

**PACIFIC**  
WOODTECH

# PWI JOIST SERIES PWI-90

LVL Flange I-joists for high-performance applications such as custom residential, commercial, and industrial construction

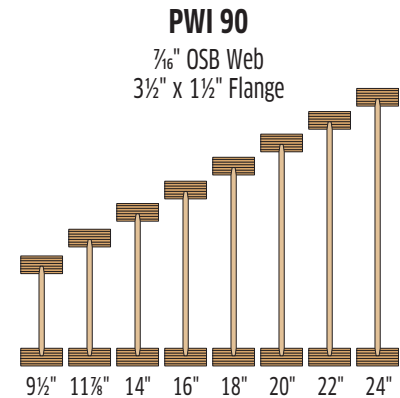


# PWI-90 Joist Series

# Reference Design Values

## REFERENCE DESIGN VALUES <sup>(1)</sup>

Joist Series	Joist Depth	EI <sup>(2)</sup> (x 10 <sup>6</sup> lb-in <sup>2</sup> )	k <sup>(3)</sup> (x 10 <sup>6</sup> lb)	M <sup>(4)</sup> (ft-lb)	V <sup>(5)</sup> (lb)	ER <sup>(6)</sup> (lb)	IR <sup>(7)</sup> (lb)	Vertical Load <sup>(8)</sup> (plf)	Weight (plf)
PWI 90	9½"	392	6.08	7915	1430	1400	2860	2400	3.6
	11⅞"	661	7.60	10255	1925	1400	3355	2400	3.9
	14"	965	8.96	12235	2125	1400	3355	2400	4.2
	16"	1306	10.24	14020	2330	1400	3355	2400	4.5
	18"	1703	11.52	15780	2535	1400	3355	1800	4.7
	20"	2155	12.80	17520	2740	1400	3355	1800	5.0
	22"	2664	14.08	19245	2935	2400 <sup>(9)</sup>	4605 <sup>(9)</sup>	1300	5.3
	24"	3232	15.36	20955	3060	2400 <sup>(9)</sup>	4605 <sup>(9)</sup>	1300	5.5



- 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.
- Bending stiffness (EI).
- 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:  
 $\delta$  = calculated deflection [in]      P = concentrated load [lb]  
 w = uniform load [lb/in]      EI = bending stiffness of the I-joist [lb-in<sup>2</sup>]  
 l = design span [in]      k = coefficient of shear deflection [lb]
- Moment capacity (M). The tabulated values shall not be increased by any code-allowed repetitive member factor.
- Shear capacity (V).
- End reaction capacity (ER) of the I-joist without web stiffeners and a minimum bearing length of 1¾ inches.
- Intermediate reaction capacity (IR) of the I-joist without web stiffeners and a minimum bearing length of 3½ inches.
- Blocking panel and rim joist vertical load capacity.
- Web stiffeners required. See *Web Stiffener Requirements* on page 4.

## Floor Spans

### ALLOWABLE RESIDENTIAL FLOOR SPANS FOR PWI JOISTS – 40 PSF LIVE LOAD AND 10 PSF DEAD LOAD

Joist Series	Joist Depth	Simple Span				Multiple Span				Simple or Multiple Span			
		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 90	9½"	22'-3"	20'-3"	19'-1"	17'-9"	24'-9"	22'-6"	21'-3"	19'-9"	22'-3"	20'-3"	19'-1"	17'-9"
	11⅞"	26'-5"	24'-1"	22'-8"	21'-2"	29'-6"	26'-10"	25'-3"	23'-6"	26'-5"	24'-1"	22'-8"	21'-2"
	14"	30'-0"	27'-4"	25'-9"	24'-0"	33'-5"	30'-5"	28'-8"	26'-7"	30'-0"	27'-4"	25'-9"	24'-0"
	16"	33'-2"	30'-3"	28'-6"	26'-6"	37'-0"	33'-8"	31'-9"	26'-7"	33'-2"	30'-3"	28'-6"	26'-6"
	18"	36'-3"	33'-0"	31'-1"	27'-10"	40'-6"	36'-10"	33'-3"	26'-7"	36'-3"	33'-0"	31'-1"	26'-7"
	20"	39'-3"	35'-9"	33'-8"	27'-10"	43'-9"	39'-10"	33'-3"	26'-7"	39'-3"	35'-9"	33'-3"	26'-7"
	22"	42'-1"	38'-4"	36'-2"	33'-8"	47'-0"	42'-9"	40'-3"	36'-7"	42'-1"	38'-4"	36'-2"	33'-8"
	24"	44'-11"	40'-11"	38'-7"	35'-11"	50'-2"	45'-8"	43'-0"	36'-7"	44'-11"	40'-11"	38'-7"	35'-11"

### ALLOWABLE RESIDENTIAL FLOOR SPANS FOR PWI JOISTS – 40 PSF LIVE LOAD AND 20 PSF DEAD LOAD

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:

- Table values apply to uniformly loaded, residential floor joists.
- Span is measured from face to face of supports.
- Deflection is limited to L/240 at total load and L/480 at live load.
- 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.
- Provide at least 1¾" of bearing length at end supports and 3½" at intermediate supports.
- 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).
- 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.

# Floor Loads

## ALLOWABLE UNIFORM FLOOR LOAD (PLF)

Joist Span (ft)	PWI 90 – Simple Span Joist																PWI 90 – Multiple Span Joist																		
	9½"		11"		14"		16"		18"		20"		22"		24"		9½"		11"		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%	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	-	381	-	447	-	447	-	447	-	447	-	447	-	614	-	614			
7	-	400	-	400	-	400	-	400	-	400	-	400	-	686	-	686	-	327	-	383	-	383	-	383	-	383	-	383	-	526	-	526			
8	-	350	-	350	-	350	-	350	-	350	-	350	-	600	-	600	-	286	-	336	-	336	-	336	-	336	-	336	-	461	-	461			
9	-	311	-	311	-	311	-	311	-	311	-	311	-	533	-	533	-	254	-	298	-	298	-	298	-	298	-	298	-	409	-	409			
10	-	280	-	280	-	280	-	280	-	280	-	280	-	480	-	480	-	229	-	268	-	268	-	268	-	268	-	268	-	368	-	368			
11	255	255	-	255	-	255	-	255	-	255	-	255	-	436	-	436	-	208	-	244	-	244	-	244	-	244	-	244	-	335	-	335			
12	203	233	-	233	-	233	-	233	-	233	-	233	-	400	-	400	-	191	-	224	-	224	-	224	-	224	-	224	-	307	-	307			
13	165	215	-	215	-	215	-	215	-	215	-	215	-	369	-	369	-	176	-	206	-	206	-	206	-	206	-	206	-	283	-	283			
14	135	200	-	200	-	200	-	200	-	200	-	200	-	343	-	343	-	163	-	192	-	192	-	192	-	192	-	192	-	263	-	263			
15	112	187	180	187	-	187	-	187	-	187	-	187	-	320	-	320	148	153	-	179	-	179	-	179	-	179	-	179	-	246	-	246			
16	94	175	152	175	-	175	-	175	-	175	-	175	-	300	-	300	125	143	-	168	-	168	-	168	-	168	-	168	-	230	-	230			
17			129	165	-	165	-	165	-	165	-	165	-	282	-	282			-	158	-	158	-	158	-	158	-	158	-	217	-	217			
18			110	156	-	156	-	156	-	156	-	156	-	267	-	267			146	149	-	149	-	149	-	149	-	149	-	205	-	205			
19			95	147	135	147	-	147	-	147	-	147	-	253	-	253			126	141	-	141	-	141	-	141	-	141	-	194	-	194			
20			82	140	117	140	-	140	-	140	-	140	-	240	-	240			110	134	-	134	-	134	-	134	-	134	-	184	-	184			
21					102	133	-	133	-	133	-	133	-	229	-	229					-	128	-	128	-	128	-	128	-	175	-	175			
22					90	127	119	127	-	127	-	127	-	218	-	218					120	122	-	122	-	122	-	122	-	167	-	167			
23					79	122	106	122	-	122	-	122	204	209	-	209					107	117	-	117	-	117	-	117	-	160	-	160			
24					71	117	94	117	-	117	-	117	182	200	-	200					95	112	-	112	-	112	-	112	-	154	-	154			
25						84	112	108	112	-	112	163	192	-	192						-	107	-	107	-	107	-	107	-	147	-	147			
26						75	108	96	108	-	108	147	185	175	185						101	103	-	103	-	103	-	103	-	142	-	142			
27						67	104	87	104	-	104	132	178	158	178						91	99	-	99	-	99	-	99	-	136	-	136			
28						61	100	78	100	98	100	119	171	143	171						83	96	-	96	-	96	-	96	-	132	-	132			
29							71	97	89	97	108	166	130	166								-	93	-	93	-	93	-	127	-	127				
30							64	93	81	93	99	160	118	160								87	89	-	89	-	89	-	123	-	123				
31							59	90	74	90	90	155	108	155								80	87	-	87	-	87	-	119	-	119				
32										67	88	82	150	99	150														84	111	115	-	115		
33										62	85	75	141	91	145														81	102	112	-	112		
34										57	82	69	133	83	141														77	79	94	108	-	108	
35										52	80	64	126	77	137														71	77	87	105	104	105	
36												59	118	71	129															80	102	96	102		102
37												54	109	66	122															74	100	89	100		100
38												50	101	61	116															69	97	83	97		97
39														56	110																	77	94		94
40														52	105																	72	92		92
41														49	98																	67	90		90
42														46	91																	62	88		88

**Notes:**

- Table values apply to uniformly loaded floor joists.
- Span is measured to the center of each support.
- 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.
- Table values do not account for stiffness added by glued or nailed sheathing.
- Provide at least 1½" of bearing length at end supports and 3½" at intermediate supports.
- 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).
- 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.

# Web Stiffener Requirements

Web stiffeners are pairs of small blocks, cut from panels or 2x4s, that are nailed to the 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.

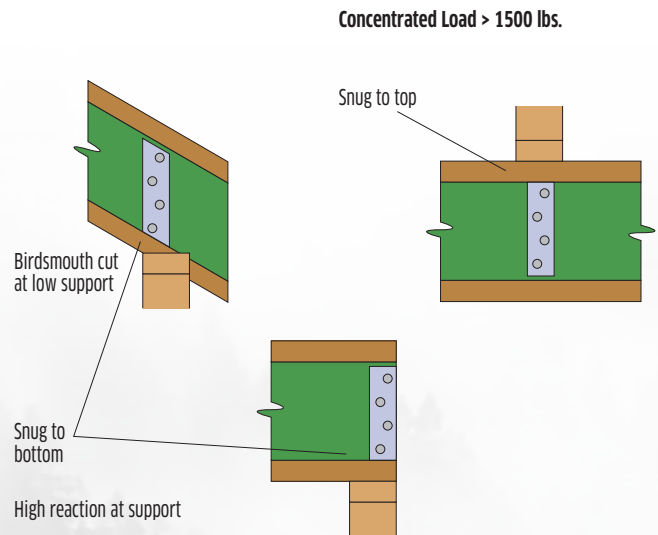
## NUMBER OF WEB STIFFENER NAILS REQUIRED

Joist Depth	24" & 20"	18" & 16"	14" & Less
All Conditions	10	8	4

## WEB STIFFENER SIZE REQUIRED

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

Web stiffener length is approximately 1/8" less than the clear distance between flanges.



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