

Power Joist[®] I-Joists
ANTHONY EACOM, Inc.

PR-L261
Revised January 24, 2012

Products: PJI-40, -60, -80, and -90 Prefabricated Wood I-Joists
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1. Basis of the product report:
 - 2012 and 2009 International Building Code (IBC): Sections 104.11 Alternative Materials and 2303.1.2 Prefabricated wood I-joists
 - 2012 and 2009 International Residential Code (IRC): Sections 104.11 Alternative Materials and R502.1.4 Prefabricated wood I-joists
 - ASTM D5055-09 and D5055-05 recognized by the 2012 IBC and IRC, and 2009 IBC and IRC, respectively
 - Performance Standard for APA EWS I-Joists, PRI-400
 - APA Reports T2001P-41, T2002P-3, T2002P-19, T2003P-32, T2003P-53, T2003P-64B, T2005P-54, T2005P-56, T2005P-102, T2007P-105B, T2008P-68, T2008P-90, T2009P-07A, and other qualification data
2. Product description:

Power Joist[®] I-Joists are made with lumber flanges and OSB web in accordance with the in-plant manufacturing standard approved by APA.
3. Design properties:

Tables 1 and 2 lists the design properties for Power Joist[®] I-Joists. The allowable spans for Power Joist[®] I-Joists shall be in accordance with the recommendations provided by the manufacturer (www.anthonyforest.com/powerjoist.shtml) and with APA *Performance Rated I-Joists*, Form Z725 (www.apawood.org/publications) for depths contained in the PRI Series.
4. Product installation:

Power Joist[®] I-Joists shall be installed in accordance with the recommendations provided by the manufacturer (www.anthonyforest.com/powerjoist.shtml) and APA *I-Joist Construction Details - Performance Rated I-Joists in Floor and Roof Framing*, Form D710 (www.apawood.org/publications). Permissible web holes and cantilever reinforcements shall be in accordance with the recommendations provided by the manufacturer, and with APA Form D710.
5. Fire-rated assemblies:

Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer (<http://www.anthonyforest.com/powerjoist.shtml>), and with APA Design/Construction Guide: *Fire-Rated Systems*, Form W305 (www.apawood.org/publications).
6. Limitations:
 - a) Power Joist[®] I-Joists shall be designed in accordance with the code using the design properties specified in this report.
 - b) Power Joist[®] I-Joists are limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent.
 - c) Power Joist[®] I-Joists are produced at ANTHONY EACOM's facility under a quality assurance program audited by APA.
 - d) This report is subject to re-examination in one year.

7. Identification:

The Power Joist® prefabricated wood I-joists described in this report are identified by a label bearing the manufacturer's name (ANTHONY EACOM, Inc.) and/or trademark, the APA assigned plant number (1058), the I-joist depth and series, the APA logo, the report number PR-L261, and a means of identifying the date of manufacture.

Table 1. Design Properties (Allowable Stress Design) for Power Joist® I-Joists ^(a)

Depth (inch)	Joist Series Designation	Also Qualified for	EI ^(b) (10 ⁶ lbf-in. ²)	M ^(c) (lbf-ft)	V ^(d) (lbf)	VLC (lbf/ft)	K ^(g) (10 ⁶ lbf)
9-1/4	9-1/4" PJI-40	N.A.	181	2,690	1,080	2,000	4.81
9-1/2	9-1/2" PJI-40	9-1/2" PRI-40	193	2,735	1,120	2,000	4.94
	9-1/2" PJI-60	9-1/2" PRI-60	231	3,780	1,120	2,000	4.94
11-1/4	11-1/4" PJI-40	N.A.	289	3,380	1,345	2,000	5.85
11-7/8	11-7/8" PJI-40	11-7/8" PRI-40	330	3,545	1,420	2,000	6.18
	11-7/8" PJI-60	11-7/8" PRI-60	396	4,900	1,420	2,000	6.18
	11-7/8" PJI-80	11-7/8" PRI-80	547	6,940	1,420	2,000	6.18
	11-7/8" PJI-90	N.A.	601	8,515	1,420	2,000	6.18
14	14" PJI-40	14" PRI-40	482	4,270	1,710	2,000	7.28
	14" PJI-60	14" PRI-60	584	5,895	1,710	2,000	7.28
	14" PJI-80	14" PRI-80	802	8,360	1,710	2,000	7.28
	14" PJI-90	N.A.	877	10,255	1,710	2,000	7.28
16	16" PJI-40	16" PRI-40	657	4,950	1,970	2,000	8.32
	16" PJI-60	16" PRI-60	799	6,835	1,970	2,000	8.32
	16" PJI-80	16" PRI-80	1,092	9,690	1,970	2,000	8.32
	16" PJI-90	N.A.	1,187	11,895	1,970	2,000	8.32
18	18" PJI-80	N.A.	1,413	11,000	2,450	2,000	9.36
	18" PJI-90	N.A.	1,546	13,445	2,450	2,000	9.36
20	20" PJI-80	N.A.	1,790	12,180	2,530	1,720	10.40
	20" PJI-90	N.A.	1,957	14,885	2,530	1,720	10.40
22	22" PJI-80	N.A.	2,214	13,340	2,615	1,440	11.44
	22" PJI-90	N.A.	2,419	16,305	2,615	1,440	11.44
24	24" PJI-80	N.A.	2,687	14,490	2,695	1,390	12.48
	24" PJI-90	N.A.	2,934	17,710	2,695	1,390	12.48

^(a) The tabulated values are design values for normal duration of load. All values, except for EI and K, shall be permitted to be adjusted for other load durations as permitted by the code.

^(b) Bending stiffness (EI) of the I-joist.

^(c) Moment capacity (M) of the I-joist, which shall not be increased by any repetitive member factor.

^(d) Shear capacity (V) of the I-joist.

^(e) Vertical Load Capacity of the I-joist.

^(f) Coefficient of shear deflection (K). For calculating uniform load and center-point load deflections of the Power Joist® in a simple-span application, use Eqs. 1 and 2.

$$\text{Uniform Load: } \delta = \frac{5\omega\ell^4}{384EI} + \frac{\omega\ell^2}{K} \quad [1]$$

$$\text{Center-Point Load: } \delta = \frac{P\ell^3}{48EI} + \frac{2P\ell}{K} \quad [2]$$

Where:

- δ = calculated deflection (in.),
- ω = uniform load (lbf/in.),
- P = concentrated load (lbf),
- ℓ = design span (in.),
- EI = bending stiffness of the I-joist (lbf-in.²), and
- K = coefficient of shear deflection (lbf).

Table 2. Reaction Capacities (Allowable Stress Design) for Power Joist® I-Joists ^(a)

Depth (in.)	Joist Series Designation	Intermediate Reaction ^(c) (lbf)				End Reaction ^(d) (lbf)			
		3-1/2 in. Brg. Length		5-1/2 in. Brg. Length		1-3/4 in. Brg. Length		4 in. Brg. Length	
		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners	
		No	Yes	No	Yes	No	Yes	No	Yes
9-1/4	PJI-40	2,700	2,880	2,795	3,230	1,080	1,080	1,080	1,080
9-1/2	PJI-40	2,755	2,900	3,245	3,245	1,080	1,120	1,120	1,120
	PJI-60	2,755	2,900	3,245	3,245	1,080	1,120	1,120	1,120
11-1/4	PJI-40	2,755	3,010	3,245	3,340	1,200	1,310	1,345	1,345
11-7/8	PJI-40	2,755	3,045	3,245	3,375	1,200	1,310	1,420	1,420
	PJI-60	2,755	3,045	3,245	3,375	1,200	1,310	1,420	1,420
	PJI-80	2,760	3,300	3,255	3,585	1,280	1,420	1,420	1,420
	PJI-90	2,760	3,300	3,255	3,585	1,280	1,420	1,420	1,420
14	PJI-40	2,755	3,175	3,245	3,485	1,200	1,480	1,550	1,710
	PJI-60	2,755	3,175	3,245	3,485	1,200	1,480	1,550	1,710
	PJI-80	3,020	3,455	3,435	3,745	1,280	1,710	1,550	1,710
	PJI-90	3,020	3,455	3,435	3,745	1,280	1,710	1,550	1,710
16	PJI-40	2,755	3,300	3,245	3,595	1,200	1,640	1,550	1,970
	PJI-60	2,755	3,300	3,245	3,595	1,200	1,640	1,550	1,970
	PJI-80	3,265	3,600	3,600	3,900	1,280	1,845	1,550	1,970
	PJI-90	3,265	3,600	3,600	3,900	1,280	1,845	1,550	1,970
18	PJI-80	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,450
	PJI-90	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,450
20	PJI-80	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,530
	PJI-90	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,530
22	PJI-80	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,615
	PJI-90	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,615
24	PJI-80	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,695
	PJI-90	3,200	3,950	3,650	4,350	N.A.	2,050	N.A.	2,695

^(a) The tabulated values are design values for normal duration of load. All values shall be permitted to be adjusted for other load durations provided that the adjusted reaction design value is not greater than the value specified below. Bearing stiffeners shall be installed in accordance with the recommendations provided by the manufacturer and APA D710.

Depth	Joist Series Designation	Maximum adjusted reaction capacity ^(b) (lbf)							
		3-1/2 in. Brg. Length		5-1/2 in. Brg. Length		1-3/4 in. Brg. Length		4 in. Brg. Length	
		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners	
		No	Yes	No	Yes	No	Yes	No	Yes
All	PJI-40	3,345		5,260		1,675		3,825	
	PJI-60	4,135		6,495		2,065		4,725	
	PJI-80	5,970		9,385		2,985		6,825	
	PJI-90	6,995		10,995		3,500		7,995	

^(b) The allowable reaction design capacity interpolated in accordance with Footnotes (c) and (d) as necessary and multiplied by an applicable load duration factor.

^(c) Interpolation of the intermediate reaction between 3-1/2- and 5-1/2-inch bearing lengths is permitted.

^(d) Interpolation of the end reaction between 1-3/4- and 4-inch bearing lengths is permitted.

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