

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

PR-L261
Revised August 16, 2011

Products: PJI-40, -60, -80, and -90 Prefabricated Wood I-Joists
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Plant: ANTHONY EACOM, Inc., 1195 Peoples Road, Sault Ste. Marie, ON, Canada P6C 3W7
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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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