



# LPI 450



## LP SOLIDSTART I-JOISTS LPI 450

LP SolidStart I-joists are straighter and more uniform in strength, stiffness and size with greater load-bearing capacity and longer spans than traditional lumber.

### PRODUCT FEATURES:

- Straighter and more uniform in strength, stiffness and size
- Light weight
- Install faster because they are available in long lengths saving you time and money
- Greater load-bearing capacity
- Provide longer spans and more open floor plans
- Allows for HVAC and plumbing to be run through webs when needed
- Allows ceilings and floors to be designed with fewer pieces, reducing installation time
- Less likely to split, shrink, twist, warp or bow reducing squeaks
- Lifetime Limited Warranty
- LP uses SFI® forest management and fiber sourcing systems



See complete warranty details  
at [LPCorp.com](http://LPCorp.com) or call 1.888.820.0325.



U.S. TECHNICAL GUIDE

BUILD WITH US:

Please verify availability with the LP SolidStart Engineered Wood Products distributor in your area prior to specifying these products.

# Product Specifications & Design Values

THESE TABLES MUST BE USED IN CONJUNCTION WITH THE LP® SolidStart® TECHNICAL GUIDE FOR RESIDENTIAL CONSTRUCTION.

DESIGN VALUES						
Series	Depth	Weight	Moment	EI (x 10 <sup>6</sup> )	K (x 10 <sup>6</sup> )	Shear
		(plf)	(lb-ft)	(lb-in <sup>2</sup> )	(lb-ft/in)	(lbs)
LPI 450	9-1/2"	2.1	3350	170	0.473	1230
	11-7/8"	2.3	4320	286	0.585	1430
	14"	2.6	5120	419	0.686	1605

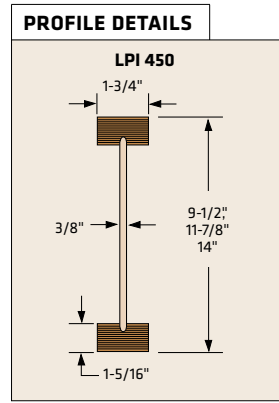
### NOTES:

- LP 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%.
- Moment and Shear are for normal load duration and shall be adjusted according to code.
- Moment shall not be increased for repetitive member use.
- Deflection calculations shall include both bending and shear deformations.  
Deflection for a simple span, uniform load:

$$\Delta = \frac{22.5wL^4}{EI} + \frac{wL^2}{K}$$

Where:  $\Delta$  = deflection (in)      EI = bending stiffness (from table)  
 $w$  = uniform load (plf)      K = shear stiffness (from table)  
 $L$  = design span (ft)

Equations for other conditions can be found in engineering references.



REACTION AND BEARING CAPACITY										
Series	Depth	End Reaction Capacity' (lbs)				Interior Reaction Capacity' (lbs)				Flange Bearing Capacity' (lb/in)
		Minimum Bearing (1-1/2")		Maximum Bearing (4")		Minimum Bearing (3-1/2")		Maximum Bearing (5-1/2")		
		W/out Stiffeners	With Stiffeners	W/out Stiffeners	With Stiffeners	W/out Stiffeners	With Stiffeners	W/out Stiffeners	With Stiffeners	
LPI 450	9-1/2"	840	1100	1040	1230	1855	2085	2195	2415	910
	11-7/8"	840	1210	1070	1430	1920	2230	2255	2510	
	14"	840	1305	1100	1605	1985	2360	2305	2595	

### NOTES:

- End and Interior Reaction Capacity shall be limited by the Flange Bearing Capacity or the bearing capacity of the support material, whichever is less.
- 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.
- To account for edge easing when determining the bearing capacity of the support material, subtract 0.10" from the flange width for the LPI 450.
- 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.
- 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.
- See below for information on web stiffener sizes and nailing.

### EXAMPLE:

Determine the unstiffened end reaction capacity for a 11-7/8" LPI 450 with 2" of bearing for a non-snow roof load and supported on an SPF wall plate (425 psi).

- Determine End Reaction (ER) w/out Stiffeners:  
ER = 840 + (1070 - 840)\*(2" - 1.5")/(4" - 1.5") = 886 lbs
- Adjust for load duration: Adjusted ER = 886 \* 1.25 = 1107 lbs
- Determine Flange Bearing Capacity (FBC):  
FBC = 910 lb/in \* 2" = 1820 lbs
- Determine wall Plate Bearing Capacity (PBC):  
PBC = 425 psi \* (2.0625" - 0.10") \* 2" = 1668 lbs
- Final End Reaction Capacity w/out Stiffeners = 1107 lbs

WEB STIFFENER REQUIREMENTS					
Series	Depth	Minimum Thickness	Maximum Height	Nail Size*	Nail Qty
LPI 450	9-1/2"	23/32"	6-3/8"	8d (2-1/2")	3
	11-7/8"	23/32"	8-3/4"	8d (2-1/2")	3
	14"	23/32"	10-7/8"	8d (2-1/2")	3

\* Nails may be Box or Common.

RIM & BLOCKING CAPACITY		
Series	Depth	Uniform Vertical Load Capacity
		(plf)
LPI 450	9-1/2"	2000
	11-7/8"	2000
	14"	1100

### NOTES:

- Uniform Vertical Load Capacity shall not be adjusted for load duration.
- Concentrated vertical loads require the addition of squash blocks. Do not use LPI rim or blocking to support concentrated vertical loads.
- 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 above.

FLANGE FACE NAILING			
Series	Nail Size and Type	Minimum Nail Distance	
		oc Spacing	End
LPI 450	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:

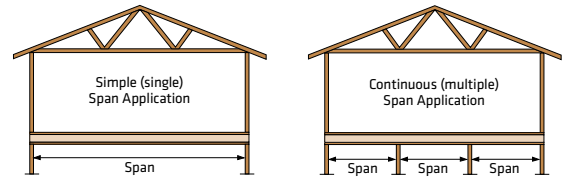
- Use only 10d box or 8d nails when securing an LPI floor or roof joist to its supports.

THESE TABLES MUST BE USED IN CONJUNCTION WITH THE LP® SolidStart® TECHNICAL GUIDE FOR RESIDENTIAL CONSTRUCTION.

**TO USE:**

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.



		Simple Span								Continuous Span							
Series	Depth	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
LPI 450	9-1/2"	17'-5"	15'-11"	15'-1"	14'-1"	18'-9"	17'-8"	16'-8"	15'-7"	18'-8"	17'-4"	16'-5"	14'-6"	-	-	-	15'-4"
	11-7/8"	20'-8"	18'-11"	17'-10"	16'-8"	22'-10"	20'-11"	19'-9"	16'-11"	22'-6"	20'-7"	18'-11"	15'-1"	-	-	19'-6"	17'-6"
	14"	23'-5"	21'-5"	20'-3"	17'-0"	25'-11"	23'-8"	21'-4"	17'-0"	25'-7"	23'-4"	19'-6"	15'-7"	-	-	22'-1"	18'-7"

		Simple Span								Continuous Span							
Series	Depth	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
LPI 450	9-1/2"	17'-5"	15'-11"	15'-1"	14'-1"	18'-9"	17'-8"	16'-8"	15'-4"	18'-8"	17'-4"	16'-5"	13'-2"	-	-	-	14'-10"
	11-7/8"	20'-8"	18'-11"	17'-10"	15'-4"	22'-10"	20'-11"	19'-3"	15'-4"	22'-6"	20'-7"	17'-2"	13'-8"	-	-	19'-5"	15'-11"
	14"	23'-5"	21'-5"	19'-4"	15'-5"	25'-11"	23'-3"	19'-4"	15'-5"	25'-7"	21'-4"	17'-9"	14'-1"	-	23'-4"	21'-1"	16'-10"

		Simple Span								Continuous Span							
Series	Depth	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
LPI 450	9-1/2"	17'-5"	15'-11"	15'-1"	12'-11"	18'-9"	17'-2"	16'-8"	15'-4"	18'-8"	16'-10"	13'-11"	11'-1"	-	17'-4"	15'-9"	12'-6"
	11-7/8"	20'-8"	18'-11"	16'-3"	12'-11"	22'-3"	19'-7"	16'-3"	12'-11"	22'-6"	17'-5"	14'-5"	11'-6"	-	19'-9"	16'-10"	13'-5"
	14"	23'-5"	19'-8"	16'-4"	13'-0"	24'-11"	19'-8"	16'-4"	13'-0"	24'-1"	18'-0"	14'-11"	11'-11"	24'-10"	21'-5"	17'-10"	14'-2"

**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 the 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" and an interior bearing length of at least 3-1/2", and 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. Web stiffeners at intermediate supports are only required where listed in the "With Web Stiffeners" section of each table. 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 Uniform Floor Load (PLF) tables, LP's design software or contact your LP Engineered Wood Products distributor for assistance.

## Framing Connectors

**GENERAL NOTES:**

1. The following tables provide a list of the more common hangers and connectors for use with LP SolidStart I-joists.
2. Refer to the manufacturer's connector guide for a complete list of hangers and to verify the suitability of a hanger or connector for a particular application.
3. Follow all connector manufacturers' installation guidelines.

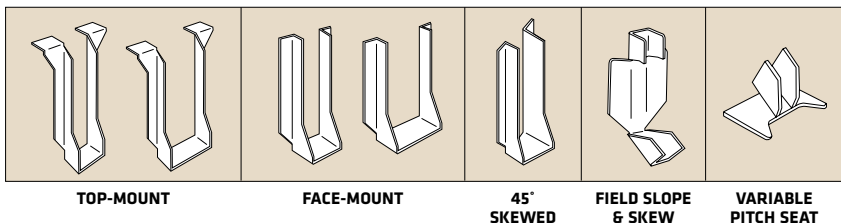
SIMPSON STRONG-TIE®		Top-Mount		Face-Mount		45° Skewed	Field Slope & Skew	Variable Pitch Seat
Series	Depth	Single	Double	Single	Double	Single	Single	Single
		LPI 450	9-1/2"	ITS1.81/9.5	ITS3.56/9.5	IUS1.81/9.5	MIU3.56/9.5	SUR/L1.81/9
11-7/8"	ITS1.81/11.88		ITS3.56/11.88	IUS1.81/11.88	MIU3.56/11.88	SUR/L1.81/11	LSSUI25 *	VPA25
14"	ITS1.81/14		ITS3.56/14	IUS1.81/14	MIU3.56/14	SUR/L1.81/14	LSSUI25 *	VPA25

\* Web filler required for proper installation of hanger.

USP STRUCTURAL CONNECTORS®		Top-Mount		Face-Mount		45° Skewed	Field Slope & Skew	Variable Pitch Seat
Series	Depth	Single	Double	Single	Double	Single	Single	Single
		LPI 450	9-1/2"	THO17950	THO35950	THF17925	THF35925	SKH1720L/R *
11-7/8"	THO17118		THO35118	THF17112	THF35112	SKH1720L/R *	LSSH179 *	TMP175 or TMPH175 *
14"	TFL1714		THO35140	THF17140	THF35140	SKH1720L/R *	LSSH179 *	TMP175 or TMPH175 *

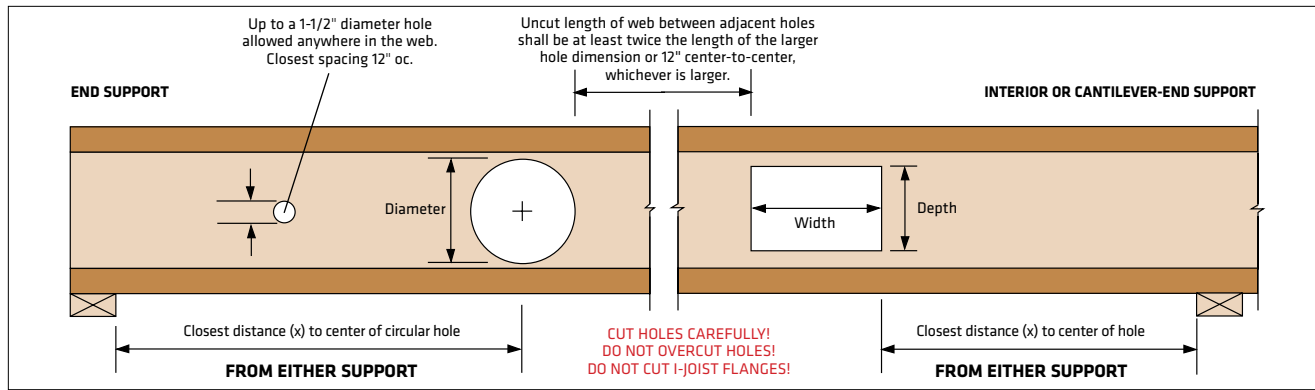
\* Web filler required for proper installation of hanger.

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



# Web Hole Specifications

THESE TABLES MUST BE USED IN CONJUNCTION WITH THE LP® SolidStart® TECHNICAL GUIDE FOR RESIDENTIAL CONSTRUCTION.



## TO USE:

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 (ft)	Distance from End Support					Distance from Interior or Cantilever-End Support					
				Hole Diameter					Hole Diameter					
				2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"
LPI 450	9-1/2"	6'	1'-0"	1'-0"	1'-0"	-	-	-	1'-0"	1'-0"	1'-0"	-	-	-
		10'	1'-0"	1'-0"	1'-8"	-	-	-	1'-0"	1'-0"	3'-2"	-	-	-
		14'	1'-0"	1'-0"	4'-2"	-	-	-	1'-5"	3'-7"	6'-3"	-	-	-
	11-7/8"	10'	1'-0"	1'-0"	1'-0"	1'-7"	-	-	1'-0"	1'-0"	1'-0"	3'-0"	-	-
		14'	1'-0"	1'-0"	1'-8"	4'-0"	-	-	1'-0"	1'-7"	3'-8"	6'-1"	-	-
		18'	1'-0"	1'-10"	4'-0"	6'-7"	-	-	2'-3"	4'-4"	6'-3"	-	-	-
	14"	22'	2'-0"	4'-1"	6'-6"	9'-3"	-	-	5'-0"	7'-3"	9'-10"	-	-	-
		14'	1'-0"	1'-0"	1'-0"	1'-11"	4'-1"	-	1'-0"	1'-0"	1'-10"	3'-10"	6'-2"	-
		18'	1'-0"	1'-0"	2'-1"	4'-3"	6'-8"	-	1'-0"	2'-7"	4'-7"	6'-10"	-	-
		22'	1'-0"	2'-4"	4'-5"	6'-9"	9'-5"	-	3'-5"	5'-5"	7'-7"	10'-0"	-	-
		26'	2'-7"	4'-7"	6'-10"	9'-4"	12'-2"	-	6'-2"	8'-4"	10'-8"	-	-	-

## DESIGN ASSUMPTIONS:

1. The hole locations listed are valid for floor joists supporting only uniform loads. The total uniform load shall not 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 is the I-joist Depth less 4" except the maximum hole depth is 6" for 9-1/2" LP I-joists, and 8" for 11-7/8" LP I-joists. 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.

RECTANGULAR HOLES	Series	Depth	Clear Span (ft)	Distance from End Support					Distance from Interior or Cantilever-End Support					
				Maximum Hole Dimension: Depth or Width					Maximum Hole Dimension: Depth or Width					
				2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"
LPI 450	9-1/2"	6'	1'-0"	1'-0"	1'-0"	1'-0"	1'-3"	1'-7"	1'-0"	1'-0"	1'-4"	1'-9"	2'-1"	2'-6"
		10'	1'-0"	1'-4"	2'-10"	3'-4"	3'-9"	4'-3"	1'-5"	2'-9"	4'-5"	-	-	-
		14'	2'-3"	3'-9"	5'-6"	6'-0"	6'-6"	-	4'-3"	5'-10"	-	-	-	-
	11-7/8"	10'	1'-0"	1'-0"	2'-2"	3'-7"	4'-0"	-	1'-2"	2'-4"	3'-8"	-	-	-
		14'	2'-0"	3'-3"	4'-8"	6'-3"	-	-	4'-0"	5'-4"	-	-	-	-
		18'	4'-5"	5'-9"	7'-4"	-	-	-	7'-1"	8'-6"	-	-	-	-
	14"	22'	6'-11"	8'-5"	10'-1"	-	-	-	10'-3"	-	-	-	-	-
		14'	1'-0"	1'-0"	2'-6"	4'-1"	6'-1"	-	1'-6"	2'-11"	4'-6"	6'-3"	-	-
		18'	1'-9"	3'-3"	4'-11"	6'-9"	-	-	4'-3"	5'-10"	7'-7"	-	-	-
		22'	4'-0"	5'-8"	7'-5"	9'-5"	-	-	7'-2"	8'-11"	-	-	-	-
		26'	6'-5"	8'-2"	10'-1"	12'-2"	-	-	10'-3"	12'-1"	-	-	-	-

## NOTES:

1. Holes may be placed anywhere within the depth of the joist. A minimum 1/4" clear distance is required between the hole and the flanges.
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 length 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 LP's design software or contact your local LP Engineered Wood Products distributor for more information.

LP SolidStart Engineered Wood Products are manufactured at different locations in the United States and Canada.

Please verify availability with the LP SolidStart Engineered Wood Products distributor in your area before specifying these products.

**Cal. Prop 65 Warning:** Use of this product may result in exposure to wood dust, known to the State of California to cause cancer.



For more information on the full line of LP SolidStart Engineered Wood Products or the nearest distributor, please contact 1.888.820.0325 or e-mail customer.support@lpcorp.com. Visit our web site at www.lpcorp.com.

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