U.S. (ASD) TECHNICAL GUIDE

TECH GUIDE

PWI 56L
PWT I-JOIST

RESIDENTIAL CONSTRUCTION

PWT FOCUSED ON EWP

PWT™ I-JOIST

Product Specifications & Design Values

These tables must be used in conjunction with the PWT™ technical guide for residential construction and installation guide.

DESIGN VALUES

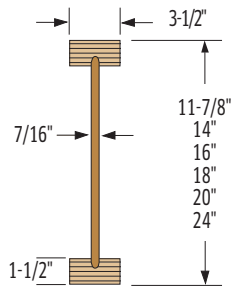
Series	Depth	Weight (plf)	Moment (lb-ft)	EI (x 10^6) (lb-in^2)	K (x 10^6) (lb-ft/in)	Shear (lbs)
PWI 56L	11-7/8"	4.5	10170	668	0.549	2055
	14"	4.8	12250	968	0.641	2330
	16"	5	14205	1301	0.729	2585
	18"	5.3	16010	1684	0.817	2845
	20"	5.5	17800	2115	0.905	3105
	24"	6	21340	3127	1.081	3620

Notes:

1. PWT I-Joists shall be designed for dry-use conditions only. Dry-use applies to products installed in dry, covered and well ventilated interior conditions in which the equivalent moisture content in lumber will not exceed 16%.
2. Moment and Shear are for normal load duration and shall be adjusted according to code.
3. Moment shall not be increased for repetitive member use.
4. Deflection calculations shall include both bending and shear deformations.

Deflection for a simple span, uniform load: $\Delta = \frac{22.5wL^4}{EI} + \frac{wL^2}{K}$

PROFILE DETAILS
PWI 56L



Where: Δ = deflection (in), w = uniform load (plf), L = design span (ft), EI = bending stiffness (from table), b = shear stiffness (from table)

Equations for other conditions can be found in engineering references.

Refer to ICC *ESR-1305* or APA *PR-L238*

REACTION AND BEARING RESISTANCE

Series	Depth	End Reaction Capacity[1] (lbs)				Interior Reaction Capacity[1] (lbs)				Flange Bearing Capacity[2] (lb/in)
		Minimum Bearing (1-1/2")		Maximum Bearing (4")		Minimum Bearing (3-1/2")		Maximum Bearing (5-1/2")		
		Without Stiffeners	With Stiffeners	Without Stiffeners	With Stiffeners	Without Stiffeners	With Stiffeners	Without Stiffeners	With Stiffeners	
PWI 56L	11-7/8"	1145	1660	1515	2055	3130	3860	3670	4060	1870
	14"	1145	1755	1535	2330	3130	4055	3670	4300	
	16"	1145	1845	1555	2585	3130	4245	3670	4525	
	18"	1141*	1936*	1575	2845	3130	4435	3670	4750	
	20"	1145*	2021*	1595	3105	3130	4620	3670	4975	
	24"	1143*	2203*	1635	3620	3130	5000	3670	5430	

* 2-1/2" bearing required

Notes:

1. End and Interior Reaction Capacity shall be limited by the Flange Bearing Capacity or the bearing capacity of the support material, whichever is less.
2. The Flange Bearing Capacity, per inch of bearing length, is based on the allowable compression perpendicular-to-grain of the I-Joist flange, accounting for eased edges.
3. To account for edge easing when determining the bearing capacity of the support material, subtract 0.10" from the flange width for the PWI 56L.
4. Reaction Capacity is for normal load duration and shall be adjusted according to code. Flange Bearing Capacity and the bearing capacity of any wood support shall not be adjusted for load duration.
5. Reaction Capacity and Flange Bearing Capacity may be increased over that tabulated for the minimum bearing length. Linear interpolation of the Reaction Capacity between the minimum and maximum bearing length is permitted. Bearing lengths longer than the maximum do not further increase Reaction Capacity. Flange Bearing Capacity and that of a wood support will increase with additional bearing length.
6. See below for information on web stiffener sizes and nailing.

Example:
Determine the unstiffened end reaction capacity for a 11-7/8" PWI 56L with 2" of bearing for a non-snow roof load and supported on an SPF wall plate (425 psi).

1. Determine End Reaction (ER) w/out Stiffeners: ER = 1145 + (1660 - 1145) * (2" - 1.5")/(4" - 1.5") = 1248 lbs
2. Adjust for load duration: Adjusted ER = 1248 * 1.25 = 1560 lbs
3. Determine Flange Bearing Capacity (FBC): FBC = 1180 lb/in * 2" = 2360 lbs
4. Determine wall Plate Bearing Capacity (PBC) PBC = 425 psi * (2.0625" - 0.10") * 2" = 1668 lbs
5. Final End Reaction Capacity w/out Stiffeners = 1248 lbs

WEB STIFFENER REQUIREMENTS

Series	Depth	Minimum Thickness	Maximum Height	Nail Size*	Nail Quantity
PWI 56L	11-7/8"	1-1/2"	8-3/4"	10d (3")	4
	14"	1-1/2"	10-7/8"	10d (3")	5
	16"	1-1/2"	12-7/8"	10d (3")	6
	18"	1-1/2"	14-7/8"	10d (3")	7
	20"	1-1/2"	16-7/8"	10d (3")	8
	24"	1-1/2"	20-7/8"	10d (3")	10

*Nails may be Box or Common.

RIM & BLOCKING CAPACITY

Series	Depth	Uniform Vertical Load Capacity (plf)
PWI 56L	11-7/8"	2400
	14"	2200
	16"	1900
	18"	1700
	20"	1580
	24"	1100

Notes:

1. Uniform Vertical Load Capacity shall not be adjusted for load duration.
2. Concentrated vertical loads require the addition of squash blocks. Do not use PWT I-Joists as rim or blocking to support concentrated vertical loads.
3. Lateral load capacity for all series above is 200 plf but may be limited by the connection details used. Do not exceed the Flange Face Nailing requirements at left.

FLANGE FACE NAILING

Series	Nail Size and Type	Minimum Nail Distance	
		oc Spacing	End
PWI 56L	8d (2-1/2") Box or Common	3"	1-1/2"
	10d (3") or 12d (3-1/4") Box	3"	1-1/2"
	10d (3") or 12d (3-1/4") Common	3"	1-1/2"
	16d Sinker (3-1/4")	3"	1-1/2"
	16d (3-1/2") Box or Common	5"	1-1/2"

Notes:

1. Use only 10d box or 8d nails when securing an PWI floor or roof joist to its supports.

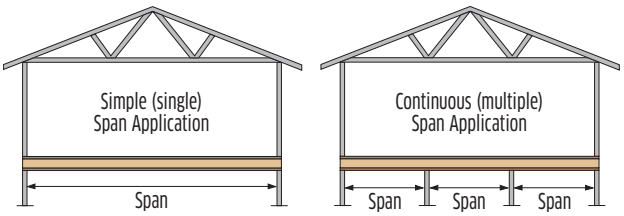
Floor Span Tables

These tables must be used in conjunction with the PWT™ technical guide for residential construction and installation guide.

Table Usage:

1. Select the Simple Span or Continuous Span table, as required.
2. Find a span that meets or exceeds the required clear span.
3. Read the corresponding joist series, depth and spacing.

Caution: For floor systems that require both Simple Span and Continuous Span joists, it is a good idea to check both before selecting a joist. Some conditions are controlled by Continuous Span rather than Simple Span.



40 PSF LIVE LOAD, 10 PSF DEAD LOAD

Series	Depth	Simple Span								Continuous Span							
		L/480				L/360				L/480; No Web Stiffeners				L/480; With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
PWI 56L	11-7/8"	26'-6"	24'-1"	22'-8"	21'-1"	29'-3"	26'-8"	25'-2"	23'-4"	28'-10"	26'-2"	24'-8"	22'-11"	-	-	-	-
	14"	29'-11"	27'-3"	25'-8"	23'-4"	33'-1"	30'-2"	28'-5"	23'-4"	32'-7"	29'-8"	27'-11"	24'-9"	-	-	-	25'-11"
	16"	33'-1"	30'-1"	28'-4"	23'-5"	36'-7"	33'-4"	29'-4"	23'-5"	36'-0"	32'-9"	30'-10"	24'-9"	-	-	-	26'-6"
	18"	35'-11"	32'-8"	30'-10"	25'-10"	39'-9"	36'-3"	32'-5"	25'-10"	39'-3"	35'-8"	31'-0"	24'-9"	-	-	33'-7"	29'-4"

40 PSF LIVE LOAD, 15 PSF DEAD LOAD

Series	Depth	Simple Span								Continuous Span							
		L/480				L/360				L/480; No Web Stiffeners				L/480; With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
PWI 56L	11-7/8"	26'-6"	24'-1"	22'-8"	21'-1"	29'-3"	26'-8"	25'-2"	21'-2"	28'-10"	26'-2"	24'-8"	22'-6"	-	-	-	22'-11"
	14"	29'-11"	27'-3"	25'-8"	21'-2"	33'-1"	30'-2"	26'-7"	21'-2"	32'-7"	29'-8"	27'-11"	22'-6"	-	-	-	24'-3"
	16"	33'-1"	30'-1"	26'-7"	21'-3"	36'-7"	32'-0"	26'-7"	21'-3"	36'-0"	32'-9"	28'-2"	22'-6"	-	-	30'-5"	24'-3"
	18"	35'-11"	32'-8"	29'-5"	23'-5"	39'-9"	35'-5"	29'-5"	23'-5"	39'-3"	33'-10"	28'-2"	22'-6"	-	35'-8"	33'-7"	26'-10"

For applications, loading, and I-Joist depths not shown use the Exacte by PWT software to design the joist

40 PSF LIVE LOAD, 25 PSF DEAD LOAD

Series	Depth	Simple Span								Continuous Span							
		L/480				L/360				L/480; No Web Stiffeners				L/480; With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
PWI 56L	11-7/8"	26'-6"	24'-1"	22'-5"	17'-10"	28'-6"	25'-11"	22'-5"	17'-10"	28'-10"	26'-2"	23'-10"	19'-0"	-	-	24'-8"	20'-8"
	14"	29'-11"	27'-0"	22'-5"	17'-11"	32'-2"	27'-0"	22'-5"	17'-11"	32'-7"	28'-8"	23'-10"	19'-0"	-	29'-8"	26'-0"	20'-8"
	16"	33'-1"	27'-0"	22'-6"	17'-11"	35'-7"	27'-0"	22'-6"	17'-11"	36'-0"	28'-8"	23'-10"	19'-0"	-	31'-4"	26'-0"	20'-9"
	18"	35'-11"	29'-11"	24'-10"	19'-9"	38'-8"	29'-11"	24'-10"	19'-9"	38'-3"	28'-7"	23'-9"	19'-0"	39'-3"	34'-8"	28'-10"	22'-11"

Design Assumptions:

1. The spans listed are the clear distance between supports. Continuous spans are based on the longest span. The shortest span shall not be less than 50% of the longest span.
2. The spans are based on uniform floor loads only as listed at the top of this page.
3. These tables reflect the additional stiffness provided by 48/24 APA RATED SHEATHING or 24 oc APA RATED STURD-I-FLOOR, or equal, glued and nailed to the top flange.
4. Live Load deflection is limited to L/480 or L/360 for simple spans as listed, and L/480 only for continuous spans.
5. Total Load deflection is limited to L/240.
6. The spans are based on an end bearing length of at least 1-3/4" for joists 16" deep or less and 2-1/2" for joists over 16" deep. An interior bearing length of at least 3-1/2". Both are limited to the bearing capacity for an SPF wall plate ($F_{c\perp}$ = 425 psi).

Additional Notes:

1. Web stiffeners are not required for the Simple Spans tables. Web stiffeners are not required at the end bearings for the Continuous Span tables. A "-" indicates no increase in span with web stiffeners. Web fillers are required for I-Joists seated in hangers that do not laterally support the top flange.
2. L/360 represents the maximum deflection allowed per code and may not provide suitable floor performance. L/480 or better is recommended for most applications.
3. These spans are not evaluated for vibration.
4. Though not required for the spans above, bridging, blocking, bottom-flange bracing or a direct-applied gypsum ceiling can improve the feel of a floor.
5. For conditions not shown, use the Exacte by PWT software, or contact your PWT distributor for assistance.

Framing Connectors

SIMPSON STRONG-TIE®

Series	Depth	Top-Mount		Face-Mount		45˚ Skewed	Field Slope & Skew	Variable Pitch Seat
		Single	Double	Single	Double	Single	Single	Single
PWI 56L	11-7/8"	ITS3.56/11.88	B7.12/11.88*	IUS3.56/11.88	HU412-2*	SUR/L410*	LSSU410*	VPA4
	14"	ITS3.56/14	B7.12/14*	IUS3.56/14	HU414-2*	SUR/L414*	LSSU410*	VPA4
	16"	ITS3.56/16	B7.12/16*	IUS3.56/16	HU414-2*	SUR/L414*	**	VPA4
	18"	MIT418	BA7.12/18	MIU3.56/18	HU414-2*	SUR/L414*	**	VPA4

* Web filler required for proper installation of hanger.

** Refer to Simpson Strong-Tie "Wood Construction Connectors" catalog for hanger selection.

MITEK STRUCTURAL CONNECTORS®

Series	Depth	Top-Mount		Face-Mount		45˚ Skewed	Field Slope & Skew	Variable Pitch Seat
		Single	Double	Single	Double	Single	Single	Single
PWI 56L	11-7/8"	TH035118	BPH71118*	IHFL35112	HD7120*	HD410_SK45L/R_BV* **	LSSH35 *	TMP4 or TMPH4 *
	14"	TH035140	BPH7114*	IHFL3514	HD7140*	HD414_SK45L/R_BV* **	LSSH35 *	TMP4 or TMPH4 *
	16"	TH035160	BPH7116*	IHFL3516	HD7160*	HD414_SK45L/R_BV* **	LSSH35 * †	TMP4 or TMPH4 *
	18"							

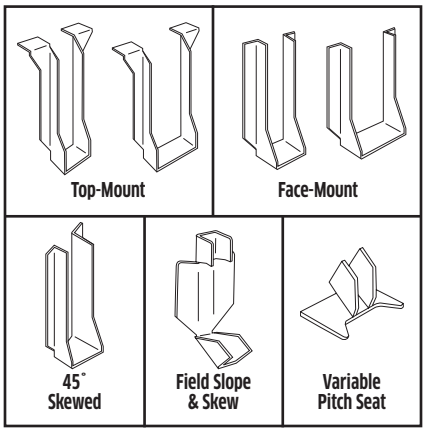
* Web filler required for proper installation of hanger.

† Hanger height is less than 60% of the joist depth. Supplemental lateral support of the top flange is required. Refer to MiTek's installation instructions.

1. Use TMP seats for joist pitch of 1:12 to 6:12. Use TMPH for joist pitch of 6:12 and greater.

General Notes:

1. The following tables provide a list of the common hangers and connectors for use with PWT I-Joists based on geometry fit only.
2. Refer to the manufacturer's connector guide for a complete list of hangers and to verify the load capacity and suitability of a hanger or connector for a particular application.
3. Follow all connector manufacturers' installation guidelines.



Web Hole Tables

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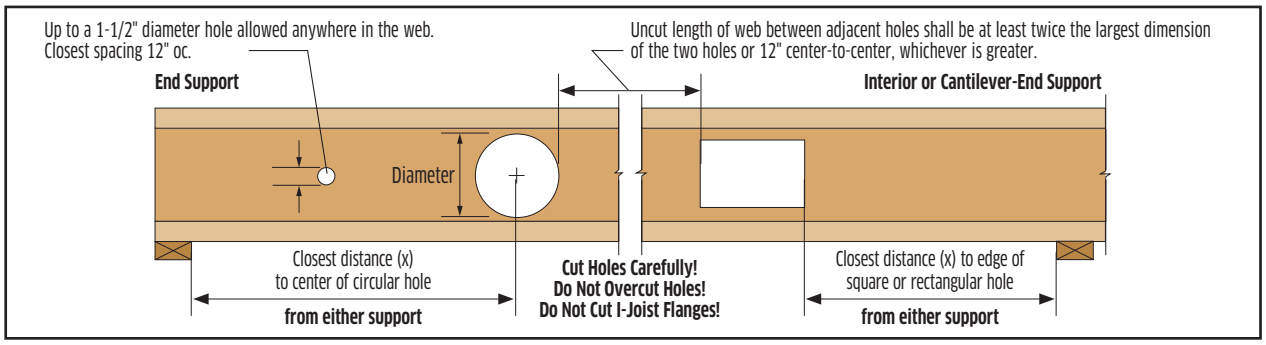

Table Usage:

1. Select the required series and depth.
2. Determine the support condition for the nearest bearing: end support or interior support (including cantilever-end supports).
3. Select the row corresponding to the required Clear Span. For spans between those listed, use the next largest value.
4. Select the column corresponding to the required hole diameter. For diameters between those listed, use the next largest value.
5. The intersection of the Clear Span row and Hole Diameter column gives the minimum distance from the inside face of bearing to the center of a circular hole.
6. Double check the distance to the other support, using the appropriate support condition.

CIRCULAR HOLES

Series	Depth	Clear Span	Distance from End Support – Hole Diameter						Distance from Interior or Cantilever-End Support – Hole Diameter					
			2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
PWI 56L	11-7/8"	6'	1'-0"	1'-0"	1'-0"	1'-0"	-	-	1'-0"	1'-0"	1'-0"	1'-0"	-	-
		10'	1'-0"	1'-0"	1'-0"	1'-9"	-	-	1'-0"	1'-0"	2'-1"	3'-5"	-	-
		14'	1'-0"	1'-0"	2'-6"	4'-1"	-	-	1'-10"	3'-3"	4'-7"	5'-11"	-	-
		18'	1'-8"	3'-2"	4'-10"	6'-7"	-	-	4'-4"	5'-9"	7'-1"	8'-5"	-	-
	14"	10'	1'-0"	1'-0"	1'-0"	1'-0"	2'-2"	-	1'-0"	1'-0"	1'-5"	2'-7"	3'-9"	-
		14'	1'-0"	1'-0"	1'-9"	3'-1"	4'-6"	-	1'-8"	2'-10"	3'-11"	5'-1"	6'-3"	-
		18'	1'-5"	2'-9"	4'-1"	5'-6"	7'-0"	-	4'-2"	5'-4"	6'-5"	7'-7"	8'-9"	-
		22'	3'-8"	5'-0"	6'-5"	8'-0"	9'-8"	-	6'-8"	7'-10"	8'-11"	10'-1"	11'-4"	-
	16"	14'	1'-0"	1'-0"	1'-4"	2'-5"	3'-7"	4'-11"	1'-6"	2'-6"	3'-6"	4'-6"	5'-6"	6'-6"
		18'	1'-4"	2'-5"	3'-6"	4'-9"	6'-1"	7'-5"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"
		22'	3'-6"	4'-8"	5'-11"	7'-2"	8'-7"	10'-1"	6'-6"	7'-6"	8'-6"	9'-6"	10'-6"	11'-9"
		26'	5'-9"	7'-0"	8'-4"	9'-9"	11'-3"	12'-10"	9'-0"	10'-0"	11'-0"	12'-0"	13'-2"	14'-8"

RECTANGULAR HOLES

Series	Depth	Clear Span	Distance from End Support – Maximum Hole Dimension: Depth or Width						Distance from Interior or Cantilever-End Support – Maximum Hole Dimension: Depth or Width					
			2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
PWI 56L	11-7/8"	6'	1'-0"	1'-0"	1'-9"	3'-3"	3'-9"	4'-3"	1'-0"	1'-9"	2'-10"	4'-0"	4'-5"	-
		10'	1'-5"	2'-9"	4'-2"	5'-11"	6'-6"	-	3'-1"	4'-3"	5'-4"	-	-	-
		14'	3'-8"	5'-2"	6'-9"	8'-8"	-	-	5'-7"	6'-9"	7'-11"	-	-	-
		18'	6'-1"	7'-9"	9'-6"	-	-	-	8'-1"	9'-3"	-	-	-	-
	14"	10'	1'-0"	1'-0"	1'-0"	2'-8"	4'-11"	5'-9"	1'-0"	1'-0"	2'-6"	4'-2"	5'-10"	-
		14'	1'-0"	1'-0"	2'-11"	5'-1"	7'-7"	8'-6"	1'-7"	3'-3"	5'-0"	6'-8"	-	-
		18'	1'-4"	3'-3"	5'-4"	7'-8"	10'-5"	-	4'-1"	5'-9"	7'-6"	9'-2"	-	-
		22'	3'-6"	5'-7"	7'-10"	10'-4"	-	-	6'-7"	8'-3"	10'-0"	12'-0"	-	-
	16"	14'	1'-0"	1'-0"	2'-5"	4'-4"	6'-5"	-	1'-5"	3'-0"	4'-6"	6'-1"	7'-8"	-
		18'	1'-2"	2'-11"	4'-9"	6'-10"	9'-2"	-	3'-11"	5'-6"	7'-0"	8'-7"	10'-6"	-
		22'	3'-4"	5'-2"	7'-2"	9'-5"	11'-11"	-	6'-5"	8'-0"	9'-6"	11'-1"	-	-
		26'	5'-8"	7'-7"	9'-9"	12'-1"	-	-	8'-11"	10'-6"	12'-0"	14'-0"	-	-

Design Assumptions:

1. The hole locations listed are valid for floor joists supporting only uniform loads. The total uniform load shall not to exceed 130 plf (e.g., 40 psf Live Load and 25 psf Dead Load spaced 24" oc).
2. Hole location is measured from the inside face of bearing to the center of a circular hole or to the nearest edge of a rectangular hole, from the closest support.
3. Clear Span has not been verified for these joists and is shown for informational purposes only! Verify that the joist selected will work for the span and loading conditions needed before checking hole location.
4. The maximum hole depth for circular holes is the I-Joist Depth less 4," except the maximum hole depth is 8" for 11-7/8". Where the Maximum Hole Dimension exceeds the hole depth, the dimension refers to hole width and the depth of the hole is assumed to be the maximum for that joist depth. The maximum hole width is 18," regardless of I-Joist Depth.
5. Holes cannot be located in the span where designated "-", without further analysis by a design professional.

Notes:

1. Holes may be placed anywhere within the depth of the web. A minimum 1/4" clear distance from the flanges is recommended so as not to cut a flange.
2. Round holes up to 1-1/2" diameter may be placed anywhere in the web.
3. Perforated "knockouts" may be neglected when locating web holes.
4. Holes larger than 1-1/2" are not permitted in cantilevers without special engineering.
5. Multiple holes shall have a clear separation along the length of the joist of at least twice the larger dimension of the larger adjacent hole, or a minimum of 12" center-to-center, whichever is greater.
6. Multiple holes may be spaced closer provided they fit within the boundary of an acceptable larger hole. Example: two 3" round holes aligned parallel to the joist length may be spaced 2" apart (clear distance) provided that a 3" high by 8" long rectangle or an 8" diameter round hole are acceptable for the joist depth at that location and completely encompass the holes.
7. For conditions not covered in this table, use Exacte by PWT software or contact your local PWT distributor for more information.

PWT™ I-JOIST

For product catalog and complete warranty details or for more information on the full line of PWT products or the nearest distributor, visit pwtewp.com.

PWT products are manufactured at different locations in the United States and Canada.

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