USER GUIDE

BPI Lumber & Engineered Wood

PACIFIC WOODTECH CORPORATION

ENGINEERED WOOD PRODUCTS

Technical Data for

Joists,

Headers, Beams,

Rim Board, Columns,

and Dimension

TABLE OF CONTENTS

EVALUATION REPORTS

I-JOIST EVALUATION REPORTS

Building Code / Authority	Evaluation Service/ Department	Report No.
International Building Code International Residential Code	APA – The Engineered Wood Association	PR-L262
	ICC-ES	ESR-1225
		ESR-1405
National Building Code of Canada	CCMC	13470-R
U.S. Dept. of Housing and Urban Development (HUD)	Manufactured Housing and Standards Division	SEB 1132
City of Los Angeles	Department of Building and Safety (LADBS)	RR 25450
State of Florida	Department of Community Affairs	FL7428
City of New York	Department of Buildings	MEA 233-98-M

GREEN VERIFICATION REPORT

Product	Certification Body	Report No.
I-joist	APA	GR-L262
	Formaldehyde Emissions Compliance	PR-E730

LVL EVALUATION REPORTS

Building Code / Authority	Evaluation Service/ Department	Report No.
International Building Code International Residential Code	APA – The Engineered Wood Association	PR-L233
	ICC-ES	ESR-2909
National Building Code of Canada	CCMC	13006-R
U.S. Dept. of Housing and Urban Development (HUD)	Manufactured Housing and Standards Division	MR 1310
City of Los Angeles	Department of Building and Safety (LADBS)	RR 25448
State of Florida	Department of Community Affairs	FL7427
City of New York	Department of Buildings	MEA 213-07-E

GREEN VERIFICATION REPORT

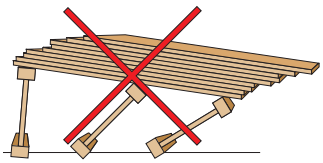
Product	Certification Body	Report No.
Laminated Veneer Lumber	APA	GR-L233
	Formaldehyde Emissions Compliance	PR-E720

For information about Pacific Woodtech's Evaluation Reports, please scan this code.

SAFETY & CONSTRUCTION PRECAUTIONS

INSTALLATION

- Walking on the joists should not be permitted until they are properly braced.
- All hangers, rim boards, rim joists and blocking at the end supports of the joists must be installed and nailed properly.
- During installation, a minimum of 1 x 4 temporary bracing is required.
- Bracing members should be spaced at 8′– 0″ o.c. and nailed to each joist with two 8d nails (10d box nails if bracing thickness exceeds 1″).
- Lap bracing ends and anchor them to temporary or permanent sheathing nailed to the first 4′ of joists at the end of the bay or a braced end wall.
- Do not cut, drill, or notch flanges.
- The ends of cantilevers must be temporarily braced on both the top and bottom flanges.
- Never overload sheathed joists with loads that exceed design loads.
- Only remove the bracing as the sheathing is attached.
- Engineered wood products should be used in dry conditions only.
- When stacking construction material, stack only over beams or walls, NOT on unsheathed joists.



These are general recommendations and in some cases, additional precautions may be required.

STORAGE & HANDLING GUIDELINES

STORAGE

- Installation guidelines from Pacific Woodtech will be included with every shipment of trademarked PWI joists to job sites.
- Store bundles upright on a smooth, level, well drained supportive surface.
- Always stack and handle I-joists in the upright position only.
- Bundles should not be in contact with the ground.
- Place 2x or LVL spacers (at a maximum of 10′ apart) between bundles and the ground and bundles stored on top of one another.
- Bundles should remain wrapped, strapped and protected from the weather until time of installation.

LVL SEALER

Pacific Woodtech's LVL has a wax-based sealer specifically formulated for laminated veneer lumber to help protect it from weather related issues during storage and construction. LVL is very dry when it is produced. It will absorb moisture and grow in size slightly as it acclimates to the climate. This sealer helps to slow the rate of moisture absorption and UV rays. However, it is not meant for protection from long-term or high concentrations of moisture exposure.

HANDLING Never use or field repair a damaged I-joist.

- All handling of joists with a forklift or crane should be done carefully.
- Joists should remain vertical during handling.
- Avoid excessive bowing during all phases of handling and installation (i.e. measuring, sawing or placement).
- Damage may result if the joist or beam is twisted or a load is applied to it while it's lying flat.

SYSTEM PERFORMANCE

Traditionally, floor vibration has not been an issue with a well-designed and constructed floor. The model code-required serviceability deflection requirements of span/360 for live load and span/240 for total load have long served to keep code-conforming floors stiff enough to minimize vibration-related problems. These deflection requirements were based on the use of traditional lumber framing and prevailing architectural norms. Spans in traditional lumber-framed structures seldom exceeded 14–16 feet.

With engineered wood products, however, designers are no longer limited by the capacities and lengths of traditional lumber structural elements. Spans unheard of just a few years ago are now common with engineered wood products. The traditional deflection limits may no longer be appropriate for the longer spans made possible by engineered wood products. For this reason, APA has voluntarily adopted a live load deflection criteria that is 33% stiffer than that required in the current model building codes. This deflection criteria was selected for increase because vibration loads are caused by transient or live loads, most often by people moving about the floor itself.

By increasing the stiffness of the floor—using span/480 requirements instead of the more traditional span/360, the vibrations caused by a thundering herd of youngsters can be more easily tolerated. Designing the ideal floor is not, however, an exact science. Because one of the benefits of a wood floor is its ability to cushion footfalls, it is not desirable to make every floor overly stiff. As usual, a one-size solution does not fit all. The selection of span/480 as a serviceability requirement is a compromise. It provides a substantial decrease in floor vibration with a minimal cost penalty without making the floor so stiff that comfort is compromised.

Researchers have proposed a number of additional methods that can be used to reduce floor vibration even further. These methods include:

- Gluing the wood structural panel floor to the PWI joists
- Attaching wood structural panels or gypsum board to the bottom of the PWI floor joists
- Decreasing the PWI floor joist spacing by one increment based on allowable span
- Using full-depth blocking at regular intervals between all of the PWI floor joists over the entire floor
- Adding concrete topping over the floor sheathing

By far the most practical and most economical way to further increase the stiffness of your floor when using PWI joists is to select the most economical joist from our allowable span tables and then maintain the same joist designation but upgrade to the next net depth.

PACIFIC WOODTECH CORPORATION

PROPOSED CONVERSION CHART

PACIFIC WOODTECH CORPORATION ENGINEERED WOOD CONVERSION CHART*

I-JOIST	Pacific Woodtech†	IB MAX-CORE	Trus Joist	Boise	Roseburg	LP
Up to 24″	PWI / 20		TJI / 110	BCI / 5000	RFPI /20	LPI / 20
	PWI / 45	IB400	TJI / 210	BCI / 6000	RFPI / 400	LPI / 20
	PWI / 47	IB600	TJI / 230	BCI / 6500	RFPI / 40	LPI / 32
	PWI / 70		TJI / 360	BCI / 60	RFPI / 70	LPI / 36
	PWI / 77		DNA	DNA	RFPI / 700	LPI / 42
	PWI / 90		TJI / 560	BCI / 90	RFPI / 90	LPI / 56

STRUCTURAL COMPOSITE LUMBER (LVL & PARALLAM [PSL])

BEAM/HEADER	Pacific Woodtech†	Trus Joist	Boise	Roseburg	LP
1¾″	LVL (1.5E)	LSL (1.55E)	LVL (1.7E)	LVL (1.5E)	LSL (1.55E)
	LVL (2.0E)	LVL (2.0E)	LVL (2.0E)	LVL (2.0E)	LVL (2.0E)
3½″	LVL (1.5E)	LSL (1.55E)	LVL (1.7E)	LVL (1.5E)	LSL (1.55E)
	LVL (2.0E)	PSL (2.0E)	LVL (2.0E)	LVL (2.0E)	LVL (2.0E)
3½″ to 7″	LVL (2.0E)	PSL (2.0E)	LVL (2.0E)	LVL (2.0E)	LVL (2.0E)

RIMBOARD	Pacific Woodtech†	Trus Joist	Boise	Roseburg	LP
1¼″-1¾″	LVL Rimboard	LSL Rimboard	LVL Rimboard	LVL Rimboard	LSL Rimboard

STUDS	Pacific Woodtech†	Trus Joist	Boise	Roseburg	LP
Various Sizes	LVL	LSL	LVL	LVL	LSL

COLUMNS	Pacific Woodtech†	Trus Joist	Boise	Roseburg	LP
Various Sizes	LVL	PSL	LVL	LVL	LVL

* Please note: This conversion chart is intended to provide a reference to similar strength/performance characteristics by respective manufacturers per current (04/2017) regional specifier guides.

† Code reports for Pacific Woodtech Corporation: I-joist (ESR-1225, PR-L262); LVL (ESR-2909, PR-L233)

Substitutions are subject to a review committee which may include the project structural engineer.

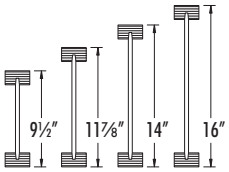
Questions? Please contact BPI at 712-366-2521.

LVL FLANGE PWI JOIST SERIES
JOIST DIMENSIONS

For more information about our complete line of products, scan this code or visit **www.pacificwoodtech.com**.

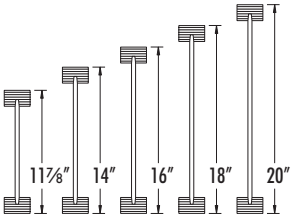
JOIST DIMENSIONS

PWI 47



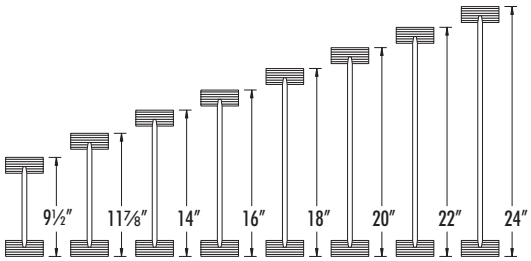
⅜″ OSB Web
2⁵⁄₁₆″ x 1⅛″ Flange

PWI 70



⅜″ OSB Web
2⁵⁄₁₆″ x 1½″ Flange

PWI 90



7⁄16″ OSB Web
3½″ x 1½″ Flange

LVL FLANGE PWI JOIST SERIES
REFERENCE DESIGN VALUES

REFERENCE DESIGN VALUES [1]

Joist Series	Joist Depth	PWI Joist	EI [2] (x 10^6 lb-in^2)	k[3] (x 10^6 lb)	M[4] (ft-lb)	V[5] (lb)	ER[6] (lb)	IR[7] (lb)	Vertical Load[8] (plf)
PWI 47	9½"	PWI 4795	206	4.94	3335	1330	875	1860	2000
	11⅞"	PWI 4711	344	6.18	4280	1705	885	1930	2000
	14"	PWI 4714	499	7.28	5075	1955	900	1995	2000
	16"	PWI 4716	674	8.32	5790	2190	910	2060	2000
PWI 70	11⅞"	PWI 7011	440	6.18	6730	1705	1160	2460	2000
	14"	PWI 7014	644	7.28	8030	1955	1160	2460	2000
	16"	PWI 7016	873	8.32	9200	2190	1160	2460	2000
	18"	PWI 7018	1141	9.36	10355	2425	1160	2460	1450
	20"	PWI 7020	1447	10.40	11495	2660	1160	2460	1450
PWI 90	9½"	PWI 9095	392	6.08	7915	1430	1400	2860	2400
	11⅞"	PWI 9011	661	7.60	10255	1925	1400	3355	2400
	14"	PWI 9014	965	8.96	12235	2125	1400	3355	2400
	16"	PWI 9016	1306	10.24	14020	2330	1400	3355	2400
	18"	PWI 9018	1703	11.52	15780	2535	1400	3355	1800
	20"	PWI 9020	2155	12.80	17520	2740	1400	3355	1800
	22"	PWI 9022	2664	14.08	19245	2935	2400 [9]	4605 [9]	1300
	24"	PWI 9024	3232	15.36	20955	3060	2400 [9]	4605 [9]	1300

1. Values apply to normal load duration. All values except EI, k and Vertical Load may be adjusted for other load durations as permitted by the code.
2. Bending stiffness (EI).
3. Coefficient of shear deflection (k). Use Equations 1 or 2 to calculate uniform load or center point load deflections in a simple-span application.

Uniform Load:

$$[1]\ \delta = \frac{5wl^4}{384EI} + \frac{wl^2}{k}$$

Center Point Load:

$$[2]\ \delta = \frac{Pl^3}{48EI} + \frac{2Pl}{k}$$

Where:

δ = calculated deflection [in]
w = uniform load [lb/in]
l = design span [in]
P = concentrated load [lb]
EI = bending stiffness of the I-joist [lb-in^2]
k = coefficient of shear deflection [lb]

4. Moment capacity (M). The tabulated values shall not be increased by any code-allowed repetitive member factor.
5. Shear capacity (V).
6. End reaction capacity (ER) of the I-joist without web stiffeners and a minimum bearing length of 1¾ inches.
7. Intermediate reaction capacity (IR) of the I-joist without web stiffeners and a minimum bearing length of 3½ inches.
8. Blocking panel and rim joist vertical load capacity.
9. Web stiffeners required. See *Web Stiffener Requirements* on page 10.

FLOOR SPANS

ALLOWABLE RESIDENTIAL FLOOR SPANS—40 PSF LIVE LOAD AND 20 PSF DEAD LOAD

Joist Series	Joist Depth	Simple Spans				Multiple Spans				Simple *or* Multiple Spans			
		12″ o.c.	16″ o.c.	19.2″ o.c.	24″ o.c.	12″ o.c.	16″ o.c.	19.2″ o.c.	24″ o.c.	12″ o.c.	16″ o.c.	19.2″ o.c.	24″ o.c.
PWI 47	9½″	18′–4″	16′–9″	15′–9″	14′–5″	20′–5″	18′–0″	15′–3″	12′–2″	18′–4″	16′–9″	15′–3″	12′–2″
	11⅞″	21′–8″	19′–10″	18′–3″	14′–7″	23′–8″	19′–0″	15′–10″	12′–7″	21′–8″	19′–0″	15′–10″	12′–7″
	14″	24′–6″	22′–4″	18′–7″	14′–10″	25′–9″	19′–8″	16′–4″	13′–0″	24′–6″	19′–8″	16′–4″	13′–0″
	16″	27′–2″	22′–7″	18′–9″	15′–0″	27′–2″	20′–4″	16′–11″	13′–6″	27′–2″	20′–4″	16′–11″	13′–6″
PWI 70	11⅞″	23′–4″	21′–3″	20′–1″	18′–8″	25′–11″	23′–8″	20′–3″	16′–2″	23′–4″	21′–3″	20′–1″	16′–2″
	14″	26′–5″	24′–1″	22′–9″	19′–2″	29′–6″	24′–4″	20′–3″	16′–2″	26′–5″	24′–1″	20′–3″	16′–2″
	16″	29′–3″	26′–8″	24′–0″	19′–2″	32′–6″	24′–4″	20′–3″	16′–2″	29′–3″	24′–4″	20′–3″	16′–2″
	18″	32′–0″	28′–10″	24′–0″	19′–2″	32′–6″	24′–4″	20′–3″	16′–2″	32′–0″	24′–4″	20′–3″	16′–2″
	20″	34′–8″	28′–10″	24′–0″	19′–2″	32′–6″	24′–4″	20′–3″	16′–2″	32′–6″	24′–4″	20′–3″	16′–2″
PWI 90	9½″	22′–3″	20′–3″	19′–1″	17′–9″	24′–9″	22′–6″	21′–3″	18′–10″	22′–3″	20′–3″	19′–1″	17′–9″
	11⅞″	26′–5″	24′–1″	22′–8″	21′–2″	29′–6″	26′–10″	25′–3″	22′–1″	26′–5″	24′–1″	22′–8″	21′–2″
	14″	30′–0″	27′–4″	25′–9″	23′–2″	33′–5″	30′–5″	27′–8″	22′–1″	30′–0″	27′–4″	25′–9″	22′–1″
	16″	33′–2″	30′–3″	28′–6″	23′–2″	37′–0″	33′–3″	27′–8″	22′–1″	33′–2″	30′–3″	27′–8″	22′–1″
	18″	36′–3″	33′–0″	29′–0″	23′–2″	40′–6″	33′–3″	27′–8″	22′–1″	36′–3″	33′–0″	27′–8″	22′–1″
	20″	39′–3″	34′–10″	29′–0″	23′–2″	43′–9″	33′–3″	27′–8″	22′–1″	39′–3″	33′–3″	27′–8″	22′–1″
	22″	42′–1″	38′–4″	36′–2″	33′–8″	47′–0″	42′–9″	38′–1″	30′–5″	42′–1″	38′–4″	36′–2″	30′–5″
	24″	44′–11″	40′–11″	38′–7″	35′–11″	50′–2″	45′–6″	38′–1″	30′–5″	44′–11″	40′–11″	38′–1″	30′–5″

Notes:

1. Table values apply to uniformly loaded, residential floor joists.
2. Span is measured from face to face of supports.
3. Deflection is limited to L/240 at total load and L/480 at live load.
4. Table values are based on glued and nailed sheathing panels (23/32″ for 24″ o.c., 19/32″ otherwise). Use an ASTM D3498 adhesive in accordance with the manufacturer's recommendations. Reduce spans by 12″ if sheathing is nailed only.
5. Provide at least 1¾″ of bearing length at end supports and 3½″ at intermediate supports.
6. Provide lateral restraint at supports (e.g. blocking panels, rim board) and along the compression flange of each joist (e.g. floor sheathing, gypsum board ceiling).
7. Use sizing software or consult a professional engineer to analyze conditions outside the scope of this table (e.g. commercial floors, different bearing conditions, concentrated loads) or for multiple span joists if the length of any span is less than half the length of an adjacent span.
8. **Web stiffeners are required at all supports for 22″ and 24″ joists. See *Web Stiffener Requirements* on page 10 for more details.**

HOW TO USE FLOOR SPAN TABLES

1. Choose the appropriate live and dead load combination as well as a joist spacing.
2. Scan down the spacing column to find a span that exceeds the design span.
3. Scan to the left from that span to determine the joist size required.

FLOOR LOADS

SIMPLE-SPAN JOIST—ALLOWABLE UNIFORM FLOOR LOAD (PLF)

Joist Span (ft)	PWI 47								PWI 70									
	9½″		11⅞″		14″		16″		11⅞″		14″		16″		18″		20″	
	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%
6	-	292	-	295	-	300	-	303	-	387	-	387	-	387	-	387	-	387
7	-	250	-	253	-	257	-	260	-	331	-	331	-	331	-	331	-	331
8	-	219	-	221	-	225	-	228	-	290	-	290	-	290	-	290	-	290
9	-	194	-	197	-	200	-	202	-	258	-	258	-	258	-	258	-	258
10	-	175	-	177	-	180	-	182	-	232	-	232	-	232	-	232	-	232
11	145	159	-	161	-	164	-	165	-	211	-	211	-	211	-	211	-	211
12	115	146	-	148	-	150	-	152	-	193	-	193	-	193	-	193	-	193
13	92	135	-	136	-	138	-	140	-	178	-	178	-	178	-	178	-	178
14	75	125	121	126	-	129	-	130	149	166	-	166	-	166	-	166	-	166
15	62	117	100	118	-	120	-	121	124	155	-	155	-	155	-	155	-	155
16	51	103	84	111	-	113	-	114	104	145	-	145	-	145	-	145	-	145
17			71	104	100	106	-	107	88	136	125	136	-	136	-	136	-	136
18			60	98	85	100	-	101	75	129	107	129	-	129	-	129	-	129
19			51	93	73	95	-	96	64	122	92	122	-	122	-	122	-	122
20			44	86	64	90	84	91	56	112	80	116	106	116	-	116	-	116
21					55	86	74	87			70	110	93	110	-	110	-	110
22					48	82	65	83			61	105	82	105	105	105	-	105
23					43	77	57	79			54	101	72	101	93	101	-	101
24					38	70	50	76			48	96	64	97	82	97	-	97
25							45	73					57	93	73	93	92	93
26							40	69					51	89	66	89	82	89
27							36	64					46	86	59	86	74	86
28							32	59					41	82	53	83	67	83
29															48	80	61	80
30															44	77	55	77
31															40	75	50	75
32																	46	73
33																	42	70
34																	38	68
35																	35	66
36																		
37																		
38																		
39																		
40																		
41																		
42																		

Notes:

1. Table values apply to uniformly loaded floor joists.
2. Span is measured to the center of each support.
3. The values in the Total columns are based on an L/240 total load deflection limit. Building codes typically require L/360 for live load. Experience has shown that a live load deflection limit of L/480 at 40 psf for residential floors does a better job than L/360 of meeting most performance expectations.
4. Table values do not account for stiffness added by glued or nailed sheathing.
5. Provide at least 1¾″ of bearing length at end supports and 3½″ at intermediate supports.
6. Provide lateral restraint at supports (e.g. blocking panels, rim board) and along the compression flange of each joist (e.g. floor sheathing, gypsum board ceiling).
7. Use sizing software or consult a professional engineer to analyze conditions outside the scope of this table (e.g. different bearing lengths, concentrated loads) or for multiple span joists if the length of any span is less than half the length of an adjacent span.

HOW TO USE FLOOR LOAD TABLES

1. Choose a joist spacing and convert the live and total design loads specified in pounds per square foot (psf) to joist loads in pounds per lineal foot (plf). Joist Spacing [ft] x Design Load [psf] = Joist Load [plf]

JOIST LOAD (PLF)

Joist Spacing		Design Load (psf)								
Inches	Feet	20	30	40	50	60	70	80	90	100
12	1	20	30	40	50	60	70	80	90	100
16	1.33	27	40	53	67	80	93	106	120	133
19.2	1.6	32	48	64	80	96	112	128	144	160
24	2	40	60	80	100	120	140	160	180	200

2. Choose a span and scan across the Span row to find a joist size with sufficient Live and Total load capacities. Both requirements must be satisfied. When no value is shown in a Live column, Total load governs.
3. Web stiffeners are required at all supports for 22″ and 24″ joists. See *Web Stiffener Requirements* on page 10 for more details.

FLOOR LOADS

SIMPLE-SPAN JOIST—ALLOWABLE UNIFORM FLOOR LOAD (PLF)

Joist Span (ft)	PWI 90															
	9½″		11⅞″		14″		16″		18″		20″		22″		24″	
	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%	Live L/480	Total 100%
6	-	467	-	467	-	467	-	467	-	467	-	467	-	800	-	800
7	-	400	-	400	-	400	-	400	-	400	-	400	-	686	-	686
8	-	350	-	350	-	350	-	350	-	350	-	350	-	600	-	600
9	-	311	-	311	-	311	-	311	-	311	-	311	-	533	-	533
10	-	280	-	280	-	280	-	280	-	280	-	280	-	480	-	480
11	255	255	-	255	-	255	-	255	-	255	-	255	-	436	-	436
12	203	233	-	233	-	233	-	233	-	233	-	233	-	400	-	400
13	165	215	-	215	-	215	-	215	-	215	-	215	-	369	-	369
14	135	200	-	200	-	200	-	200	-	200	-	200	-	343	-	343
15	112	187	180	187	-	187	-	187	-	187	-	187	-	320	-	320
16	94	175	152	175	-	175	-	175	-	175	-	175	-	300	-	300
17			129	165	-	165	-	165	-	165	-	165	-	282	-	282
18			110	156	-	156	-	156	-	156	-	156	-	267	-	267
19			95	147	135	147	-	147	-	147	-	147	-	253	-	253
20			82	140	117	140	-	140	-	140	-	140	-	240	-	240
21					102	133	-	133	-	133	-	133	-	229	-	229
22					90	127	119	127	-	127	-	127	-	218	-	218
23					79	122	106	122	-	122	-	122	204	209	-	209
24					71	117	94	117	-	117	-	117	182	200	-	200
25							84	112	108	112	-	112	163	192	-	192
26							75	108	96	108	-	108	147	185	175	185
27							67	104	87	104	-	104	132	178	158	178
28							61	100	78	100	98	100	119	171	143	171
29									71	97	89	97	108	166	130	166
30									64	93	81	93	99	160	118	160
31									59	90	74	90	90	155	108	155
32											67	88	82	150	99	150
33											62	85	75	141	91	145
34											57	82	69	133	83	141
35											52	80	64	126	77	137
36													59	118	71	129
37													54	109	66	122
38													50	101	61	116
39															56	110
40															52	105
41															49	98
42															46	91

Notes:

1. Table values apply to uniformly loaded floor joists.
2. Span is measured to the center of each support.
3. The values in the Total columns are based on an L/240 total load deflection limit. Building codes typically require L/360 for live load. Experience has shown that a live load deflection limit of L/480 at 40 psf for residential floors does a better job than L/360 of meeting most performance expectations.
4. Table values do not account for stiffness added by glued or nailed sheathing.
5. Provide at least 1¾″ of bearing length at end supports and 3½″ at intermediate supports.
6. Provide lateral restraint at supports (e.g. blocking panels, rim board) and along the compression flange of each joist (e.g. floor sheathing, gypsum board ceiling).
7. Use sizing software or consult a professional engineer to analyze conditions outside the scope of this table (e.g. different bearing lengths, concentrated loads) or for multiple span joists if the length of any span is less than half the length of an adjacent span.

PSF TO PLF CONVERSION – LOAD IN POUNDS PER LINEAL FOOT (PLF)

O.C. Spacing		Load in Pounds per Square Foot (psf)											
Inches	Feet	20	25	30	35	40	45	50	55	60	65	70	75
12	1.00	20	25	30	35	40	45	50	55	60	65	70	75
16	1.33	27	33	40	47	53	60	67	73	80	87	93	100
19.2	1.60	32	40	48	56	64	72	80	88	96	104	112	120
24	2.00	40	50	60	70	80	90	100	110	120	130	140	150

o.c. spacing (ft) x load (psf) = load (plf)

WEB STIFFENER REQUIREMENTS

Web stiffeners are pairs of small blocks, cut from panels or 2x4s, that are nailed to the joist web to stiffen a deep web, increase reaction capacity or accommodate a special connector. Web stiffeners are not required when joists are sized by means of the tables in this guide, with the following exceptions:

1. Web stiffeners are required at the ends of joists set in hangers that are not deep enough to laterally support the top flanges of the joists. Refer to the hanger manufacturer's installation instructions.
2. Web stiffeners are required to accommodate special connector nailing requirements. Refer to the connector manufacturer's installation instructions.
3. Web stiffeners are required at birdsmouth cuts at the low end supports of sloped joists.
4. Web stiffeners are required at all supports on 22- and 24-inch joists.

When joists are sized by means of sizing software, or otherwise engineered for an application, web stiffeners are required as follows:

1. Web stiffeners are required for high reactions at supports. Refer to an evaluation report.
2. Web stiffeners are required under concentrated loads applied to the tops of joists between supports, or along cantilevers beyond the support, when the concentrated load exceeds 1500 pounds.

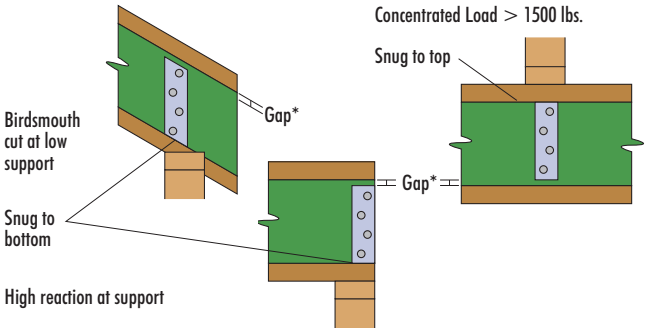
NUMBER OF WEB STIFFENER NAILS REQUIRED

Joist Depth	24″ & 20″	18″ & 16″	14″ & Less
All Other Conditions	10	6	4

WEB STIFFENER SIZE REQUIRED

Flange Width	Minimum Dimensions		
	Web Stiffeners		Nails
	Thickness	Width	
1½″	15/32″	2 5/16″	2½″ x 0.131″
1¾″	19/32″	2 5/16″	2½″ x 0.131″
2 1/16″	23/32″	2 5/16″	2½″ x 0.131″
2 5/16″	23/32″	2 5/16″	2½″ x 0.131″
2½″	23/32″	2 5/16″	2½″ x 0.131″
3½″	1½″	3½″	3¼″ x 0.131″

*Web stiffener length is approximately ⅛″ less than the clear distance between flanges.



WEB HOLE SPECIFICATIONS

DUCT HOLES

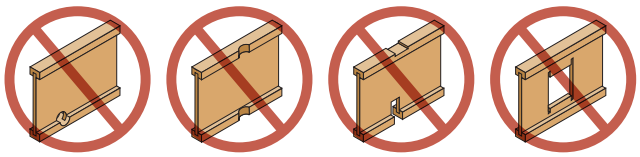
Minimum Distance 'D' From Any Support to the Centerline of the Hole

Joist Series	Joist Span (ft)	Duct Hole Width								
		8″	10″	12″	14″	16″	18″	20″	22″	24″
47	≤ 8	3′–9″	3′–10″	3′–11″	(2)					
	≤ 12	5′–7″	5′–9″	5′–11″	(2)					
	≤ 16	7′–6″	7′–8″	7′–10″	(2)					
	≤ 20	9′–4″	9′–7″	9′–10″	(2)					
70	≤ 8	3′–7″	3′–8″	3′–9″	3′–10″	(2)	(2)	(2)		
	≤ 12	5′–5″	5′–6″	5′–8″	5′–10″	(2)	(2)	(2)		
	≤ 16	7′–2″	7′–5″	7′–7″	7′–9″	(2)	(2)	(2)		
	≤ 20	9′–0″	9′–3″	9′–6″	9′–9″	(2)	(2)	(2)		
	≤ 24	10′–10″	11′–1″	11′–5″	11′–8″	(2)	(2)	(2)		
90 depths to 20″(3)	≤ 8	3′–8″	3′–9″	3′–10″	3′–11″	(2)	(2)	(2)	(2)	(2)
	≤ 12	5′–7″	5′–8″	5′–10″	5′–11″	(2)	(2)	(2)	(2)	(2)
	≤ 16	7′–5″	7′–7″	7′–9″	7′–11″	(2)	(2)	(2)	(2)	(2)
	≤ 20	9′–4″	9′–6″	9′–8″	9′–11″	(2)	(2)	(2)	(2)	(2)
	≤ 24	11′–2″	11′–5″	11′–8″	11′–10″	(2)	(2)	(2)	(2)	(2)

Notes:
(1) For other joist spans, use sizing software to locate the duct hole
(2) For this width, use sizing software to locate the duct hole
(3) For joist depths greater than 20 inches, use sizing software to locate duct holes

GENERAL NOTES

1. Table values apply to joists sized by means of the load or span tables in this publication. Use beam sizing software for a more precise analysis or to analyze conditions outside of the scope of these tables.
2. Web holes may be located anywhere between the joist flanges. Leave at least ⅛ inch clearance between the edges of holes and the flanges.
3. Do not cut rectangular holes, or round holes larger than 1½ inch diameter, in cantilevers.
4. The horizontal clearance between the edges of adjacent holes must be at least twice the diameter (or longest side) of the larger hole. Exception: A 1½ inch diameter hole may be drilled anywhere in the web. Provide at least 3 inches of horizontal clearance from adjacent holes of any size.
5. 1½ inch diameter holes are factory-scored in the web at 16 inches on center.

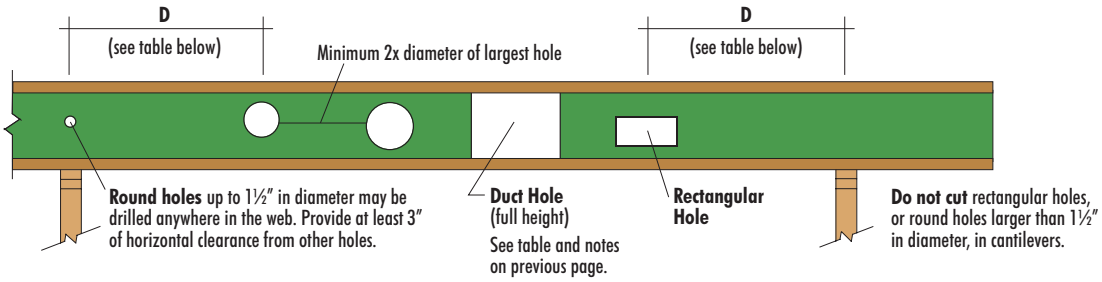


Never drill, cut or notch the flange, or over-cut the web.

Holes in webs should be cut with a sharp saw.

For rectangular holes, avoid over cutting the corners, as this can cause unnecessary stress concentrations. Slightly rounding the corners is recommended. Starting the rectangular hole by drilling a 1″ diameter hole in each of the 4 corners and then making the cuts between the holes is another good method to minimize damage to I-joists.

WEB HOLE SPECIFICATIONS



ROUND AND RECTANGULAR HOLES

Minimum Distance 'D' From Any Support to the Centerline of the Hole

		Round Hole Diameter	2"	3"	4"	5"	6"	6¼"	8⅝"	10"	10¾"	12"	12¾"	14¾"	16¾"
		Rectangular Hole Longest Side	1½"	2¼"	3"	3¾"	4½"	4⅝"	6⅜"	7½"	8"	9"	9½"	11"	12½"
9½" Joist	Span (ft)	8′	1′–1″	1′–7″	2′–1″	2′–8″	3′–2″	3′–4″							
		12′	1′–7″	2′–4″	3′–2″	3′–11″	4′–9″	5′–0″							
		16′	2′–1″	3′–2″	4′–3″	5′–3″	6′–4″	6′–8″							
11⅞" Joist	Span (ft)	8′	1′–1″	1′–2″	1′–2″	1′–8″	2′–2″	2′–3″	3′–6″						
		12′	1′–1″	1′–2″	1′–10″	2′–6″	3′–3″	3′–5″	5′–3″						
		16′	1′–1″	1′–5″	2′–5″	3′–4″	4′–4″	4′–7″	7′–0″						
		20′	1′–1″	1′–9″	3′–0″	4′–2″	5′–5″	5′–8″	8′–10″						
14" Joist	Span (ft)	12′	1′–1″	1′–2″	1′–2″	1′–5″	2′–1″	2′–3″	3′–10″	4′–10″	5′–5″				
		16′	1′–1″	1′–2″	1′–2″	1′–10″	2′–9″	3′–0″	5′–2″	6′–5″	7′–3″				
		20′	1′–1″	1′–2″	1′–2″	2′–4″	3′–5″	3′–9″	6′–5″	8′–0″	9′–1″				
		24′	1′–1″	1′–2″	1′–5″	2′–9″	4′–2″	4′–6″	7′–8″	9′–7″	10′–11″				
16" Joist	Span (ft)	16′	1′–1″	1′–2″	1′–2″	1′–3″	1′–4″	1′–6″	3′–7″	4′–9″	5′–5″	6′–7″	7′–5″		
		20′	1′–1″	1′–2″	1′–2″	1′–3″	1′–8″	1′–11″	4′–6″	6′–0″	6′–10″	8′–3″	9′–4″		
		24′	1′–1″	1′–2″	1′–2″	1′–3″	2′–0″	2′–4″	5′–5″	7′–2″	8′–2″	9′–11″	11′–2″		
		28′	1′–1″	1′–2″	1′–2″	1′–3″	2′–4″	2′–8″	6′–4″	8′–5″	9′–6″	11′–7″	13′–0″		
18" Joist	Span (ft)	16′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	2′–2″	3′–3″	3′–11″	5′–0″	5′–7″	7′–7″	
		20′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	2′–8″	4′–1″	4′–11″	6′–2″	7′–0″	9′–6″	
		24′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	3′–2″	4′–11″	5′–10″	7′–5″	8′–5″	11′–5″	
		28′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	3′–9″	5′–9″	6′–10″	8′–8″	9′–9″	13′–4″	
20" Joist	Span (ft)	16′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	1′–4″	1′–10″	2′–5″	3′–6″	4′–1″	5′–9″	7′–9″
		20′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	1′–4″	2′–3″	3′–1″	4′–4″	5′–1″	7′–2″	9′–9″
		24′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	1′–4″	2′–9″	3′–8″	5′–2″	6′–1″	8′–7″	11′–8″
		28′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	1′–4″	3′–2″	4′–3″	6′–1″	7′–2″	10′–0″	13′–7″
22" Joist	Span (ft)	16′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	2′–7″	3′–4″	3′–9″	4′–5″	4′–10″	6′–0″	7′–1″
		20′	1′–1″	1′–2″	1′–2″	1′–3″	1′–5″	1′–7″	3′–2″	4′–2″	4′–8″	5′–7″	6′–1″	7′–6″	8′–10″
		24′	1′–1″	1′–2″	1′–2″	1′–3″	1′–8″	1′–10″	3′–10″	5′–0″	5′–7″	6′–8″	7′–3″	8′–11″	10′–7″
		28′	1′–1″	1′–2″	1′–2″	1′–3″	1′–11″	2′–2″	4′–6″	5′–10″	6′–7″	7′–9″	8′–6″	10′–5″	12′–5″
24" Joist	Span (ft)	16′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	1′–10″	2′–7″	3′–0″	3′–8″	4′–0″	5′–1″	6′–2″
		20′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	2′–3″	3′–2″	3′–8″	4′–6″	5′–0″	6′–4″	7′–8″
		24′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	2′–9″	3′–10″	4′–5″	5′–5″	6′–0″	7′–8″	9′–3″
		28′	1′–1″	1′–2″	1′–2″	1′–3″	1′–3″	1′–3″	3′–2″	4′–6″	5′–2″	6′–4″	7′–0″	8′–11″	10′–9″

See **General Notes** below

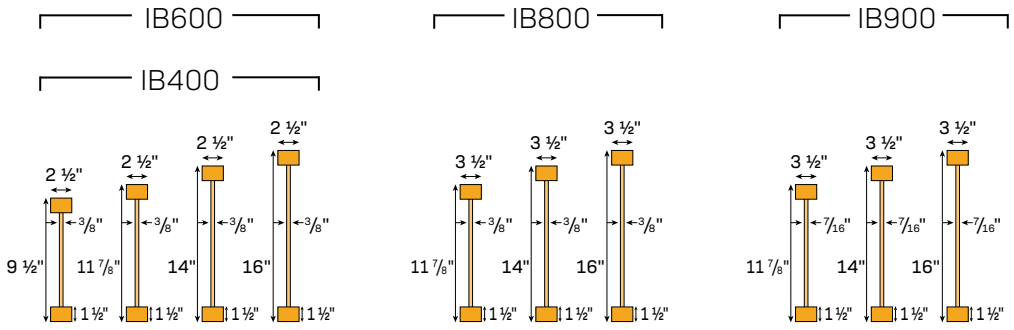
GENERAL NOTES

1. Table values apply to joists sized by means of the load or span tables in this publication. Use beam sizing software for a more precise analysis or to analyze conditions outside of the scope of these tables.
2. Web holes may be located anywhere between the joist flanges. Leave at least ⅛ inch clearance between the edges of holes and the flanges.
3. Do not cut rectangular holes, or round holes larger than 1½ inch diameter, in cantilevers.
4. The horizontal clearance between the edges of adjacent holes must be at least twice the diameter (or longest side) of the larger hole. Exception: A 1½ inch diameter hole may be drilled anywhere in the web. Provide at least 3 inches of horizontal clearance from adjacent holes of any size.
5. 1½ inch diameter holes are factory-scored in the web at 16 inches on center.

IB MAX-CORE I-JOIST TABLE

TABLE IBU-EP1

Engineering Properties of IB400, IB600, IB800 and IB900 Series Depth I-Joists (US Allowable Stress Design)(*1)



Series	Joist Depth	Bending Stiffness(*2) EI joist (x10⁶ lbf-in²)	Moment(*3) M (ft-lbf)	Shear(*4) V (lbf)	Shear Deflection Factor(*5) K (x10⁶ lbf)	I-Joist Self-Weight (plf)
IB400	9 ½"	198	2800	1185	4.94	2.6
	11 7/8"	336	3630	1480	6.18	2.9
	14"	494	4370	1750	7.28	3.1
	16"	673	5065	2000	8.32	3.3
IB600	9 ½"	235	3860	1370	4.94	2.6
	11 7/8"	399	5000	1570	6.18	2.9
	14"	585	6020	1750	7.28	3.1
	16"	799	6980	2000	8.32	3.3
IB800	11 7/8"	552	7,080	1,585	6.18	3.7
	14"	807	8,530	1,750	7.28	3.9
	16"	1,094	9,890	2,000	8.32	4.1
IB900	11 7/8"	604	8,825	1,925	6.18	3.9
	14"	884	10,630	2,125	7.28	4.1
	16"	1,199	12,635	2,330	8.32	4.3

NOTES:

1. Design values were developed in accordance with NDS, "National Design Specification for Wood Construction" for standard term load duration (CD=1). All values, except EI and K, are permitted to be adjusted for other load durations as permitted by NDS.
2. Bending stiffness (EI) of the I-joist.
3. Moment capacity (M) shall not be increased by any Code-allowed system factor.
4. Shear capacity (V) of the I-joist with a minimum end bearing of 4 inches with web stiffeners. I-joists without web stiffeners and reaction-limited smaller bearings may have lower capacities. See tables IBU-ER1 and IBU-IR1 for web stiffener requirements which vary by depth and series.
5. Shear deflection factor (K), which shall be used to calculate uniform load and center-point load deflections of the I-joist in a simple span application based on equations #1 and #2 to the right.
6. For information relating to the use of IB products in Canada, refer to our Canadian literature.

PWLVL PRODUCT SUMMARY

1¾" PWLVL REFERENCE DESIGN VALUES

Depth (in)	1.5E PWLVL							2.0E PWLVL						
	Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)			EI (x 10^6 lb-in^2)	Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)			EI (x 10^6 lb-in^2)
	100%	115%	125%	100%	115%	125%		100%	115%	125%	100%	115%	125%	
3½	939	1080	1174	857	986	1071	9	1164	1338	1455	1181	1358	1476	13
5½	1476	1697	1845	1934	2224	2417	36	1829	2103	2286	2664	3064	3330	49
7¼	1945	2237	2432	3179	3656	3974	83	2411	2772	3013	4380	5037	5475	111
9¼	2482	2854	3103	4929	5669	6162	173	3076	3537	3845	6791	7810	8489	231
9½	2549	2932	3186	5172	5947	6465	188	3159	3633	3948	7125	8194	8907	250
11¼	3019	3472	3773	7011	8063	8764	311	3741	4302	4676	9660	11109	12075	415
11⅞	3186	3664	3983	7728	8887	9660	366	3948	4541	4936	10647	12245	13309	488
14	3757	4320	4696	10393	11952	12992	600	4655	5353	5819	14320	16468	17900	800
16	4293	4937	5367	13217	15200	16522	896	5320	6118	6650	18210	20942	22763	1195
18	4830	5555	6038	16339	18789	20423	1276	5985	6883	7481	22511	25888	28139	1701
20	5367	6172	6708	19751	22713	24688	1750	6650	7648	8313	27212	31294	34015	2333
22	5903	6789	7379	23447	26964	29309	2329	7315	8412	9144	32305	37150	40381	3106
24	6406	7367	8008	27166	31241	33957	2977	7938	9129	9923	37428	43043	46786	3969

3½" PWLVL REFERENCE DESIGN VALUES

Depth (in)	2.0E PWLVL						
	Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)			EI (x 10^6 lb-in^2)
	100%	115%	125%	100%	115%	125%	
3½	2328	2677	2909	2362	2716	2952	25
5½	3658	4206	4572	5328	6128	6660	97
7¼	4821	5544	6027	8761	10075	10951	222
9¼	6151	7074	7689	13583	15620	16978	462
9½	6318	7265	7897	14251	16388	17813	500
11¼	7481	8603	9352	19320	22218	24150	831
11⅞	7897	9081	9871	21295	24489	26619	977
14	9310	10707	11638	28639	32935	35799	1601
16	10640	12236	13300	36421	41884	45526	2389
18	11970	13766	14963	45022	51775	56277	3402
20	13300	15295	16625	54424	62587	68030	4667
22	14630	16825	18288	64609	74301	80761	6211
24	15877	18258	19846	74857	86085	93571	7939

5¼" PWLVL REFERENCE DESIGN VALUES

Depth (in)	2.0E PWLVL						
	Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)			EI (x 10^6 lb-in^2)
	100%	115%	125%	100%	115%	125%	
5½	5486	6309	6858	7992	9191	9991	146
7¼	7232	8317	9040	13141	15112	16426	333
9¼	9227	10611	11534	20374	23430	25468	693
9½	9476	10898	11845	21376	24582	26720	750
11¼	11222	12905	14027	28980	33327	36225	1246
11⅞	11845	13622	14807	31942	36734	39928	1465
14	13965	16060	17456	42959	49403	53699	2401
16	15960	18354	19950	54631	62826	68289	3584
18	17955	20648	22444	67533	77663	84416	5103
20	19950	22943	24938	81635	93881	102044	7000
22	21945	25237	27431	96914	111451	121142	9317
24	23815	27388	29769	112285	129128	140357	11908

7" PWLVL REFERENCE DESIGN VALUES

Depth (in)	2.0E PWLVL						
	Maximum Vertical Shear (lb)			Maximum Bending Moment (ft-lb)			EI (x 10^6 lb-in^2)
	100%	115%	125%	100%	115%	125%	
7¼	9643	11089	12053	17522	20150	21902	445
9¼	12303	14148	15378	27166	31240	33957	923
9½	12635	14530	15794	28501	32777	35627	1000
11¼	14963	17207	18703	38640	44436	48300	1661
11⅞	15794	18163	19742	42590	48978	53237	1954
14	18620	21413	23275	57279	65871	71599	3201
16	21280	24472	26600	72842	83768	91052	4779
18	23940	27531	29925	90044	103550	112555	6804
20	26600	30590	33250	108847	125174	136059	9333
22	29260	33649	36575	129218	148601	161523	12423
24	31754	36517	39692	149714	172171	187142	15877

AVAILABLE SIZES (INCHES)

1.5E AND 2.0E PWLVL		2.0E PWLVL		
1½"	1¾"	3½"	5¼"	7"
3½	3½	3½	–	–
5½	5½	5½	5½	–
7¼	7¼	7¼	7¼	7¼
9¼	9¼	9¼	9¼	9¼
9½	9½	9½	9½	9½
11¼	11¼	11¼	11¼	11¼
11⅞	11⅞	11⅞	11⅞	11⅞
14	14	14	14	14
16	16	16	16	16
18	18	18	18	18
20	20	20	20	20
22	22	22	22	22
24	24	24	24	24

EQUIVALENT SPECIFIC GRAVITY FOR FASTENER DESIGN

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

1.5E PWLVL REFERENCE DESIGN VALUES[1]

Modulus of Elasticity E =	1500000 psi[2]
Bending (beam) F_b =	2250 psi[3][4]
Horizontal Shear (beam) F_v =	230 psi
Compression Perpendicular to Grain (beam) $F_{c\perp}$ =	750 psi[2]

2.0E PWLVL REFERENCE DESIGN VALUES[1]

Modulus of Elasticity E =	2000000 psi[2]
Bending (beam) F_b =	3100 psi[3][4]
Horizontal Shear (beam) F_v =	285 psi
Compression Perpendicular to Grain (beam) $F_{c\perp}$ =	850 psi[2]

(1) Values apply to dry service conditions

(2) Do not adjust for load duration

(3) Adjust by $(12/d)^{1/5}$, where d is the depth of the member [inches]

(4) Adjust by 1.04 for repetitive members as defined in the *ANSI/AWC NDS*

For information about Pacific Woodtech's LVL products, please scan this code.

ONE-PLY 1¾" 2.0E BEAM
ALLOWABLE UNIFORM FLOOR LOADS–100%

ALLOWABLE UNIFORM LOADS* – POUNDS PER LINEAL FOOT – 1¾" 2.0E PWLVL **ONE-PLY x 1¾" 2.0E PWLVL**

Span (ft)	Key	3½"	5½"	7¼"	9¼"	9½"	11¼"	11⅞"	14"
6	LL	86	333	762	-	-	-	-	-
	TL	127	497	763	1028	1063	1325	1425	1796
	BRG	1.5 / 3	1.5 / 3	1.5 / 3.9	2.1 / 5.2	2.2 / 5.4	2.7 / 6.7	2.9 / 7.2	3.6 / 9.1
7	LL	54	210	480	-	-	-	-	-
	TL	71	278	636	849	877	1083	1161	1445
	BRG	1.5 / 3	1.5 / 3	1.5 / 3.8	2 / 5	2.1 / 5.2	2.6 / 6.4	2.7 / 6.9	3.4 / 8.5
8	LL		140	322	668	724	-	-	-
	TL		162	374	723	746	916	979	1208
	BRG		1.5 / 3	1.5 / 3	2 / 4.9	2 / 5	2.5 / 6.2	2.6 / 6.6	3.3 / 8.2
9	LL		99	226	469	508	-	-	-
	TL		100	232	629	649	793	846	1038
	BRG		1.5 / 3	1.5 / 3	1.9 / 4.8	2 / 4.9	2.4 / 6	2.6 / 6.4	3.2 / 7.9
10	LL		-	-	342	370	615	724	-
	TL		65	151	509	551	699	745	909
	BRG		1.5 / 3	1.5 / 3	1.7 / 4.3	1.9 / 4.7	2.4 / 5.9	2.5 / 6.3	3.1 / 7.7
11	LL		-	-	257	278	462	544	-
	TL		44	102	381	413	625	665	809
	BRG		1.5 / 3	1.5 / 3	1.5 / 3.6	1.5 / 3.9	2.3 / 5.8	2.5 / 6.2	3 / 7.5
12	LL			-	198	214	356	419	686
	TL			71	293	317	529	586	729
	BRG			1.5 / 3	1.5 / 3	1.5 / 3.2	2.2 / 5.4	2.4 / 6	3 / 7.4
13	LL			-	156	169	280	329	540
	TL			51	229	249	415	489	663
	BRG			1.5 / 3	1.5 / 3	1.5 / 3	1.8 / 4.6	2.2 / 5.4	2.9 / 7.3
14	LL			-	125	135	224	264	432
	TL			37	183	198	331	390	578
	BRG			1.5 / 3	1.5 / 3	1.5 / 3	1.6 / 4	1.9 / 4.7	2.8 / 6.9
15	LL				101	110	182	214	351
	TL				148	160	268	316	503
	BRG				1.5 / 3	1.5 / 3	1.5 / 3.4	1.6 / 4.1	2.6 / 6.4
16	LL				83	90	150	177	289
	TL				121	131	220	260	428
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3.6	2.3 / 5.8
17	LL				70	75	125	147	241
	TL				100	109	183	216	356
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3.2	2.1 / 5.2
18	LL				59	64	105	124	203
	TL				84	91	153	181	299
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3	1.8 / 4.6
19	LL					54	90	105	173
	TL					77	129	153	253
	BRG					1.5 / 3	1.5 / 3	1.5 / 3	1.7 / 4.1
20	LL						77	90	148
	TL						110	130	216
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.7
21	LL						66	78	128
	TL						95	112	186
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.4
22	LL						58	68	111
	TL						82	97	161
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.1
23	LL							59	97
	TL							84	140
	BRG							1.5 / 3	1.5 / 3
24	LL								86
	TL								122
	BRG								1.5 / 3
25	LL								76
	TL								107
	BRG								1.5 / 3
26	LL								67
	TL								95
	BRG								1.5 / 3
27	LL								60
	TL								84
	BRG								1.5 / 3
28	LL								54
	TL								75
	BRG								1.5 / 3
29	LL								
	TL								
	BRG								
30	LL								
	TL								
	BRG								

* Can be applied to the beam in addition to its own weight.
Simple or multiple beam spans.

2 plies minimum for depths greater than 14 inches.

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 850 psi.

TWO-PLY 1¾" (OR 3½") 2.0E BEAM
ALLOWABLE UNIFORM FLOOR LOADS–100%

ALLOWABLE UNIFORM LOADS* – POUNDS PER LINEAL FOOT – 1¾" 2.0E PWLVL **TWO-PLY x 1¾" 2.0E PWLVL (or 3½")**

Span (ft)	Key	3½"	5½"	7¼"	9¼"	9½"	11¼"	11⅞"	14"	16"	18"	20"	22"	24"
6	LL	172	666	1525	-	-	-	-	-	-	-	-	-	-
	TL	254	993	1526	2056	2127	2650	2850	3591	4388	5304	6366	7613	8997
	BRG	1.5 / 3	1.5 / 3	1.5 / 3.9	2.1 / 5.2	2.2 / 5.4	2.7 / 6.7	2.9 / 7.2	3.6 / 9.1	4.4 / 11.1	5.4 / 13.4	6.4 / 16.1	7.7 / 19.2	9.1 / 22.7
7	LL	108	419	960	-	-	-	-	-	-	-	-	-	-
	TL	141	556	1272	1698	1754	2166	2322	2889	3484	4147	4893	5736	6634
	BRG	1.5 / 3	1.5 / 3	1.5 / 3.8	2 / 5	2.1 / 5.2	2.6 / 6.4	2.7 / 6.9	3.4 / 8.5	4.1 / 10.3	4.9 / 12.2	5.8 / 14.4	6.8 / 16.9	7.8 / 19.6
8	LL		281	643	1336	1447	-	-	-	-	-	-	-	-
	TL		324	747	1446	1493	1831	1958	2416	2887	3404	3972	4600	5252
	BRG		1.5 / 3	1.5 / 3	2 / 4.9	2 / 5	2.5 / 6.2	2.6 / 6.6	3.3 / 8.2	3.9 / 9.8	4.6 / 11.5	5.4 / 13.4	6.2 / 15.5	7.1 / 17.7
9	LL		197	452	938	1016	-	-	-	-	-	-	-	-
	TL		200	464	1259	1298	1586	1693	2075	2465	2885	3342	3838	4346
	BRG		1.5 / 3	1.5 / 3	1.9 / 4.8	2 / 4.9	2.4 / 6	2.6 / 6.4	3.2 / 7.9	3.8 / 9.4	4.4 / 11	5.1 / 12.7	5.8 / 14.6	6.6 / 16.5
10	LL		-	-	684	741	1230	1447	-	-	-	-	-	-
	TL		130	302	1018	1103	1398	1490	1819	2150	2504	2884	3292	3705
	BRG		1.5 / 3	1.5 / 3	1.7 / 4.3	1.9 / 4.7	2.4 / 5.9	2.5 / 6.3	3.1 / 7.7	3.6 / 9.1	4.2 / 10.6	4.9 / 12.2	5.6 / 13.9	6.3 / 15.7
11	LL		-	-	514	557	924	1087	-	-	-	-	-	-
	TL		87	204	762	826	1250	1331	1618	1905	2211	2535	2882	3228
	BRG		1.5 / 3	1.5 / 3	1.5 / 3.6	1.5 / 3.9	2.3 / 5.8	2.5 / 6.2	3 / 7.5	3.5 / 8.9	4.1 / 10.3	4.7 / 11.8	5.4 / 13.4	6 / 15
12	LL			-	396	429	712	837	1372	-	-	-	-	-
	TL			142	585	635	1058	1172	1457	1711	1979	2262	2562	2860
	BRG			1.5 / 3	1.5 / 3	1.5 / 3.2	2.2 / 5.4	2.4 / 6	3 / 7.4	3.5 / 8.7	4 / 10.1	4.6 / 11.5	5.2 / 13	5.8 / 14.5
13	LL			-	311	337	560	659	1079	-	-	-	-	-
	TL			102	459	497	830	977	1325	1552	1790	2041	2305	2566
	BRG			1.5 / 3	1.5 / 3	1.5 / 3	1.8 / 4.6	2.2 / 5.4	2.9 / 7.3	3.4 / 8.6	3.9 / 9.9	4.5 / 11.2	5.1 / 12.7	5.7 / 14.1
14	LL			-	249	270	448	527	864	1290	-	-	-	-
	TL			74	365	396	662	780	1156	1420	1635	1859	2095	2327
	BRG			1.5 / 3	1.5 / 3	1.5 / 3	1.6 / 4	1.9 / 4.7	2.8 / 6.9	3.4 / 8.4	3.9 / 9.7	4.4 / 11	5 / 12.4	5.5 / 13.8
15	LL				203	220	365	429	703	1049	1493	-	-	-
	TL				296	321	537	632	1006	1280	1504	1707	1920	2128
	BRG				1.5 / 3	1.5 / 3	1.5 / 3.4	1.6 / 4.1	2.6 / 6.4	3.3 / 8.2	3.8 / 9.6	4.3 / 10.9	4.9 / 12.2	5.4 / 13.5
16	LL				167	181	300	353	579	864	1230	-	-	-
	TL				242	263	440	519	856	1124	1391	1578	1771	1960
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3.6	2.3 / 5.8	3.1 / 7.7	3.8 / 9.5	4.3 / 10.7	4.8 / 12	5.3 / 13.3
17	LL				139	151	250	295	483	720	1026	1407	-	-
	TL				200	218	365	431	711	994	1230	1466	1644	1817
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3.2	2.1 / 5.2	2.9 / 7.2	3.6 / 8.9	4.2 / 10.6	4.8 / 11.9	5.3 / 13.1
18	LL				117	127	211	248	407	607	864	1185	-	-
	TL				168	182	306	361	597	885	1095	1326	1534	1693
	BRG				1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3	1.8 / 4.6	2.7 / 6.8	3.4 / 8.4	4.1 / 10.2	4.7 / 11.8	5.2 / 13
19	LL					108	179	211	346	516	735	1008	1342	-
	TL					153	259	306	506	760	981	1188	1412	1584
	BRG					1.5 / 3	1.5 / 3	1.5 / 3	1.7 / 4.1	2.5 / 6.2	3.2 / 8	3.9 / 9.6	4.6 / 11.4	5.1 / 12.8
20	LL						154	181	296	442	630	864	1150	1470
	TL						220	261	432	649	884	1070	1272	1475
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.7	2.2 / 5.6	3 / 7.6	3.7 / 9.1	4.3 / 10.9	5 / 12.6
21	LL						133	156	256	382	544	747	994	1270
	TL						189	224	371	559	800	969	1152	1336
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.4	2 / 5.1	2.9 / 7.2	3.5 / 8.7	4.1 / 10.3	4.8 / 12
22	LL						116	136	223	332	473	649	864	1105
	TL						163	193	321	484	694	881	1048	1216
	BRG						1.5 / 3	1.5 / 3	1.5 / 3.1	1.8 / 4.6	2.6 / 6.6	3.3 / 8.3	3.9 / 9.9	4.6 / 11.4
23	LL							119	195	291	414	568	756	967
	TL							168	280	422	605	805	957	1110
	BRG							1.5 / 3	1.5 / 3	1.7 / 4.2	2.4 / 6	3.2 / 8	3.8 / 9.4	4.4 / 10.9
24	LL								172	256	365	500	666	851
	TL								245	370	530	732	877	1018
	BRG								1.5 / 3	1.5 / 3.9	2.2 / 5.5	3 / 7.6	3.6 / 9	4.2 / 10.5
25	LL								152	227	323	442	589	753
	TL								215	325	467	646	807	936
	BRG								1.5 / 3	1.5 / 3.6	2 / 5.1	2.8 / 7	3.5 / 8.7	4 / 10.1
26	LL								135	201	287	393	524	669
	TL								190	288	414	572	745	864
	BRG								1.5 / 3	1.5 / 3.3	1.9 / 4.7	2.6 / 6.4	3.3 / 8.4	3.9 / 9.7
27	LL								120	180	256	351	468	598
	TL								168	255	368	509	681	800
	BRG								1.5 / 3	1.5 / 3.1	1.7 / 4.4	2.4 / 6	3.2 / 8	3.7 / 9.3
28	LL								108	161	230	315	419	536
	TL								149	227	328	454	609	742
	BRG								1.5 / 3	1.5 / 3	1.6 / 4.1	2.2 / 5.6	3 / 7.4	3.6 / 9
29	LL									145	207	283	377	482
	TL									203	294	407	546	690
	BRG									1.5 / 3	1.5 / 3.8	2.1 / 5.2	2.8 / 6.9	3.5 / 8.7
30	LL									131	187	256	341	436
	TL									182	264	366	491	632
	BRG									1.5 / 3	1.5 / 3.5	1.9 / 4.8	2.6 / 6.4	3.3 / 8.2

* Can be applied to the beam in addition to its own weight. Simple or multiple beam spans.

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 850 psi.

1.5E PWLVL RIM BOARD

1.5E PWLVL Rim Board Reference Design Values[1]

Horizontal Load	=	200 plf[2] Fasten to the wall plate with 8d box or common nails at 6″ o.c. Value applies to a ten minute wind or earthquake load duration ($C_D = 1.60$)
Vertical Load	=	3450 plf[2]
½″ Diameter Lag Screw or Bolt Lateral Load	=	350 lb[3]

1.5E PWLVL Reference Design Values[1]

Modulus of Elasticity E	=	1,500,000 psi[2]
Bending (beam) F_b	=	2,250 psi[3] May be adjusted by $(12/d)^{1/5}$, where d is the depth of the member (inches) May be adjusted by 1.04 for repetitive members as defined in *ANSI/AF&PA NDS*
Horizontal Shear (beam) F_v	=	230 psi[3]
Compression Perpendicular to Grain (beam) $F_{c\perp}$	=	750 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

Nails & Wood Screws	Face	Lateral	0.50
		Withdrawal	0.50
	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

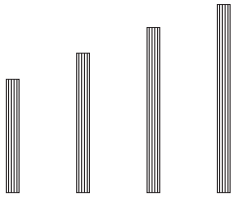
Nail Size	Spacing
8d common (2½″ x 0.131″)	3″
10d common (3″ x 0.148″)	4″
16d common (3½″ x 0.162″)	6″[1]

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

1¼″, 1½″, AND 1¾″ 1.5E PWLVL RIM BOARD

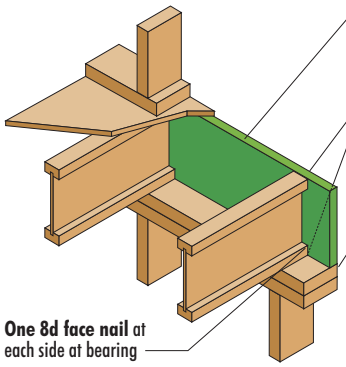
AVAILABLE SIZES (INCHES):

9½	11⅞	14	16



WEIGHTS (PLF):

3.1	3.9	4.5	5.2



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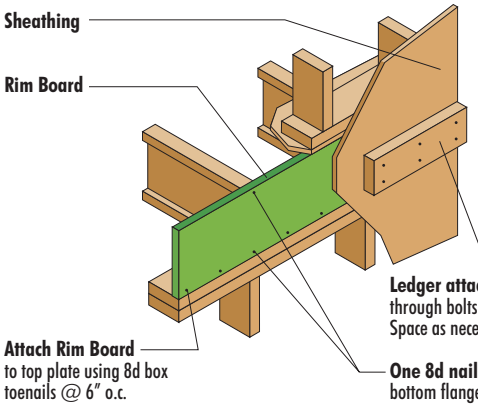


2.0E PWLVL COLUMNS

The properties that make PWLVL a superior beam material make it ideal for column use as well. In PWLVL columns, you'll find only quality construction, free of deep cracks, checks or twists. These columns are desirable enough to leave exposed, for a beautiful finish.

2.0E PWLVL Columns are available in:

3½″ x 3½″	–	–
3½″ x 5½″	5¼″ x 5½″	–
3½″ x 7¼″	5¼″ x 7¼″	7 x 7¼″

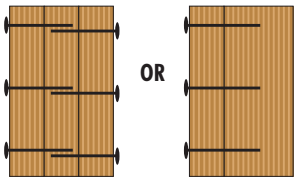
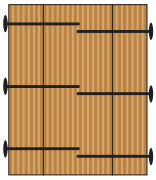
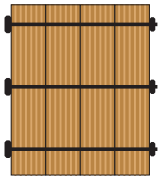
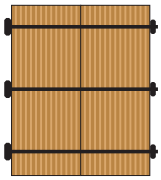
REFERENCE COLUMN DESIGN VALUES

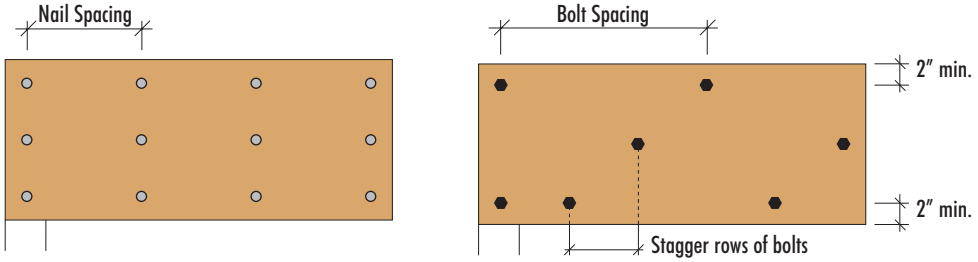
E	=	2,000,000 psi
COV_E	=	0.10
$F_{b\text{-BEAM}}$	=	3100 psi x $(12/d_1)^{1/5}$
d_1	=	wide-face dimension [inches]
$F_{b\text{-PLANK}}$	=	3100 psi x $(1.75/d_2)^{1/3}$
d_2	=	narrow-face dimension [feet]
F_c	=	2750 psi

Contact us for special-order column sizes.

MULTIPLE-PLY PWLVL BEAM ASSEMBLY

COMBINATIONS OF 1¾″ AND 3½″ PLIES

CONDITION A	CONDITION B	CONDITION C	CONDITION D	CONDITION E
				
2 pieces 1¾″	3 pieces 1¾″ OR 1 piece 1¾″ 1 piece 3½″	2 pieces 1¾″ 1 piece 3½″	4 pieces 1¾″	2 pieces 3½″



1¾″ AND 3½″ PLIES—MAXIMUM UNIFORM SIDE LOAD (PLF)

Condition	3¼″ x 0.131″ Nails		16d Common Nails		½″ Bolts		
	2 Rows at 12″ o.c.	3 Rows at 12″ o.c.	2 Rows at 12″ o.c.	3 Rows at 12″ o.c.	2 Rows at 24″ o.c.	2 Rows at 12″ o.c.	3 Rows at 12″ o.c.
Condition A (2–1¾″)	390	585	565	845	510	1015	1520
Condition B (3–1¾″ OR 1–1¾″ + 1–3½″)	290	435	425	635	380	765	1145
Condition C (2–1¾″ + 1–3½″)	260	390	375	565	465	930	1395
Condition D (4–1¾″)	Use bolts for this condition				340	680	1015
Condition E (2–3½″)	Use bolts for this condition				860	1720	2580

Notes:

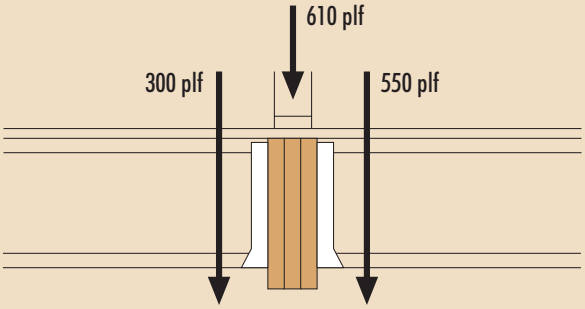
1. Minimum fastener schedule for smaller side loads and top-loaded beams:
   Conditions A, B & C, beams 12″ deep or less:
   2 rows 3¼″ x 0.131″ at 12″ o.c.
   Conditions A, B & C, beams deeper than 12″:
   3 rows 3¼″ x 0.131″ at 12″ o.c.
   Conditions D & E, all beam depths:
   2 rows ½″ bolts at 24″ o.c.
2. The table values for nails may be doubled for 6″ o.c. and tripled for 4″ o.c. nail spacings.
3. The nail schedules shown apply to both sides of a three-ply beam.
4. 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 ½″ bolts. Bolt holes shall be the same diameter as the bolt.
5. 7″ wide beams must be loaded from both sides and/or top loaded.
6. Beams wider than 7″ must be designed by the engineer of record.
7. Load duration factors may be applied to the table values.
8. For proprietary fastener alternatives, consult the manufacturer's literature.

HOW TO USE THE MAXIMUM UNIFORM SIDE LOAD TABLE

EXAMPLE:

THREE 1¾″ PLIES LOADED FROM BOTH SIDES AND ABOVE (CONDITION B)

1. Use allowable load tables or sizing software to size the beam to carry a total load of (300 + 610 + 550) = 1460 plf.
2. 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 scan this code.

PWLVL DIMENSION

LAMINATED VENEER LUMBER ENGINEERED FOR STRUCTURAL FRAMING

Extra-long PWLVL Dimension wall and floor framing 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 2.0E PWLVL	2000000	4125	285	2750
	1.5″ x 3.5″ x 1.8E PWLVL	1800000	3660	285	2450
	1.5″ x 3.5″ x 1.5E PWLVL	1500000	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 2.0E PWLVL	2000000	3770	285	2750
	1.5″ x 5.5″ x 1.8E PWLVL	1800000	3345	285	2450
	1.5″ x 5.5″ x 1.5E PWLVL	1500000	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 2.0E PWLVL	2000000	3565	285	2750
	1.5″ x 7.25″ x 1.8E PWLVL	1800000	3165	285	2450
	1.5″ x 7.25″ x 1.5E PWLVL	1500000	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 2.0E PWLVL	2000000	3395	285	2750
	1.5″ x 9.25″ x 1.8E PWLVL	1800000	3015	285	2450
	1.5″ x 9.25″ x 1.5E PWLVL	1500000	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 2.0E PWLVL	2000000	3265	285	2750
	1.5″ x 11.25″ x 1.8E PWLVL	1800000	2895	285	2450
	1.5″ x 11.25″ x 1.5E PWLVL	1500000	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.

For information about our complete line of products, please scan this code, visit www.pacificwoodtech.com, or call 1-888-707-2285.

METSÄWOOD INSULATED LVL HEADERS

3½" and 5½" KERTO® INSULATED LVL HEADER

GENERAL KERTO HEADER is a Structural Insulated Header designed to meet the current energy conservation code. It complies with the 2009 IRC. This unique header solution combines two high performance materials into a **one-piece, dimensionally stable, structural header with exceptional insulation performance and high-speed installation.**

Kerto Header's outer structure is comprised of Metsä Wood Kerto Plank Laminated Veneer Lumber, a superior-quality engineered wood that is dimensionally stable and high-load capable. The interior is high-performance BASF Neopor® EPS Foam, which contains graphite particles that reflect and absorb radiant heat energy. The header can achieve R-value performances far exceeding those possible with standard white EPS.

Kerto Header wall assemblies have a 36% improvement over conventional batt-insulated wall applications and eliminate the possibility of draft and air leakage through the header itself.

High load capacity and predictable performance: 2.0 MOE; 2900 F_b.

INTENDED USE

This product is intended to be used as headers for roof and floor loads under dry conditions of use, and other industrial applications.

DIMENSIONS, COMPOSITION AND TOLERANCES

Nominal Thickness (inches)	3½	5½
Widths	9¼, 11¼	9¼, 11¼
Lengths	16', 24'	16', 24'
Weight PLF	9¼ : 5.3 lbs. 11¼ : 6.4 lbs.	9¼ : 5.4 lbs. 11¼ : 6.6 lbs.
R-Value	Up to 10	Up to 20

5½" INSULATION VALUES

KERTO PLANK® LVL 5½" THICK INSULATED HEADER COMPARED TO CONVENTIONAL 5½" THICK HEADER WITH BATT INSULATION

Material	Kerto Plank R-Values	Conventional R-Values
Outside (moving) air boundary layer	0.17	0.17
Wood siding	0.80	0.08
½-inch plywood sheathing	0.63	0.63
2 members 1.18-inch Kerto Plank® LVL	2.62	
3⅛-inch BASF Neopor® Type VIII (EPS) 40° F	15.09	
2 members 1½-inch solid sawn lumber		3.00
2½-inch fiberglass batt insulation		9.30
½-inch gypsum wall board	0.45	0.45
Inside (still) vertical air boundary layer	0.68	0.68
Total R-Value: header materials	17.71	12.30
Total R-Value: wall + header materials	20.44	15.03

Framing width X-Beam creates a clean, uniform framing job.

Rosboro X-Beam™: Next-Generation Glulam

Rosboro glulam products are sold through a nation-wide distribution network that provides next day delivery. Glulam is the most cost effective engineered wood product on the market today making it the best choice for floor, roof and wall framing.

In the past glulam was used primarily in applications that called for an attractive exposed architectural beam. Feedback from builders suggested we were missing business because our product didn't match the standard 2x4 and 2x6 wall framing, standard glulam depths did not match I-joist depths and excessive camber could be a problem. Rosboro listened to the market and redesigned their glulam product offering and named it X-Beam.

X-Beam™

X-Beam is an architectural appearance glulam that is 3½" and 5½" wide. It fits flush with standard framing and is available in conventional and I-joist depths. Best of all, X-Beam is the most cost-effective engineered wood product on the market.

Inventoried Widths:

- Beams: 3½" • 5½" • 6¾" • 8¾"

Inventoried Depths

- Conventional Depths:
  - 3.5" and 8.75"— up to 19.5"
  - 5.5" and 6.75"— up to 24"

Other depths available through custom order.

- I-joist compatible (IJC) depths
  - 9½" • 11⅞" • 14"
  - IJC depth tolerance +/- 1/16"

Other depths available through custom order.

Columns

X-Beam glulam columns are architectural appearance, surfaced four sides and all four edges are eased. These glulam columns will remain straight and true.

Inventoried Sizes:

- 3½" x 6" • 5½" x 5½" • 5½" x 6"

Certifications

Rosboro glulam products are inspected and certified by the APA/EWS to ANSI A190.1-2012 and ICC-ES Evaluation Report ESR-1940.

Rosboro X-Beam: Design Values

Product	Layup Combination	Flexural Stress F_b (psi)[2]		Compression Perpendicular to Grain $F_{c\perp}$ (psi)	Shear F_v (psi)[3]	MOE (10^6 psi)	
		Tension Zone	Compression Zone			Apparent	True
X-Beam	24F-V4	2400	1850	650	265	1.8	1.9

(1) F_b shall be adjusted by the volume effect factor using the following formula:
$C_v = (5.125/b)^{1/10} \times (12/d)^{1/10} \times (21/L)^{1/10} \leq 1.0$
where: b = beam width (in), d = beam depth (in), L = beam length (ft)

(2) For non-prismatic members, notched members, members subject to impact or cyclic loading, or shear design of bending members at connections (NDS-05 3.4.3.3), the design shear (F_v) shall be multiplied by a factor of 0.72.

(3) The F_v values do not include adjustments for checking.

Rosboro X-Beam Columns: Design Values

Layup Combination	Bending about Y-Y Axis F_{by} (psi)	Bending about X-X Axis F_{bx} (psi)	Compression Parallel F_c (psi)[3]	MOE (10^6 psi)
EWS 3 DF	2100[1]	2000[2]	2300[3]	1.9

Notes:
1. Applicable to 4 or more lams. This value shall be reduced to 1,850 psi for 3 lams and 1,550 psi for 2 lams.
2. Applicable to column depths up to 15″. For column depths exceeding 15″, F_{bx} = 1,760 psi.
3. Applicable to 4 or more lams. This value shall be reduced to 1,900 psi for 2 or 3 lams.

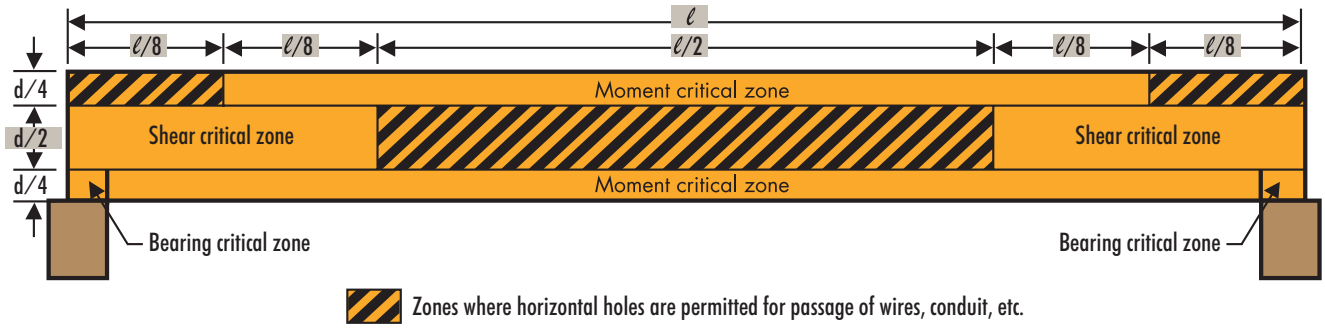
Camber Chart

Length	12′	14′	16′	18′	20′	22′	24′	26′
	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber
Radius 3500′	0	⅛	⅛	⅛	⅛	¼	¼	¼
Radius 5000′	0	0	⅛	⅛	⅛	⅛	⅛	¼
No Camber	0	0	0	0	0	0	0	0

Rosboro X-beam radius is 5000′.
ANSI/A190.1-2012: Tolerances for camber are applicable at the time of manufacture without allowance for dead load deflection.
Up to 20′ = plus or minus ¼″ 21′– 40′ = plus or minus ⅜″

Allowable Horizontal Hole Chart

Zones where horizontal holes are permitted in a uniformly loaded, simply supported beam



Notes:

(1) The above diagram applies to horizontal holes and beams properly sized using APA or Rosboro uniform load tables. For concentrated load conditions, contact Rosboro Technical Support.

(2) Field holes should be drilled for access only (small diameter wires, conduit, cable and other lightweight materials) and not for load bearing hardware attachments unless designed specifically by the project engineer. Square and rectangular holes are not allowed.

(3) These field drilled holes should meet the following guidelines:

A. Hole size: The hole diameter should not exceed 1½″ or 1/10 the beam depth, whichever is smaller.

B. Hole location: The hole should have a minimum clear distance, as measured from the edge of the hole to the nearest edge of the beam, of 4 hole diameters to the top or bottom of the beam and 8 hole diameters from the end of the beam. Otherwise as shown in the shaded area.

C. Hole spacing: The minimum clear spacing between adjacent holes, as measured between the nearest edge of the holes, should be 8 hole diameters based on the largest diameter of any adjacent hole in the beam.

D. Number of holes: The maximum number of holes should not exceed 1 hole per every 5 feet of beam length. In other words, the maximum number of holes should not exceed 4 for a 20-foot long beam. The hole spacing limitation, as given above, should be satisfied separately.

(4) For glulam members that have been over-sized, these guidelines may be relaxed based on an engineering analysis.

(5) Holes in cantilevered beams require additional analysis, contact Rosboro Technical Support.

SIMPSON Strong-Tie FRAMING CONNECTORS

SERIES	FLANGE WIDTH
PWI-47, PWI-77	2 5/16"
PWI-90	3 1/2"

FACE MOUNT HANGERS

SINGLE I-JOIST				DOUBLE I-JOIST			
Width	Depth	Hanger	Load[2] (100%)	Width	Depth	Hanger	Load[2] (100%)
1½"	9½"	U210[1]	1215	3"	9½"	MIU3.12/9	2305
	11⅞"	U210[1]	1215		11⅞"	MIU3.12/11	2880
	14"	U210[1]	1215		14"	MIU3.12/11[1]	2880
1¾"	9½"	IUS1.81/9.5	950	3½"	9½"	MIU3.56/9	2305
	11⅞"	IUS1.81/11.88	1185		11⅞"	MIU3.56/11	2880
	14"	IUS1.81/14	1420		14"	MIU3.56/14	3170
	16"	IUS1.81/16	1660		16"	MIU3.56/16	3455
2 1/16"	9½"	IUS2.06/9.5	950	4⅛"	9½"	MIU4.28/9	2305
	11⅞"	IUS2.06/11.88	1185		11⅞"	MIU4.28/11	2880
	14"	IUS2.06/14	1420		14"	MIU4.28/14	3170
	16"	IUS2.06/16	1660		16"	MIU4.28/16	3455
2 5/16"	9½"	IUS2.37/9.5	950	4⅝"	9½"	MIU4.75/9	2305
	11⅞"	IUS2.37/11.88	1185		11⅞"	MIU4.75/11	2880
	14"	IUS2.37/14	1420		14"	MIU4.75/14	3170
	16"	IUS2.37/16	1660		16"	MIU4.75/16	3455
	18"	MIU2.37/18	3745		18"	MIU4.75/18	3745
	20"	MIU2.37/20	4030		20"	MIU4.75/20	4030
	22"	MIU2.37/20[1]	4030		22"	MIU4.75/20[1]	4030
	24"	MIU2.37/20[1]	4030		24"	MIU4.75/20[1]	4030
3½"	9½"	IUS3.56/9.5	1185	7"	9½"	HU410-2[1]	2680
	11⅞"	IUS3.56/11.88	1420		11⅞"	HU412-2[1]	3275
	14"	IUS3.56/14	1420		14"	HU414-2[1]	3870
	16"	IUS3.56/16	1660		16"	HU414-2[1]	3870
	18"	MIU3.56/18[1]	3745		18"	HU414-2[1]	3870
	20"	MIU3.56/20[1]	4030		20"	See Simpson Catalog*	
	22"	MIU3.56/20[1]	4030		22"		
	24"	MIU3.56/20[1]	4030		24"		

1. Web stiffeners required.
2. Loads shown are for hangers installed on Douglas-fir–Larch or equivalent. Fill all face nail holes and fill round joist nail holes; Face nails shall be 16d common, except for IUS, which use 10d common.

TOP FLANGE HANGERS

SINGLE I-JOIST				DOUBLE I-JOIST			
Width	Depth	Hanger	Load[2] (100%)	Width	Depth	Hanger	Load[2] (100%)
1½"	9½"	ITS1.56/9.5	1520	3"	9½"	LBV3.12/9.5	2590
	11⅞"	ITS1.56/11.88	1520		11⅞"	LBV3.12/11.88	2590
	14"	LBV1.56/14	2590		14"	LBV3.12/14	2590
1¾"	9½"	ITS1.81/9.5	1520	3½"	9½"	MIT49.5	2305
	11⅞"	ITS1.81/11.88	1520		11⅞"	MIT411.88	2305
	14"	ITS1.81/14	1520		14"	MIT414	2305
	16"	ITS1.81/16	1520		16"	MIT416	2305
2 1/16"	9½"	ITS2.06/9.5	1520	4⅛"	9½"	MIT4.28/9.5	2305
	11⅞"	ITS2.06/11.88	1520		11⅞"	MIT4.28/11.88	2305
	14"	ITS2.06/14	1520		14"	MIT4.28/14	2305
	16"	ITS2.06/16	1520		16"	LBV4.28/16	2590
2 5/16"	9½"	ITS2.37/9.5	1520	4⅝"	9½"	MIT359.5-2	2305
	11⅞"	ITS2.37/11.88	1520		11⅞"	MIT3511.88-2	2305
	14"	ITS2.37/14	1520		14"	MIT3514-2	2305
	16"	ITS2.37/16	1520		16"	MIT4.75/16	2305
	18"	MIT3518	2305		18"	LBV4.75/18	2590
	20"	MIT3520	2305		20"	LBV4.75/20	2590
	22"	LBV2.37X	2590		22"	B4.75X	3800
	24"	LBV2.37X	2590		24"	B4.75X	3800
3½"	9½"	ITS3.56/9.5	1520	7"	9½"	B7.12/9.5	3800
	11⅞"	ITS3.56/11.88	1520		11⅞"	B7.12/11.88	3800
	14"	ITS3.56/14	1520		14"	B7.12/14	3800
	16"	ITS3.56/16	1520		16"	B7.12/16	3800
	18"	MIT418[1]	2305		18"	HB7.12/18	5650
	20"	MIT420[1]	2305		20"	HB7.12/20	5650
	22"	HIT422	2550		22"	HB7.12/22	5650
	24"	HIT424	2550		24"	HB7.12/24	5650

1. Web stiffeners required.
2. Loads shown are for hangers installed on Douglas-fir–Larch or equivalent. Fill all face nail holes and fill round joist nail holes; Face nails shall be 16d common, except for ITS, which use 10d common.

ADJUSTABLE HEIGHT HANGERS

SINGLE I-JOIST				DOUBLE I-JOIST			
Width	Depth	Hanger	Load[2] (100%)	Width	Depth	Hanger	Load[2] (100%)
1½"	9½"–11⅞"	THAI222	1715	3"	9½"– 14"	THAI-2	2020
1¾"	9½"–14"	THAI1.81/22	1715	3½"	9½"– 14"	THAI422	1715
2 1/16"	9½"–14"	THAI2.1	1715	4⅛"	9½"– 14"	THAI-2	2020
2 5/16"	9½"–14"	THAI3522	1715	4⅝"	9½"– 14"	THAI-2	2020
3½"	9½"–14"	THAI422	1715	7"	9½"– 14"	See Simpson Catalog*	

- Web stiffeners required for all I-joists used with Adjustable Height Hangers.
- For joists 16" and above, See *Simpson Wood Construction Connectors* catalog for hanger selection.

2. Loads shown use 10d common nails.

VARIABLE PITCH – SINGLE I-JOISTS

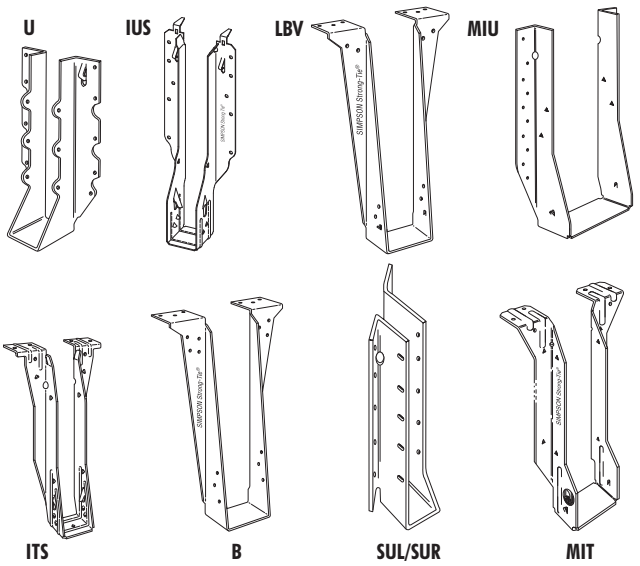
SINGLE I-JOIST			
Width	Depth	Hanger	Load (100%)
1½"	ALL	VPA2	1050
1¾"	ALL	VPA25	1050
2 1/16"	ALL	VPA2.1	1230
2 5/16"	ALL	VPA35	1230
3½"	ALL	VPA4	1230

- VPA connectors provide a bearing length of 2". They should not be used in applications that require longer bearings, such as intermediate supports.

SKEWED 45° HANGERS

SINGLE I-JOIST				DOUBLE I-JOIST			
Width	Depth	Hanger	Load[3] (100%)	Width	Depth	Hanger	Load[3] (100%)
1½"	9½"	SUR/L210[1]	1440	3"	9½"	SUR/L210-2[1]	2015
	11⅞"	SUR/L210[1]	1440		11⅞"	SUR/L210-2[1]	2015
	14"	SUR/L214	1730		14"	SUR/L214-2[1]	2500
1¾"	9½"	SUR/L1.81/9	1730	3½"	9½"	SUR/L410[1]	2015
	11⅞"	SUR/L1.81/11	2305		11⅞"	SUR/L410[1]	2015
	14"	SUR/L1.81/14	2500		14"	SUR/L414[1]	2500
	16"	SUR/L1.81/14[1]	2500		16"	SUR/L414[1]	2500
2 1/16"	9½"	SUR/L2.1/9	2015	4⅛"	9½"	HSUR/L4.28/9	1785
	11⅞"	SUR/L2.1/11	2305		11⅞"	HSUR/L4.28/11	2380
	14"	SUR/L2.1/14	2590		14"	HSUR/L4.28/11[1]	2380
	16"	SUR/L2.1/14	2590		16"	HSUR/L4.28/11[1]	2380
2 5/16"	9½"	SUR/L2.37/9	2015	4⅝"	9½"	HSUR/L4.75/9	1785
	11⅞"	SUR/L2.37/11	2305		11⅞"	HSUR/L4.75/11	2380
	14"	SUR/L2.37/14	2590		14"	HSUR/L4.75/14	2975
	16"	SUR/L2.37/14[1]	2590		16"	HSUR/L4.75/16	3330
	18"	SUR/L2.37/14[1]	2590		18"	HSUR/L4.75/16[1]	3330
	20"	SUR/L2.37/14[1]	2590		20"	HSUR/L4.75/16[1]	3330
3½"	9½"	SUR/L410[1]	2015	7"	9½"	HU410-2X[1,2]	2145
	11⅞"	SUR/L410[1]	2015		11⅞"	HU412-2X[1,2]	2620
	14"	SUR/L414[1]	2500		14"	HU414-2X[1,2]	3870
	16"	SUR/L414[1]	2500		16"	HU414-2X[1,2]	3870
	18"	SUR/L414[1]	2500		18"	HU414-2X[1,2]	3870
	20"	SUR/L414[1]	2500		20"	See Simpson Catalog*	
	22"	See Simpson Catalog*			22"		
	24"				24"		

1. Web stiffeners required.
2. Skewed option must be special ordered. Specify skew angle and direction. Web stiffeners required.
3. Loads shown are for hangers installed on Douglas-fir–Larch or equivalent. Fill all face nail holes with 16d common.

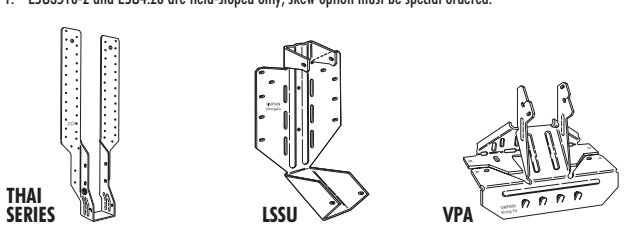


FIELD SLOPE AND SKEW

SINGLE I-JOIST				DOUBLE I-JOIST			
Width	Depth	Hanger	Load (100%)	Width	Depth	Hanger	Load (100%)
1½"	9½"–11⅞"	LSSU210	995	3"	9½"– 14"	LSSU210-2	1625
1¾"	9½"–14"	LSSUI25	995	3½"	9½"– 14"	LSSU410	1625
2 1/16"	9½"–14"	LSSU2.1	995	4⅛"	9½"– 14"	LSU4.28[1]	2300
2 5/16"	9½"–14"	LSSUI35	995	4⅝"	9½"– 14"	LSU3510-2[1]	2300
3½"	9½"–14"	LSSU410	1625	7"	9½"– 14"	See Simpson Catalog*	

- Web stiffeners required for all I-joists used with Field Slope and Skew Hangers.

1. LSU3510-2 and LSU4.28 are field-sloped only, skew option must be special ordered.



*See *Simpson Strong-Tie Wood Construction Connectors* catalog for hanger selection. All hangers listed are manufactured by Simpson Strong-Tie Co., Inc. For additional information, refer to the current Simpson Strong-Tie literature, www.strongtie.com or contact Simpson Strong-Tie at 800-999-5099.

PACIFIC WOODTECH CORPORATION 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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- IB MAX-CORE I-joist
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- MetsäWood Insulated Headers
- Simpson Engineered Wood Hangers & Hardware

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