

2010.3 Allowable Stress Design

- NOTE:
- THIS COMPONENT IS DESIGNED TO SUPPORT ONLY THE VERTICAL LOADS SHOWN. VERIFICATION OF LOADING, DEFLECTION LIMITATIONS, FRAMING METHODS, WIND AND SEISMIC BRACING, AND OTHER LATERAL BRACING THAT IS ALWAYS REQUIRED IS THE RESPONSIBILITY OF THE PROJECT ENGINEER OR ARCHITECT.
 - PROVIDE RESTRAINT AT SUPPORTS TO ENSURE LATERAL STABILITY.
 - DO NOT CUT, NOTCH OR DRILL LPI FLANGES.
 - SHIM ALL BEARINGS FOR FULL CONTACT.
 - VERIFY DIMENSIONS BEFORE CUTTING LPI TO SIZE.
 - THIS LPI IS TO BE USED AS A FLOOR JOIST ONLY.
 - COMPRESSION EDGE BRACING REQUIRED AT 77" O.C. OR LESS.

LOAD TABLE

NOTE: LOADS SHOWN ARE FOR INPUT LOAD CASE (1). OTHER LOAD CASES FOR PATTERN LIVE LOADING ARE CHECKED AS REQUIRED. (DIMENSIONS MEASURED FROM LEFT END OF SPAN OR CANTILEVER.)

DISTRIBUTION	SOURCE	TYPE	TOP/SIDE	LOAD	FROM	TO	LOAD	LDf
					FT-IN-SX	FT-IN-SX		
UNIFORM	FLOOR	LIVE	TOP	40 PLF	00-00-00	22-06-00		1.00
UNIFORM	FLOOR	DEAD	TOP	15 PLF	00-00-00	22-06-00		0.90
CONCENTRATED	ROOF	LIVE	TOP	369 LBS	00-00-00	MINBERG=3.50"		1.15
CONCENTRATED	ROOF	DEAD	TOP	184 LBS	00-00-00	MINBERG=3.50"		0.90
CONCENTRATED	WALL	DEAD	TOP	100 LBS	00-00-00	MINBERG=3.50"		0.90
CONCENTRATED	ROOF	LIVE	TOP	369 LBS	22-06-00	MINBERG=3.50"		1.15
CONCENTRATED	ROOF	DEAD	TOP	184 LBS	22-06-00	MINBERG=3.50"		0.90
CONCENTRATED	WALL	DEAD	TOP	100 LBS	22-06-00	MINBERG=3.50"		0.90

1 LPI 32Plus DEPTH 11.875"
WEB: 0.375"
FLANGE 1.50 X 2.50

DESIGN CRITERIA :
MSI: 0.49
VSI: 0.43
RSI: 0.42

LIVE LOAD = 40 PSF
DEAD LOAD = 15 PSF
TOTAL LOAD = 55 PSF

SPACING = 12.00 IN. C/C

DEFLECTION CRITERIA :
LIVE LOAD DEFL: L / 360
TOTAL LOAD DEFL: L / 240

CODE COMPLIANCES :
REPORT #
APA FR-1238
ICC-ES EBR-1305
CCMC 12412-R

DEFLECTION ASSUMES COMPOSITE ACTION WITH GLUED AND NAILED 23/32" APA RATED SHEATHING (48/24 SPAN RATING)

WARNING NOTES:

THIS COMPONENT DESIGN IS SPECIFICALLY FOR L-P ENGINEERED WOOD PRODUCTS. USE OF THIS DESIGN FOR ANYTHING OTHER THAN LP LVL OR LP LSL OR LP I-JOISTS IS STRICTLY PROHIBITED. ANY MODIFICATION OF THIS DOCUMENT REQUIRES REVIEW BY A DESIGN PROFESSIONAL.

PROVIDE RESTRAINT AT CONCENTRATED LOAD TO ENSURE LATERAL STABILITY.

MINIMUM BEARING SIZES ARE SUFFICIENT TO PREVENT CRUSHING OF THE LPI JOIST AS DESIGNED. IT IS THE RESPONSIBILITY OF THE PROJECT ENGINEER, ARCHITECT OR DESIGNER TO VERIFY THAT THE SUPPORT STRUCTURE FOR THIS JOIST IS CAPABLE OF SUPPORTING THE REACTIONS.

ANCHOR LPI JOIST SECURELY TO BEARINGS OR HANGERS.

SUBFLOOR TAKES CARE OF THIS.

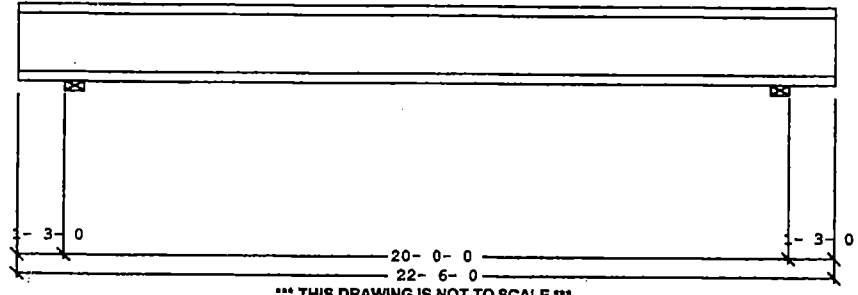
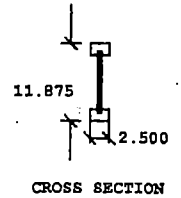
SUPPORT REACTIONS (LBS):

MAXIMUM BEARING NUMBER	1	2
DOWN	1086	1086
UPLIFT	---	---

MIN BEARING SIZES (IN-SX)

3-8	3-8
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	MAXIMUM DEFLECTIONS		LEFT CANTILEVER		RIGHT CANTILEVER	
	CALCULATED	ALLOWABLE	CALCULATED	ALLOWABLE	CALCULATED	ALLOWABLE
LIVE LOAD	0.35"	0.66"	-0.06"	0.20"	-0.06"	0.20"
*DEAD LOAD	0.08"		-0.01"		-0.01"	
TOTAL LOAD	0.40"	0.98"	-0.06"	0.30"	-0.06"	0.30"

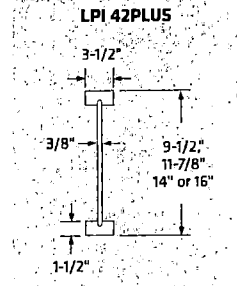
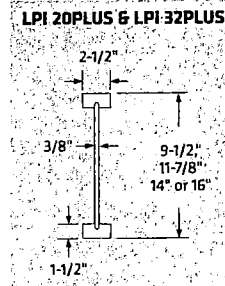


*** THIS DRAWING IS NOT TO SCALE ***

Handling & Erection	Miscellaneous Information	LP LVL, LP LSL and CTR, LP I-Joist Specifications	Software Provided By:
Temporary and permanent bracing for holding component plumb and for resisting lateral forces shall be designed and installed by others. No loads are to be applied to the component until after all the framing and fastening are completed. At no time shall loads greater than design loads be applied to the component.	The use of this component shall be specified by the designer of the complete structure. Obtain all the necessary code compliance approval and instructions from the designers of the complete structure before using this component. If the design criteria listed above does not meet local building code requirements, do not use this design. When this drawing is signed and sealed, the structural design is approved as shown in this drawing based on data provided by the customer. LP LVL, LP LSL and CTR, LP I-joists are made without camber and will deflect under load. Wood in direct contact with concrete must be protected as required by code. Continuous lateral support is assumed (wall, floor beam, etc.). LP does not provide on-site inspection. This drawing must have an Architect's or Engineer's seal affixed to be considered an Engineering document.	<ul style="list-style-type: none"> * Supports and connections for LP LVL, LP LSL, CTR and LPI to be specific applications. * Common nails driven parallel to glue lines shall be spaced a minimum of 4" for 10d and 3" for 8d. * Do not cut, notch, drill or alter LP LVL, LP LSL and CTR, LP I-joists except as shown in published material from LP any use of LP LVL, LSL and CTR, LP I-joists contrary to the limits set forth hereon, negates any express warranty of the product and LP disclaims all implied warranties including the implied warranties of merchantability and fitness for a particular use. 	LP Engineered Wood Products 08/24/10 WISC 414 Union Street, Suite 2000 Nashville, TN 37219 Phone 800.515.7570 Fax 866.753.4369
Design Criteria		* A COPY OF THIS DRAWING IS TO BE GIVEN TO THE INSTALLING CONTRACTOR LP is a registered trademark of Louisiana-Pacific Corporation.	DWG # _____ SHEET # _____

Product Specifications & Design Values

DESIGN VALUES						
Series	Depth	Weight (plf)	Moment (lb-ft)	EI (x 10 ⁶) (lb-in ²)	K (x 10 ³) (lb-ft/in)	Shear (lbs)
LPI 20Plus	9-1/2"	2.6	2810	185	0.358	1230
	11-7/8"	2.9	3755	318	0.438	1350
	14"	3.1	4400	474	0.512	1620
LPI 32Plus	9-1/2"	2.6	3620	243	0.213	1250
	11-7/8"	2.9	4690	406	0.267	1350
	14"	3.1	5645	589	0.313	1620
LPI 42Plus	9-1/2"	3.4	5375	328	0.501	1305
	11-7/8"	3.5	6965	555	0.613	1615
	14"	3.8	8390	810	0.716	1830
	16"	4.0	9725	1100	0.813	2020



NOTES:

- LPI® SolidStart® 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: Δ = 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.

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 20Plus	9-1/2"	970	1140	1110	1230	2065	2375	2330	2635	955
	11-7/8"	970	1275	1155	1350	2235	2525	2475	2830	
	14"	970	1395	1200	1620	2380	2665	2600	3005	
LPI 32Plus	9-1/2"	970	1140	1110	1250	2065	2375	2330	2635	1180
	11-7/8"	970	1275	1155	1350	2235	2525	2475	2830	
	14"	970	1395	1200	1620	2380	2665	2600	3005	
LPI 42Plus	9-1/2"	1160	1305	1305	1305	2900	3095	2900	3195	1705
	11-7/8"	1280	1550	1595	1615	3020	3340	3090	3515	
	14"	1280	1620	1595	1830	3135	3565	3265	3805	
	16"	1280	1800	1595	2020	3245	3775	3435	4080	

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, and may be further limited by the bearing strength of the support material. The bearing capacity of a wood support is based on the species of the lumber or type of composite lumber. For SPF lumber (425 psi), the Flange Bearing Capacity for the LPI 20Plus may be used.
- 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.

EXAMPLE:

Determine the stiffened end reaction capacity for a 14" LPI 20Plus with 2" of bearing for a non-snow roof load and supported on an SPF wall plate.

- Determine ER w/ Stiffeners:
 $ER = 1395 + (1620 - 1395) * (2" - 1.5") / (4" - 1.5") = 1440$ lbs
- Adjust for load duration: Adjusted ER = 1440 * 1.25 = 1800 lbs
- Determine Flange Bearing Capacity: FBC = 955 lb/in * 2" = 1910 lbs
- Determine wall plate bearing capacity: since wall plate is SPF, use same as LPI 20Plus = 1910 lbs
- Final End Reaction Capacity w/ Stiffeners = 1800 lbs

RIM AND BLOCKING CAPACITY		
Series	Depth	Uniform Vertical Load Capacity (plf)
LPI 20Plus	9-1/2"	1900
	11-7/8"	1760
	14"	1600
LPI 32Plus	9-1/2"	2200
	11-7/8"	2200
LPI 42Plus	14"	1600
	16"	1500

WE HAVE 653# 1086# REACTION

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 at right.

FLANGE FACE NAILING			
Series	Nail Size	Minimum Nail Distance	
		OC Spacing	End
LPI 20Plus	8d (2-1/2") Box or Common	2"	1"
LPI 32Plus	10d (3") or 12d (3-1/4") Box	2"	1"
LPI 42Plus	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	4"	1-1/2"

NOTES

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