

**PKI Series I-Joists**  
**PinkWood Ltd.**

**PR-L315C**

Revised April 6, 2016

Products: PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-Joists  
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1. Basis of the product report:
  - 2010 National Building Code of Canada (NBCC): Clause 1.2.1.1 of Division A and Clauses 4.1, 4.3.1.1, and 9.23.4.2 of Division B
  - CSA O86-14 Engineering Design in Wood
  - ASTM D5055-13e1 recognized by CSA O86-14
  - APA Reports T2014M-11, T2014M-19, T2015M-01, T2015M-09, T2016M-09, T2016M-14, and T2016M-17, and other qualification data
2. Product description:

PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists, as described in Table 1, are made with lumber flanges and an OSB web in accordance with the in-plant manufacturing standard approved by APA.
3. Design properties:

Tables 2 and 3 list the factored resistances for PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists. The maximum spans for PKI Series I-joists covered by this report shall be in accordance with the recommendations provided by the manufacturer ([www.pinkwood.ca](http://www.pinkwood.ca)).
4. Product installation:

PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists shall be installed in accordance with the recommendations provided by the manufacturer (see link above). Permissible web holes and cantilever reinforcements shall be in accordance with the recommendations provided by the manufacturer.
5. Fire-rated assemblies:

Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer (see link above), APA Product Report PR-S315, or Table A-9.10.3.1.B of the NBCC.
6. Limitations:
  - a) PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists shall be designed in accordance with the code using the design properties specified in this report.
  - b) PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists are limited to dry service conditions as defined in CSA O86, at which the average equilibrium moisture content of solid-sawn lumber over a year is 15 percent or less and does not exceed 19 percent.
  - c) PKI10, PKI20, PKI23, PKI35Plus, PKI40, and PKI50 Series I-joists are produced at the PinkWood Ltd. facility in Calgary, Alberta, Canada under a quality assurance program audited by APA.
  - d) This report is subject to re-examination in one year.

7. Identification:

The PKI Series prefabricated wood I-joists described in this report are identified by a label bearing the manufacturer's name (PinkWood Ltd.) and/or trademark, the APA assigned plant number (1113), the I-joist depth and series, the APA logo, the report number PR-L315, and a means of identifying the date of manufacture.

Table 1. Description of PKI Series I-Joists<sup>(a)</sup>

Joist Series	Joist Depths mm (in.)	Flanges			Web	
		Material	Dimension		Material	Thickness, mm (in.)
			Depth, mm (in.)	Width, mm (in.)		
PKI10	241 – 356 (9-1/2 -14)	Proprietary SPF	38 (1-1/2)	64 (2-1/2)	OSB	9.5 (3/8)
PKI20	241 – 406 (9-1/2 -16)	Proprietary SPF	38 (1-1/2)	64 (2-1/2)	OSB	9.5 (3/8)
PKI23	241 – 406 (9-1/2 -16)	Proprietary SPF	38 (1-1/2)	64 (2-1/2)	OSB	11 (7/16)
PKI35Plus	241 – 406 (9-1/2 -16)	Proprietary SPF	38 (1-1/2)	89 (3-1/2)	OSB	9.5 (3/8)
PKI40	241 – 406 (9-1/2 -16)	Proprietary SPF	38 (1-1/2)	89 (3-1/2)	OSB	9.5 (3/8)
	457 – 610 (18 - 24)	Proprietary SPF	38 (1-1/2)	89 (3-1/2)	OSB	11 (7/16)
PKI50	302 – 610 (11-7/8 - 24)	Proprietary SPF	38 (1-1/2)	89 (3-1/2)	OSB	11 (7/16)

<sup>(a)</sup> Referenced dimensions are nominal. Tolerances are as specified in the plant quality manual.

Table 2. Factored Resistances for PKI Series I-Joists (a)

Joist Depth mm (in.)	Joist Series	EI <sup>(b)</sup> (10 <sup>6</sup> kN-mm <sup>2</sup> )	M <sub>r</sub> <sup>(c)</sup> (kN-mm)	V <sub>r</sub> <sup>(d)</sup> (kN)	VLC <sub>r</sub> <sup>(e)</sup> (kN/m)	K <sup>(f)</sup> (kN)
241 (9-1/2)	PKI10	482	5,100	8.85	48.7	21,970
302 (11-7/8)		821	6,030	10.43	48.7	27,490
356 (14)		1,205	8,390	11.79	48.7	32,380
241 (9-1/2)	PKI20	554	6,335	8.85	48.7	21,970
302 (11-7/8)		938	8,465	10.43	48.7	27,490
356 (14)		1,375	9,930	11.79	48.7	32,380
406 (16)		1,871	11,410	13.13	48.7	37,010
241 (9-1/2)	PKI23	597	7,250	11.13	48.7	21,970
302 (11-7/8)		1,010	9,410	12.67	48.7	27,490
356 (14)		1,478	11,325	14.08	48.7	32,380
406 (16)		2,009	13,130	15.38	48.7	37,010
241 (9-1/2)	PKI35Plus	672	7,570	8.85	48.7	21,970
302 (11-7/8)		1,136	9,800	10.43	48.7	27,490
356 (14)		1,664	11,750	11.79	48.7	32,380
406 (16)		2,258	13,350	13.13	48.7	37,010
241 (9-1/2)	PKI40	941	12,150	9.41	48.7	21,970
302 (11-7/8)		1,587	15,720	11.41	48.7	27,490
356 (14)		2,316	18,930	13.16	48.7	32,380
406 (16)		3,134	21,940	14.85	48.7	37,010
457 (18)		4,078	24,815	17.80	43.8	41,630
508 (20)		5,163	27,450	18.82	39.0	46,260
559 (22)		6,382	30,070	19.76	31.6	50,885
610 (24)		7,742	32,650	20.68	26.8	55,510
302 (11-7/8)	PKI50	1,621	17,940	14.99	48.7	27,490
356 (14)		2,365	20,745	16.01	48.7	32,380
406 (16)		3,200	24,025	16.96	48.7	37,010
457 (18)		4,170	28,795	17.80	43.8	41,630
508 (20)		5,277	31,960	18.82	39.0	46,260
559 (22)		6,523	32,900	19.76	31.6	50,885
610 (24)	7,912	35,730	20.68	26.8	55,510	

For Imperial: 1 mm = 0.0394 in., 1 N = 0.2248 lbf, 1 kN/m = 5.71 lbf/in.

(a) All factored resistance values include the resistance factor specified in CSA-O86. The tabulated values are for the standard term of load duration ( $K_D = 1.0$ ). All values, except for EI, vertical load resistance, and K, are permitted to be adjusted for other load durations as permitted by the code.

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

(c) Factored moment resistance ( $M_r$ ) of the I-joist.

(d) Factored shear resistance ( $V_r$ ) of the I-joist.

(e) Factored uniform vertical load resistance ( $VLC_r$ ) of the I-joist.

(f) Coefficient of shear deflection (K). For calculating uniform load and center-point load deflections of the I-joist in a simple-span application, use Equations 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:  $\delta$  = calculated deflection (mm)  
 $\omega$  = uniform load (kN/mm)  
 P = concentrated load (kN)

- $\ell$  = design span (mm)
- $EI$  = bending stiffness of the I-joist (kN-mm<sup>2</sup>)
- $K$  = coefficient of shear deflection (kN)

Table 3. Factored Reaction Resistances for PKI Series I-Joists<sup>(a,b,c)</sup>

Joist Depth mm (in.)	Joist Series	End Reaction(kN)				Intermediate Reaction (kN)			
		38 mm (1-1/2 in.) or 64 mm (2-1/2 in.) <sup>(d)</sup> Brg. Length		89 mm (3-1/2 in.) or 102 mm (4 in.) <sup>(e)</sup> Brg. Length		89 mm (3-1/2 in.) Brg. Length		140 mm (5-1/2 in.) Brg. Length	
		w/o Brg. Stiffeners	w/Brg. Stiffeners	w/o Brg. Stiffeners	w/Brg. Stiffeners	w/o Brg. Stiffeners	w/Brg. Stiffeners	w/o Brg. Stiffeners	w/Brg. Stiffeners
241 (9-1/2) 302 (11-7/8) 356 (14)	PKI10	6.32	8.00	7.79	8.85	15.41	16.01	17.20	17.69
		6.32	8.95	8.14	10.43	15.41	17.45	17.73	19.73
		6.32	9.79	8.42	11.79	15.41	18.71	18.15	20.78
241 (9-1/2) 302 (11-7/8) 356 (14) 406 (16)	PKI20	6.81	8.00	7.79	8.85	15.41	16.67	17.20	18.50
		6.81	8.95	8.14	10.43	16.36	17.73	18.22	19.87
		6.81	9.79	8.42	11.79	17.24	18.71	19.13	21.10
		6.81	10.60	8.71	13.13	18.04	19.62	20.01	22.29
241 (9-1/2) 302 (11-7/8) 356 (14) 406 (16)	PKI23	7.37	10.04	9.48	10.53	16.92	19.45	20.01	22.54
		7.37	10.32	10.08	11.80	16.92	19.45	20.01	23.03
		7.37	10.57	10.43	12.95	16.92	19.45	20.01	23.45
		7.37	10.81	10.53	14.04	16.92	19.45	20.01	23.87
241 (9-1/2) 302 (11-7/8) 356 (14) 406 (16)	PKI35Plus	6.32	8.00	7.79	8.85	15.41	16.01	17.20	17.69
		6.32	8.95	8.14	10.43	15.41	17.45	17.73	19.73
		6.32	9.79	8.42	11.79	15.41	18.71	18.15	20.78
		6.32	10.60	8.59	13.09	15.41	20.22	18.57	21.80
241 (9-1/2) 302 (11-7/8) 356 (14) 406 (16) 457 (18) 508 (20) 559 (22) 610 (24)	PKI40	8.32	9.41	9.16	9.41	20.36	21.73	20.64	22.43
		8.74	10.60	11.20	11.41	21.24	23.45	21.90	24.68
		8.99	11.65	11.20	13.16	21.66	25.03	23.03	26.71
		9.09	12.64	11.20	14.85	22.08	26.50	24.12	28.64
		9.20	14.46	11.80	17.90	20.01	30.08	24.12	34.89
		9.20	15.34	11.80	18.54	20.01	30.96	24.12	34.89
		9.20	16.22	11.80	19.20	20.01	31.80	24.12	34.89
		9.20	17.13	11.80	19.87	20.01	32.58	24.12	34.89
302 (11-7/8) 356 (14) 406 (16) 457 (18) 508 (20) 559 (22) 610 (24)	PKI50	8.74	10.60	11.20	11.41	21.24	23.45	21.90	24.68
		8.99	11.65	11.20	13.16	21.66	25.03	23.03	26.71
		9.09	12.64	11.20	14.85	22.08	26.50	24.12	28.64
		9.20	14.46	11.80	17.90	20.01	30.08	24.12	34.89
		9.20	15.34	11.80	18.54	20.01	30.96	24.12	34.89
		9.20	16.22	11.80	19.20	20.01	31.80	24.12	34.89
		9.20	17.13	11.80	19.87	20.01	32.58	24.12	34.89

For Imperial: 1 mm = 0.0394 in., 1 N = 0.2248 lbf

- (a) The tabulated values are for the standard term of load duration ( $K_D = 1.0$ ). All values are permitted to be adjusted for other load durations as permitted by the code provided that the adjusted values do not exceed the factored compressive resistance perpendicular to grain ( $Q_r$ ) of the bearing plate supporting the I-joist in accordance with CSA O86.
- (b) Interpolation between bearing lengths is permitted.
- (c) Bearing stiffeners shall be installed in accordance with the recommendations provided by the manufacturer.
- (d) Bearing length = 64 mm (2-1/2 in.) for 457-mm (18-in.) to 610-mm (24-in.) deep PKI40 and PKI50 I-joist series. Bearing length = 38 mm (1-1/2 in.) for all other cases.
- (e) Bearing length = 89 mm (3-1/2 in.) for PKI23 I-joist series. Bearing length = 102 mm (4 in.) for all other cases.

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