load - limits deflection to L/240
TL = Maximum total load - limits deflections to L/180 (or a maximum of 0.3125" for beams 7¼" deep or less)
BRG = Required end / intermediate bearing length (inches), based on bearing stress of 750 psi.

Beams: Roof–Non Snow 125%

ALLOWABLE UNIFORM LOADS* – POUNDS PER LINEAL FOOT ONE PLY x 1¾" 1.6E PWLVL

Span (ft)	Key	3½"	5½"	7¼"	9¼"	9½"	11¼"	11½"	14"
6	LL	96	374	-	-	-	-	-	-
	TL	99	388	770	1037	1073	1337	1438	1811
	BRG	1.5/3	1.5/3	1.8/4.4	2.4/5.9	2.5/6.2	3.1/7.7	3.3/8.2	4.2/10.4
7	LL	-	-	-	-	-	-	-	-
	TL	53	208	479	857	885	1093	1171	1457
	BRG	1.5/3	1.5/3	1.5/3.2	2.3/5.7	2.4/5.9	2.9/7.3	3.1/7.8	3.9/9.8
8	LL	-	-	-	-	-	-	-	-
	TL	-	121	279	729	753	924	988	1219
	BRG	-	1.5/3	1.5/3	2.2/5.6	2.3/5.8	2.8/7.1	3/7.6	3.7/9.3
9	LL	-	-	-	528	572	-	-	-
	TL	-	75	173	604	634	800	854	1047
	BRG	-	1.5/3	1.5/3	2.1/5.2	2.2/5.5	2.8/6.9	2.9/7.4	3.6/9.9
10	LL	-	-	-	385	417	692	-	-
	TL	-	48	112	489	513	696	752	917
	BRG	-	1.5/3	1.5/3	1.9/4.7	2/4.9	2.7/6.7	2.9/7.2	3.5/8.8
11	LL	-	-	-	289	313	520	612	-
	TL	-	32	76	381	413	574	633	816
	BRG	-	1.5/3	1.5/3	1.6/4	1.7/4.4	2.4/6.1	2.7/6.7	3.4/8.6
12	LL	-	-	-	223	241	401	471	-
	TL	-	-	53	293	317	482	531	715
	BRG	-	-	1.5/3	1.5/3.4	1.5/3.7	2.2/5.6	2.5/6.1	3.3/8.2

Notes:

* Can be applied to the beam in addition to its own weight.
Simple or multiple beam spans.
Wax-based sealer applied to mitigate moisture issues associated with wood products during storage and construction.

Key to Table:

LL = Maximum live load - limits deflection to L/240
TL = Maximum total load - limits deflections to L/180 (or a maximum of 0.3125" for beams 7¼" deep or less)
BRG = Required end / intermediate bearing length (inches), based on bearing stress of 750 psi.

Design conditions outside the scope of this guide may be designed using CSD software.

Floor Joists: 100%

ALLOWABLE FLOOR JOIST SPANS – 40 PSF LIVE LOAD AND 15 PSF DEAD LOAD - L/480

Joist Size [in.]	Simple Span				Multiple Span			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"
1½ x 7¼	13'-7"	12'-7"	12'-0"	11'-4"	15'-2"	14'-0"	13'-1"	10'-5"
1½ x 9½	17'-5"	16'-2"	15'-4"	14'-6"	19'-6"	18'-1"	17'-1"	13'-9"
1½ x 11½	21'-7"	19'-11"	18'-11"	[17'-10"]	24'-2"	22'-3"	20'-0"	16'-0"
1½ x 14	25'-2"	23'-3"	[22'-0"]	[20'-9"]	28'-3"	24'-1"	20'-0"	16'-0"

ALLOWABLE FLOOR JOIST SPANS – 60 PSF LIVE LOAD AND 15 PSF DEAD LOAD - L/480

1½ x 7¼	11'-10"	10'-11"	10'-5"	9'-7"	13'-2"	11'-6"	9'-6"	7'-7"
1½ x 9½	15'-3"	14'-1"	13'-5"	[12'-7"]	17'-0"	15'-2"	12'-7"	10'-0"
1½ x 11½	18'-10"	17'-4"	[16'-5"]	[15'-6"]	21'-1"	17'-7"	14'-8"	11'-8"
1½ x 14	22'-0"	[20'-3"]	[19'-3"]	[16'-10"]	23'-7"	17'-7"	14'-8"	11'-8"

ALLOWABLE FLOOR JOIST SPANS – 440 PSF LIVE LOAD AND 15 PSF DEAD LOAD - L/360

1½ x 7¼	14'-11"	13'-10"	13'-2"	12'-0"	16'-8"	14'-8"	13'-1"	10'-5"
1½ x 9½	19'-3"	17'-9"	16'-11"	15'-4"	21'-6"	18'-9"	17'-1"	13'-9"
1½ x 11½	23'-9"	21'-11"	20'-10"	[18'-9"]	26'-7"	23'-0"	20'-0"	16'-0"
1½ x 14	27'-9"	25'-7"	[24'-3"]	[21'-10"]	30'-11"	24'-1"	20'-0"	16'-0"

ALLOWABLE FLOOR JOIST SPANS – 60 PSF LIVE LOAD AND 15 PSF DEAD LOAD - L/360

1½ x 7¼	13'-0"	12'-1"	11'-6"	9'-7"	14'-6"	11'-6"	9'-6"	7'-7"
1½ x 9½	16'-9"	15'-6"	14'-9"	[12'-7"]	18'-7"	15'-2"	12'-7"	10'-0"
1½ x 11½	20'-8"	[19'-1"]	[18'-0"]	[15'-10"]	22'-9"	17'-7"	14'-8"	11'-8"
1½ x 14	24'-3"	[22'-3"]	[20'-11"]	[16'-10"]	23'-7"	17'-7"	14'-8"	11'-8"

Notes:

- Table values apply to uniformly loaded, residential floor joists.
- Span is measured from face to face of supports.
- Table values are based on glued and nailed sheathing panels (19/32"). Use an ASTM D3498 adhesive in accordance with the manufacturer's recommendations.
- Provide at least 1½" of bearing length at end supports, 2" for spans in [brackets], and 3½" at intermediate supports.
- Provide lateral restraint at supports (e.g. full-depth solid blocking, rim board) and along the compression edge of each joist (e.g. floor sheathing).
- 14" multiple-span joists require full-depth, solid blocking at ½-points along each span.
- Spans developed using apparent E.
- Design conditions outside the scope of this guide may be designed using CSD software.
- See hole details at pacificwoodtech.com.

Ceiling Joists: 100%

ALLOWABLE CEILING JOIST SPAN – L/360

Joist Spacing (o.c.)	Joist Size [in.]	Design Load			
		10 LL / 5 DL	20 LL / 10 DL	30 LL / 10 DL	40 LL / 10 DL
		Ceiling Joist Span			
12"	1½ x 5½	16'- 7"	13'- 2"	11'- 6"	10'- 5"
	1½ x 7¼	21'- 11"	17'- 5"	15'- 2"	13'- 9"
	1½ x 9½	28'- 0"	22'- 2"	19'- 5"	17'- 7"
	1½ x 9½	28'- 9"	22'- 10"	19'- 11"	18'- 1"
	1½ x 11½	34'- 0"	27'- 0"	23'- 7"	21'- 5"
16"	1½ x 11½	35'- 11"	28'- 6"	24'- 11"	22'- 7"
	1½ x 5½	15'- 1"	12'- 0"	10'- 5"	9'- 6"
	1½ x 7¼	19'- 11"	15'- 10"	13'- 9"	12'- 6"
	1½ x 9½	25'- 5"	20'- 2"	17'- 7"	16'- 0"
	1½ x 9½	22'- 2"	17'- 7"	15'- 4"	14'- 0"
24"	1½ x 11½	22'- 10"	18'- 1"	15'- 9"	14'- 4"
	1½ x 11½	27'- 0"	21'- 5"	18'- 8"	17'- 0"
	1½ x 5½	13'- 2"	10'- 5"	9'- 1"	8'- 3"
	1½ x 7¼	17'- 5"	13'- 9"	12'- 0"	10'- 11"
	1½ x 9½	22'- 2"	17'- 7"	15'- 4"	14'- 0"
24"	1½ x 9½	26'- 1"	20'- 8"	18'- 1"	16'- 5"
	1½ x 11½	30'- 11"	24'- 6"	21'- 5"	19'- 6"
	1½ x 11½	32'- 8"	25'- 11"	22'- 7"	20'- 7"

Notes:

- Tables are based on:
 - Deflection criteria as listed.
 - Uniform loads. Simple Spans.
 - 100% load duration.
 - Minimum ceiling joist bearing length of 2", assuming a top plate F_{cL} of 425 psi.
- Lateral support required at bearing points.
- Connect to rafter per Rafter Span table.
- Spans listed are from center of support to center of support.
- Spans developed using apparent E.
- Design conditions outside the scope of this guide may be designed using CSD software.

Rafters: Roof-Snow 115%

ALLOWABLE RAFTER SPAN – L/360

Rafter Spacing (o.c.)	Rafter Size [in.]		Roof Snow Load (PSF)											
			20 LL + 10 DL			30 LL + 10 DL			40 LL + 10 DL			50 LL + 10 DL		
			Roof Slope											
		4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12	
12"	1½ x 5½	Span	12'- 5"	10'- 9"	8'- 11"	11'- 4"	9'- 9"	8'- 2"	10'- 6"	9'- 1"	7'- 8"	9'- 11"	8'- 7"	7'- 3"
		Nail Qty.	6	3	2	7	3	2	8	4	2	9	4	3
	1½ x 7¼	Span	16'- 5"	14'- 2"	11'- 9"	14'- 11"	12'- 11"	10'- 10"	13'- 10"	12'- 0"	10'- 1"	13'- 0"	11'- 4"	9'- 6"
		Nail Qty.	8	4	2	9	4	3	10	5	3	12	5	3
	1½ x 9¼	Span	20'- 11"	18'- 1"	15'- 0"	19'- 0"	16'- 6"	13'- 9"	17'- 8"	15'- 4"	12'- 10"	16'- 8"	14'- 6"	12'- 2"
		Nail Qty.	10	5	3	11	5	3	13	6	4	15	7	4
	1½ x 9½	Span	21'- 6"	18'- 7"	15'- 5"	19'- 7"	16'- 11"	14'- 2"	18'- 2"	15'- 9"	13'- 3"	17'- 1"	14'- 10"	12'- 6"
		Nail Qty.	10	5	3	12	6	3	14	6	4	15	7	4
	1½ x 11¼	Span	25'- 6"	22'- 0"	18'- 3"	23'- 2"	20'- 1"	16'- 9"	21'- 6"	18'- 8"	15'- 8"	20'- 3"	17'- 7"	14'- 10"
		Nail Qty.	12	5	3	14	6	4	*	7	5	*	8	5
	1½ x 11½	Span	26'- 0"	23'- 2"	19'- 3"	24'- 5"	21'- 2"	17'- 8"	22'- 9"	19'- 9"	16'- 6"	21'- 5"	18'- 7"	15'- 8"
		Nail Qty.	12	6	4	15	7	4	*	8	5	*	9	5
	1½ x 14	Span	26'- 0"	26'- 0"	22'- 9"	26'- 0"	25'- 0"	20'- 11"	26'- 0"	23'- 3"	19'- 6"	25'- 3"	21'- 11"	18'- 5"
		Nail Qty.	12	6	4	15	8	5	*	9	5	*	10	6
16"	1½ x 5½	Span	11'- 3"	9'- 9"	8'- 1"	10'- 3"	8'- 11"	7'- 5"	9'- 6"	8'- 3"	6'- 11"	9'- 0"	7'- 10"	6'- 7"
		Nail Qty.	8	4	2	9	4	3	10	5	3	12	5	3
	1½ x 7¼	Span	14'- 11"	12'- 10"	10'- 8"	13'- 7"	11'- 9"	9'- 10"	12'- 7"	10'- 11"	9'- 2"	11'- 10"	10'- 4"	8'- 8"
		Nail Qty.	9	4	3	11	5	3	13	6	4	14	7	4
	1½ x 9¼	Span	19'- 0"	16'- 5"	13'- 8"	17'- 4"	15'- 0"	12'- 6"	16'- 1"	13'- 11"	11'- 8"	15'- 1"	13'- 2"	11'- 1"
		Nail Qty.	11	5	3	14	6	4	*	7	4	*	8	5
	1½ x 9½	Span	19'- 6"	16'- 10"	14'- 0"	17'- 9"	15'- 5"	12'- 10"	16'- 6"	14'- 4"	12'- 0"	15'- 6"	13'- 6"	11'- 4"
		Nail Qty.	12	6	4	14	7	4	*	8	5	*	8	5
	1½ x 11¼	Span	23'- 2"	20'- 0"	16'- 7"	21'- 0"	18'- 3"	15'- 3"	19'- 7"	17'- 0"	14'- 3"	18'- 5"	16'- 0"	13'- 5"
		Nail Qty.	14	7	4	*	8	5	*	9	5	*	10	6
	1½ x 11½	Span	24'- 5"	21'- 1"	17'- 6"	22'- 3"	19'- 3"	16'- 1"	20'- 8"	17'- 11"	15'- 0"	19'- 5"	16'- 11"	14'- 2"
		Nail Qty.	15	7	4	*	8	5	*	9	6	*	10	6
	1½ x 14	Span	26'- 0"	24'- 10"	20'- 8"	26'- 0"	22'- 8"	19'- 0"	24'- 4"	21'- 2"	17'- 9"	22'- 11"	19'- 11"	16'- 9"
		Nail Qty.	15	8	5	*	10	6	*	11	7	*	12	7
24"	1½ x 5½	Span	9'- 10"	8'- 6"	7'- 1"	9'- 0"	7'- 9"	6'- 6"	8'- 4"	7'- 3"	6'- 1"	7'- 10"	6'- 10"	5'- 9"
		Nail Qty.	9	4	3	11	5	3	12	6	4	14	7	4
	1½ x 7¼	Span	13'- 0"	11'- 3"	9'- 4"	11'- 10"	10'- 3"	8'- 7"	11'- 0"	9'- 6"	8'- 0"	10'- 4"	9'- 0"	7'- 7"
		Nail Qty.	12	6	4	14	7	4	*	8	5	*	8	5
	1½ x 9¼	Span	16'- 7"	14'- 4"	11'- 11"	15'- 1"	13'- 1"	10'- 11"	14'- 0"	12'- 2"	10'- 2"	13'- 2"	11'- 6"	9'- 8"
		Nail Qty.	15	7	4	*	8	5	*	9	6	*	11	6
	1½ x 9½	Span	17'- 1"	14'- 9"	12'- 3"	15'- 6"	13'- 5"	11'- 3"	14'- 5"	12'- 6"	10'- 6"	13'- 7"	11'- 10"	9'- 11"
		Nail Qty.	15	7	4	*	9	5	*	10	6	*	11	7
	1½ x 11¼	Span	20'- 2"	17'- 5"	14'- 6"	18'- 5"	15'- 11"	13'- 4"	17'- 1"	14'- 10"	12'- 5"	16'- 1"	14'- 0"	11'- 9"
		Nail Qty.	*	8	5	*	10	6	*	11	7	*	13	8
	1½ x 11½	Span	21'- 4"	18'- 5"	15'- 4"	19'- 5"	16'- 10"	14'- 1"	18'- 0"	15'- 8"	13'- 1"	17'- 0"	14'- 9"	12'- 5"
		Nail Qty.	*	9	5	*	11	6	*	12	7	*	13	8
	1½ x 14	Span	25'- 2"	21'- 8"	18'- 1"	22'- 11"	19'- 10"	16'- 7"	21'- 3"	18'- 5"	15'- 6"	20'- 0"	17'- 5"	14'- 7"
		Nail Qty.	*	10	6	*	12	7	*	14	8	*	*	9

Where number of nails is designated as "*" or resulted to more than 15, connection shall be evaluated by a design professional. ***Bold italic*** values require 2x6 bearing wall.

Notes:

- Tables are based on:
 - Minimum rafter bearing length of 3½", assuming a top plate Fc1 of 425 psi.
 - Uniform load. Simple Span.
- Spans shown are the maximum horizontal distance from the outside face of the exterior wall to center of ridge.
- Purlins may be installed (per section R802.5.1 of the IRC) to reduce rafter spans.
- Interpolation to determine nail quantity for other slopes is permitted.
- Spans developed using apparent E.
- Design conditions outside the scope of this guide may be designed using CSD software.

How to Use This Table

- Determine the roof snow load.
- Determine the rafter on-center spacing.
- Scan down the appropriate roof snow load column until reaching a value that meets or exceeds the span of the application.
- Select the PWLVL rafter depth and note the number of 0.131" x 3¼" nails required at the heel and ceiling joist lap connection for the roof slope.
- Spans developed using apparent E.

Required Length for Sloped Members

SLOPE FACTORS

Roof Slope	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
Rafter	1.031	1.054	1.083	1.118	1.158	1.202	1.250	1.302	1.357	1.414
Hip/Valley	1.015	1.027	1.042	1.060	1.081	1.105	1.131	1.160	1.191	1.224

D FACTORS

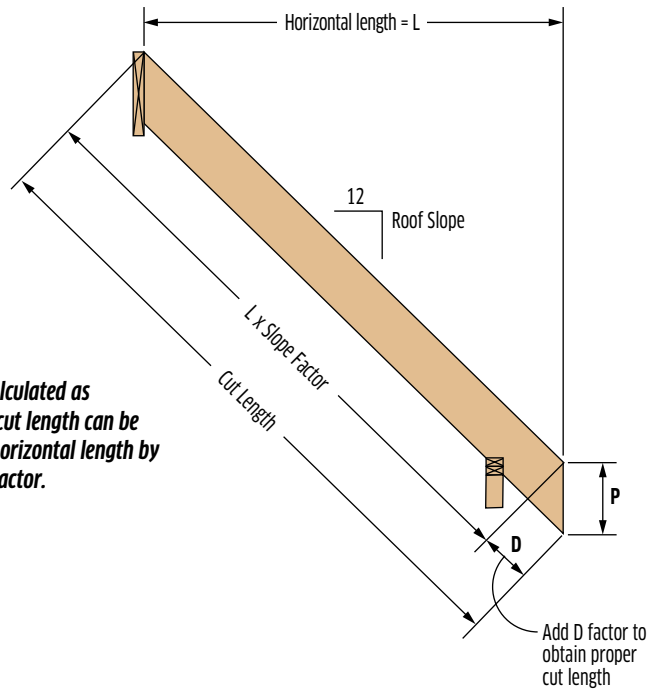
Rafter Depth (D) [in]	Roof Slope									
	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
5½"	1.375	1.875	2.375	2.75	3.25	3.75	4.125	4.625	5.125	5.5
7¼"	1.875	2.5	3.125	3.625	4.25	4.875	5.5	6.125	6.75	7.25
9¼"	2.375	3.125	3.875	4.625	5.5	6.25	7	7.75	8.5	9.25
9½"	2.375	3.25	4	4.75	5.625	6.375	7.125	8	8.75	9.5
11¼"	2.875	3.75	4.75	5.625	6.625	7.5	8.5	9.375	10.375	11.25
11½"	3	4	5	6	7	8	9	10	11	11.875

RAFTER PLUMB CUT (P)

Rafter Depth (D) [in]	Roof Slope									
	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
5½"	5.75	5.88	6.00	6.25	6.38	6.63	6.88	7.25	7.50	7.88
7¼"	7.50	7.75	7.88	8.13	8.50	8.75	9.13	9.50	9.88	10.38
9¼"	9.63	9.88	10.13	10.38	10.75	11.13	11.63	12.13	12.63	13.13
9½"	9.88	10.13	10.38	10.63	11.00	11.50	11.88	12.38	13.00	13.50
11¼"	11.63	11.88	12.25	12.63	13.13	13.63	14.13	14.75	15.38	16.00
11½"	12.25	12.63	12.88	13.38	13.75	14.38	14.88	15.50	16.13	16.88

CUT LENGTH CALCULATION

Cut Length = Horizontal Length x Slope Factor + D



Length of rafter plumb cut (P) is calculated as rafter depth x slope factor. Actual cut length can be approximated by multiplying the horizontal length by the slope factor and adding the D factor.

1¾" Beam–Sloped End Cut

ALLOWABLE END REACTIONS – POUNDS

Slope		3½" Bearing				
Beam Depth [in.]	Heel Height [in.]	4:12	6:12	8:12	10:12	12:12
11½"	4	1,386	1,543	1,700	1,856	2,013
	5	1,654	1,811	1,968	2,124	2,281
	6	1,923	2,080	2,236	2,392	2,549
	7	2,191	2,348	2,505	2,603	2,603
	8	2,459	2,603	2,603	2,603	2,603
	9	2,603	2,603	2,603	2,603	2,603
	10	2,603	2,603	2,603	2,603	2,603
	11	2,603	2,603	2,603	2,603	2,603
14"	4	1,386	1,543	1,700	1,856	2,013
	5	1,654	1,811	1,968	2,124	2,281
	6	1,923	2,080	2,236	2,392	2,549
	7	2,191	2,348	2,505	2,603	2,603
	8	2,459	2,603	2,603	2,603	2,603
	9	2,603	2,603	2,603	2,603	2,603
	10	2,603	2,603	2,603	2,603	2,603
	11	2,603	2,603	2,603	2,603	2,603

Slope		5¼" Bearing				
Beam Depth [in.]	Heel Height [in.]	4:12	6:12	8:12	10:12	12:12
11½"	4	1,542	1,778	2,013	2,247	2,482
	5	1,811	2,046	2,281	2,515	2,750
	6	2,079	2,314	2,550	2,783	3,019
	7	2,347	2,583	2,818	3,052	3,287
	8	2,616	2,851	3,086	3,320	3,555
	9	2,884	3,119	3,355	3,588	3,824
	10	3,152	3,388	3,623	3,857	3,905
	11	3,421	3,656	3,891	3,905	3,905
14"	4	1,542	1,778	2,013	2,247	2,482
	5	1,811	2,046	2,281	2,515	2,750
	6	2,079	2,314	2,550	2,783	3,019
	7	2,347	2,583	2,818	3,052	3,287
	8	2,616	2,851	3,086	3,320	3,555
	9	2,884	3,119	3,355	3,588	3,824
	10	3,152	3,388	3,623	3,857	3,905
	11	3,421	3,656	3,891	3,905	3,905

Values limited by reduced shear capacity or bearing based on SPF plates (425 psf).

Notes:

1. For 3½" (or 2-ply) and 5¼" (or 3-ply) wide beams, multiply by 2 and 3, respectively.
2. No increase for duration of load permitted.
3. Table values apply to horizontal LVL beams that have been properly designed for appropriate strength and stiffness.
4. Table considers only downward loading.
5. No holes or concentrated loads permitted within tapered cut.
6. Brace compression edge of member as required per member design.
7. Members with bevel cut are not permitted to be used as a tension tie or drag strut.
8. Beam capacity is determined by heel height and length of cut.
9. Design conditions outside the scope of this guide may be designed using CSD software.

PWLVL Rim Board

ALLOWABLE LOADS

Minimum Thickness [in]	Depth [in]	Vertical Load Capacity		Lateral Load Capacity [plf]
		Uniform Load [plf]	Concentrated Load [lb]	
1¼	9½	4,250	3,760	200
	11½	4,250	3,760	
	14	3,550	3,550	
	16	2,900	2,900	
1½	9½	6,480	4,500	250
	11½	6,480	4,500	
	14	5,600	4,500	
	16	4,800	4,500	
	18	3,900	2,700	
	20	3,200	2,700	
1¾	24	2,250	2,250	250
	9½	7,560	5,200	
	11½	7,560	5,200	
	14	6,900	5,200	
	16	6,200	5,200	
	18	5,500	4,200	
	20	4,800	4,200	
	24	3,500	3,500	

1.6E PWLVL Reference Design Values⁽¹⁾

True (Shear-Free) Modulus of Elasticity, $E = 1,600,000 \text{ psi}^{(2)}$

Bending (beam) $F_b = 2,250 \text{ psi}^{(3)}$

May be adjusted by $(12/d)^{1/5}$, where d is the depth of the member (inches)
May be adjusted by 104 for repetitive members as defined in *ANSI/AF&PA NDS*

Horizontal Shear (beam) $F_v = 230 \text{ psi}^{(3)}$

Compression Perpendicular to Grain (beam) $F_{c\perp} = 750 \text{ psi}^{(2)}$

- Notes:**
1. Values apply to dry service conditions
 2. Do not adjust for load duration
 3. May be adjusted for load duration

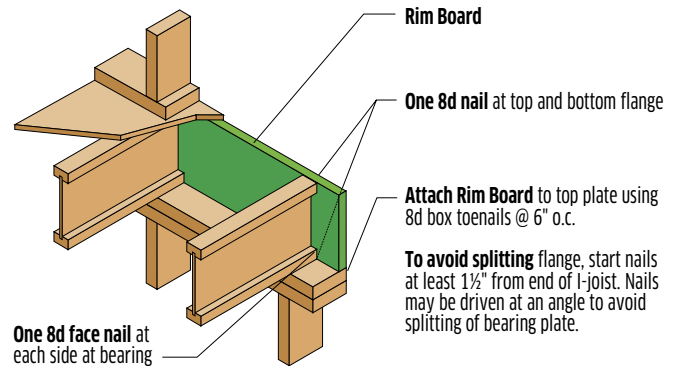
EQUIVALENT SPECIFIC GRAVITY FOR FASTENER DESIGN

Fastener Type	Face	Equivalent Specific Gravity	
		Lateral	Withdrawal
Nails & Wood Screws	Edge	Lateral	0.50
		Withdrawal	0.47
Bolts & Lag Screws	Face	Lateral	0.50

CLOSEST ON-CENTER SPACING for a single row of nails in the narrow face

Nail Size	Spacing
8d common (2½" x 0.131")	3"
10d common (3" x 0.148")	4"
16d common (3½" x 0.162")	6" ⁽¹⁾

1. May be 4" when nailing through bottom wall plate and sheathing (maximum 1⅜" penetration).



PWLVL Sill Plates

Reference Design Values

DRY USE

	Beam Orientation	Plank Orientation
Modulus of Elasticity, $E^{(1)(4)}$	1,600,000 psi	1,600,000 psi
Adjusted Modulus of Elasticity, $E_{min}^{(1)(5)}$	805,000 psi	805,000 psi
Bending Stress, $F_b^{(2)(3)}$	2,250 psi	2,250 psi
Compression Perpendicular to Grain, $F_{c\perp}^{(1)}$	750 psi	650 psi
Compression Parallel to Grain, $F_{c\parallel}$	1,950 psi	1,950 psi
Horizontal Shear, F_v	230 psi	150 psi

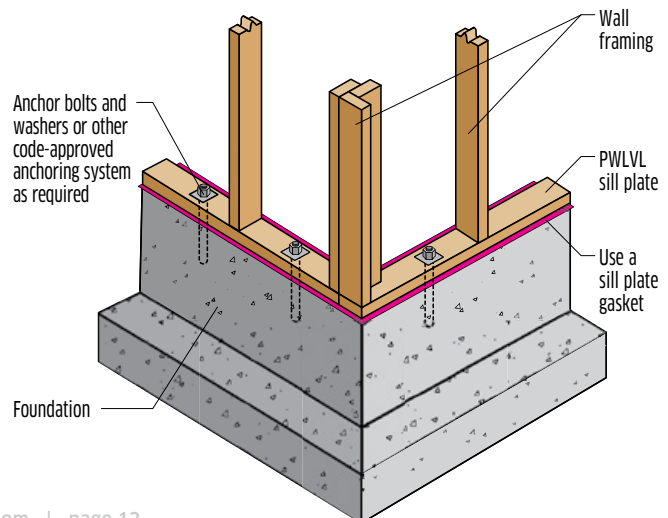
Notes:

1. Do not adjust for load duration.
2. Adjust by $(12/d)^{0.2}$, where d is the depth of the member [inches].
3. Adjust by 1.04 for repetitive members as defined in the NDS.
4. True (Shear-Free) modulus of elasticity does not account for shear deformation.
5. Reference modulus of elasticity for beam and column stability calculations in accordance with the NDS.
6. PWLVL should not be in direct contact with concrete. Sill plate gasket required.

EQUIVALENT SPECIFIC GRAVITY FOR CONNECTION DESIGN

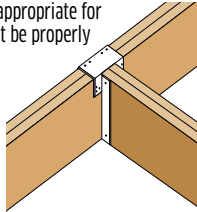
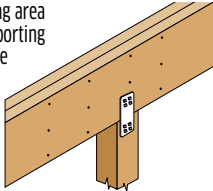
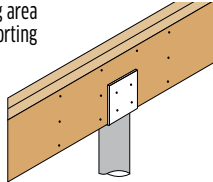
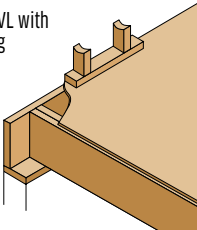
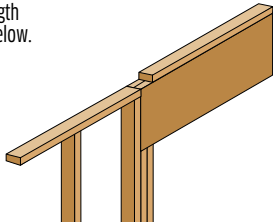
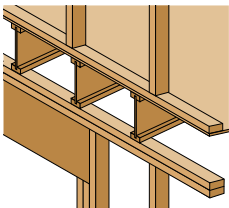
Connection Type	Face ⁽¹⁾	Edge ⁽²⁾
Nail – Withdrawal	0.50	0.47
Nail – Lateral	0.50	0.50
Bolt – Lateral	0.50	NA

1. Face: member faces showing the face of one veneer, typically the wide face of the member.
2. Edge: member faces showing the narrow edge of all veneers, typically the narrow face of the member.



Bearing Details

For multiple-ply PWLVL beam assembly conditions and fastening recommendations, see next page.

<p>B1 BEAM-TO-BEAM CONNECTION</p> <p>Make sure hanger capacity is appropriate for each application. Hangers must be properly installed to accommodate full capacity.</p> 	<p>B2 BEARING ON WOOD COLUMN</p> <p>Verify the required bearing area and the ability of the supporting column member to provide adequate strength.</p> 	<p>B3 BEARING ON STEEL COLUMN</p> <p>Verify the required bearing area and the ability of the supporting column member to provide adequate strength.</p> 
<p>B4 BEARING ON EXTERIOR WALL</p> <p>Prevent direct contact of PWLVL with concrete. Consult local building code for requirements.</p> 	<p>B5 BEARING FOR DOOR OR WINDOW HEADER-1-STORY TYPICAL</p> <p>See "Bearing Length Requirements" below.</p> 	<p>B6 WINDOW/DOOR HEADER-2-STORY TYPICAL</p> <p>See "Bearing Length Requirements" below.</p> 

Bearing Length Requirements

PACIFIC WOODTECH LVL BEARING LENGTH REQUIREMENTS (1, 2, 3, 4, 5, 6, 7)

Support Material	Hem-Fir ⁽⁶⁾		Southern Pine ⁽⁶⁾		DF-L ⁽⁶⁾		1.6E PWLVL ⁽⁷⁾	
F _{cL} (psi)	405 psi		565 psi		625 psi		750 psi	
LVL Beam Width	1 1/2"	3"	1 1/2"	3 1/2"	1 1/2"	3 1/2"	1 1/2"	3 1/2"
Reaction [lb]	1000	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
	2000	3"	1 1/2"	2 1/4"	1 1/2"	2"	1 1/2"	1 1/2"
	3000	4 1/4"	2 1/4"	3 3/4"	1 3/4"	2 3/4"	1 1/2"	2 1/2"
	4000	5 1/4"	3"	4 1/4"	2 1/4"	3 3/4"	2"	3 1/4"
	5000	7 1/4"	3 3/4"	5 1/4"	2 3/4"	4 3/4"	2 1/2"	4"
	6000	8 1/2"	4 1/4"	6 1/4"	3 1/4"	5 1/2"	2 3/4"	4 3/4"
	7000	10"	5"	7 1/4"	3 3/4"	6 1/2"	3 1/4"	5 1/2"
	8000		5 3/4"	8 1/4"	4 1/4"	7 1/2"	3 3/4"	6 1/4"
	9000		6 1/2"	9 1/4"	4 3/4"	8 1/4"	4 1/4"	7"
	10000		7 1/4"	10 1/4"	5 1/4"	9 1/4"	4 3/4"	7 3/4"
11000		8"	11 1/4"	5 3/4"	10 1/4"	5 1/4"	8 1/2"	

Notes:

- The minimum required bearing length is 1 1/2".
- Duration of load factors may not be applied to bearing length requirements.
- All PWLVL beams require support across their full width.
- All PWLVL beams require lateral support at bearing points.

Continued in next column

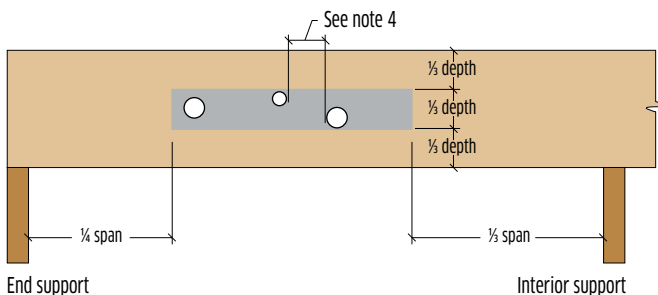
PACIFIC WOODTECH LVL BEARING LENGTH REQUIREMENTS (1, 2, 3, 4, 5, 6, 7)

Support Material	Hem-Fir ⁽⁶⁾		Southern Pine ⁽⁶⁾		DF-L ⁽⁶⁾		1.6E PWLVL ⁽⁷⁾	
F _{cL} (psi)	405 psi		565 psi		625 psi		750 psi	
LVL Beam Width	1 1/2"	3"	1 1/2"	3 1/2"	1 1/2"	3 1/2"	1 1/2"	3 1/2"
Reaction [lb]	12000	8 1/2"		6 1/4"	11"	5 1/2"	9 1/4"	4 3/4"
	13000	9 1/4"		6 3/4"		6"	10"	5"
	14000	10"		7 1/4"		6 1/2"	10 3/4"	5 1/2"
	15000	10 3/4"		7 3/4"		7"	11 1/2"	5 3/4"
	16000			8 1/4"		7 1/2"	12 1/4"	6 1/4"
	17000			8 3/4"		8"	13"	6 1/2"
	18000			9 1/4"		8 1/4"		7"
	19000			9 3/4"		8 3/4"		7 1/4"
	20000			10 1/4"		9 1/4"		7 3/4"
	21000			10 3/4"		9 3/4"		8"
	22000			11 1/4"		10 1/4"		8 1/2"

- The support member must be sized to carry the load from the PWLVL beam.
- Use these values when the PWLVL beam is supported by a wall plate, sill plate, timber or built-up girder.
- Use these values when the PWLVL beam is supported by the end of a column or connection hardware.

Hole Details

HOLES IN PWLVL BEAMS



Notes:

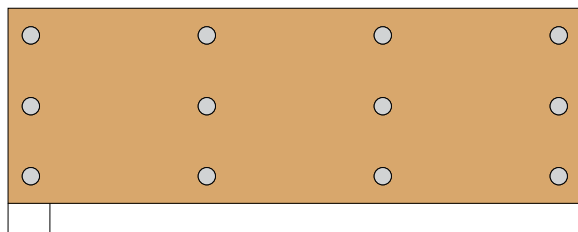
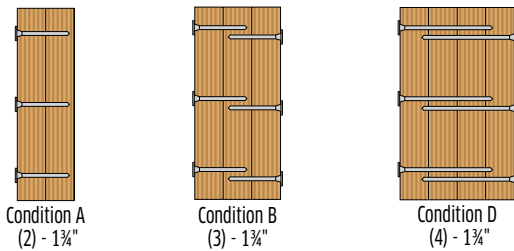
- This detail applies only to uniformly loaded, simple and multiple span beams. Cantilevered beams and beams that carry concentrated loads are outside the scope of this detail.
- Square and rectangular holes are not permitted.
- Round holes may be drilled or cut with a hole saw anywhere within the shaded area of the beam.
- The horizontal distance between adjacent holes must be at least two times the size of the larger hole. This restriction also applies to the location of access holes relative to bolt holes in multi-ply beams.
- Do not drill more than three access holes in any four foot long section of beam.
- The maximum round hole diameter permitted is:

PWLVL Beam Depth	5 1/2"	7 1/4"	9 1/2" to 24"
Maximum Hole Diameter	1 1/8"	1 1/2"	2"
- These limitations apply to holes drilled for plumbing or wiring access only. The size and location of holes drilled for fasteners are governed by the provisions of the *National Design Specification for Wood Construction*.
- Beams deflect under load. Size holes to provide clearance where required.

Multiple-Ply PWLVL Beam Assembly

COMBINATIONS OF 1 3/4" AND 3 1/2" PLIES

NAILS



1 3/4" AND 3 1/2" PLIES—MAXIMUM UNIFORM SIDE LOAD (PLF)

Condition	3 3/4" x 0.131" Nails		16d Common Nails	
	2 Rows at 12" o.c.	3 Rows at 12" o.c.	2 Rows at 12" o.c.	3 Rows at 12" o.c.
Condition A (2-1 3/4")	390	585	565	845
Condition B (3-1 3/4" OR 1-1 3/4" + 1-3 1/2")	290	435	425	635
Condition D (4-1 3/4")	Use bolts for this condition (see note 1).			

Notes:

- Minimum fastener schedule for smaller side loads and top-loaded beams:
Conditions A and B, beams 12" deep or less: 2 rows 3 3/4" x 0.131" at 12" o.c.
Conditions A and B, beams deeper than 12": 3 rows 3 3/4" x 0.131" at 12" o.c.
Condition D, all beam depths: 2 rows 1/2" bolts at 24" o.c.
- The table values for nails may be doubled for 6" o.c. and tripled for 4" o.c. nail spacings.
- The nail schedules shown apply to both sides of a three-ply beam.
- The table values apply to bolts meeting the requirements of *ANSI/ASME Standard B18.2.1*. A standard cut washer, or metal plate or strap of equal or greater dimensions, shall be provided between the wood and the bolt head and between the wood and the nut. The distance from the edge of the beam to the bolt holes must be at least 2" for 1/2" bolts. Bolt holes shall be the same diameter as the bolt.
- 7" wide beams must be loaded from both sides and/or top loaded.
- Beams wider than 7" must be designed by the engineer of record.
- Load duration factors may be applied to the table values.
- For proprietary fastener alternatives, consult the manufacturer's literature.

How to Use the Maximum Uniform Side Load Table

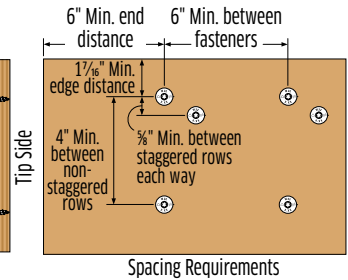
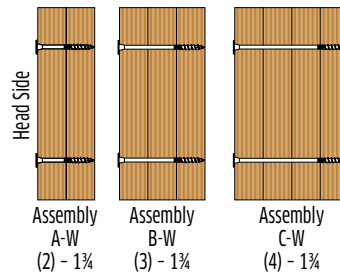
EXAMPLE: THREE 1 3/4" PLIES LOADED FROM BOTH SIDES AND ABOVE (CONDITION B)

- Use allowable load tables or sizing software to size the beam to carry a total load of $(300 + 610 + 550) = 1460$ plf.
- Refer to the Condition B row in the table. Scan across the row from left to right for a table value greater than 550 plf, which is the greatest side load carried by the beam. The fourth value in the row indicates that 3 rows of 16d common nails at 12" o.c. will accommodate a side load of 635 plf which is greater than the 550 plf required. Use 3 rows of 16d common nails at 12" o.c., from both sides, to assemble the beam.

To review Pacific Woodtech's Installation Guide, please visit pacificwoodtech.com.

COMBINATIONS OF 1 3/4" PLIES

STRONG-DRIVE® SDW STRUCTURAL WOOD SCREWS



SIDeloaded 1 3/4" MULTI-PLY SCL ASSEMBLIES – ALLOWABLE UNIFORM LOAD APPLIED TO EITHER OUTSIDE MEMBER

Multiple Members	Nominal Screw Length (in)	Loaded Side	Structural Composite Lumber						
			SDW @ 12" o.c.		SDW @ 16" o.c.		SDW @ 24" o.c.		
			2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	
A-W	2-ply SCL	3%	Either	1600	2400	1200	1800	800	1200
B-W	3-ply SCL	5	Head	1200	1800	900	1350	600	900
			Tip	900	1350	675	1015	450	675
C-W	4-ply SCL	6%	Head	1065	1600	800	1200	535	800
			Tip	800	1200	600	900	400	600

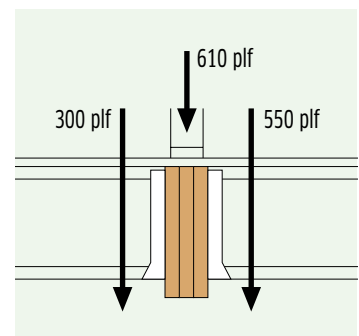
- Each ply is assumed to carry same proportion of load.
- Loads may be applied to the head side and point side concurrently provided neither published allowable load is exceeded. (Example: a 3-ply assembly with a head side load of 1300 plf and point side load of 1000 plf may be fastened together with 3 rows of SDW @ 16" o.c.)
- When hangers are installed on point side, hanger face fasteners must be a minimum of 3" long.
- Tables are based on Main Member Penetration as noted in Single-Fastener Load Tables of the *Simpson Strong-Tie Fastening Systems 2017-2018 Catalog C-F-2017* (page 358).
- Please consult strongtie.com for the latest fastener details and data.

Installation

- SDW screws install best with a low-speed 1/2" drill and a T-40 6-lobe bit. The matched bit included with the screws is recommended for best results.
- Screw heads that are countersunk flush to the wood surface are acceptable if the screw has not spun out.
- Individual screw locations may be adjusted up to 3" to avoid conflicts with other hardware or to avoid lumber defects.
- Pre-drilling is typically not required.

SCREW DIMENSIONS

Model No.	Nominal Screw Length (L) (in)	Thread Length (TL) (in)	Head Stamp Length
SDW22338	3%	1 1/16"	3.37
SDW22500	5	1 1/16"	5.00
SDW22634	6%	1 1/16"	6.75



Software Tools



The Most Powerful Software Tools in the Market
iStruct® software suite, featuring isPlan® and isDesign®

Pacific Woodtech Corporation provides customers with the best information services in the industry—and supplies its customer base with software tools to perform daily engineering and drawing functions required in today's market.

isPlan® features:

- Draw and design floor and roof framing plans with engineered wood products
- Includes structural analysis and reporting, take-offs, quotes, and cutting optimization with inventory integration
- Automatically develops loads and produces bold, color graphic layouts in 2D and 3D
- Specially engineered for companies with a dedicated design staff
- Supports the full Pacific Woodtech product line
- Includes isDesign – the single member beam design

isDesign® features:

- A user-friendly, single-member sizing program with impeccable graphics that creates easy-to-read beam calcs
- Analyze loads and calculate sizes and spacing for Pacific Woodtech engineered wood products
- Requires little or no training for the architect, engineer, or designer

Pacific Woodtech customers receive:

- No charge for isDesign® single-member sizing software
- No charge for customers to distribute isDesign® to its customer base
- Customer product logos and nomenclature on beam calcs
- Printed calc sheets display shear, deflection, moment, and reaction
- Value-engineered framing plans
- Engineered or non-engineered placement plans
- Internet software training and support
- Internet updates for all software

Member Information

Type:	Order	Application:	Floor
Piles:	2	Design Method:	ASD
Moisture Condition:	Dry	Building Code:	IBC/IRC 2015
Deflection LL:	480	Load Sharing:	No
Deflection TL:	240	Deck:	Not Checked
Importance:	Normal		
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brq	Live	Dead	Snow	Wind	Const
1	312	162	0	0	0
2	312	162	0	0	0

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	1777 ft-lb	79 1/2"	2190 ft-lb	0.803 (9%)	D+L	L
Unbraced	1777 ft-lb	79 1/2"	4376 ft-lb	0.279 (26%)	D+L	L
Shear	405 lb	11 5/8"	7887 lb	0.051 (5%)	D+L	L
LL Defl inch	0.050 (1.042)	79 9/16"	0.302 (1.480)	0.130 (13%)	D+L	L
TL Defl inch	0.077 (1.237)	79 9/16"	0.765 (1.240)	0.100 (10%)	D+L	L

Design Notes

- 1 Girders are designed to be supported on the bottom edge only.
- 2 Multiple plies must be fastened together as per manufacturer's details.
- 3 Top loads must be supported equally by all plies.
- 4 Top braced at bearings.
- 5 Bottom braced at bearings.
- 6 Lateral slenderness ratio based on single ply width.

Load Table

ID	Load Type	Location	Trib Width	Side	Dead	Live	Snow	Wind	Const.	Comments
1	Uniform	1-0-0	Top		0.9 PSF	40 PSF	0 PSF	0 PSF	0 PSF	
	Self Weight				11 PLF					

Manufacturer Info

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www.pacificwoodtech.com
APA, PFI-1333, ICC-ES ESR-2909

This design is valid until 10/18/2022

The iStruct® software suite is truly a solution like no other and is designed for quick learning and application. The accelerated training time means users are up and running quickly and cost effectively!

What you get from Pacific Woodtech is what your customers expect from you—the best tools and the best service possible!

Product Warranty

Pacific Woodtech Corporation warrants that its products, as manufactured, will be free from manufacturing errors or defects in workmanship and material.

In addition, provided the product, as manufactured, is stored, handled, installed and used correctly, Pacific Woodtech Corporation warrants the adequacy of its design.

This warranty is backed by the full resources of Pacific Woodtech Corporation and by underwritten product liability insurance.



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