IB Series I-Joists
International Beams, Inc.

PR-L252C

Revised September 30, 2018

Products: IB400, 600, 800 and 900 Prefabricated Wood I-Joists
International Beams, Inc., 2010 Bld. St-Elzear West, Laval, Quebec, H7L 4A8, Canada
(941) 552-9914
www.internationalbeams.com;

1. Basis of the product report:
    - 2015 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
    - CAN/CSA O86-14 (reprinted May 2016) Engineering Design in Wood
    - ASTM D5055-13e1 recognized by CAN/CSA O86-14
    - Performance Standard for APA EWS I-Joists, PRI-400
    - APA Reports T2000P-42A, T2001P-53, T2001P-63, T2001P-78, T2002P-65, T2003P-17, T2003P-18A, T2003P-52, T2005P-01A, T2005P-40B, T2005P-99A, T2006P-36, T2006P-43, T2006P-53, T2008P-37, T2009P-34A, T2010P-06, T2010P-49A, T2013P-31, and T2014P-10, and other qualification data

2. Product description:
    IB Series I-Joists covered in this report, as described in Table 1, are made with lumber flanges and OSB web in accordance with the in-plant manufacturing standard approved by APA.

3. Design properties:
    Tables 2 through 4 list the factored resistances for IB Series I-Joists. The design spans for IB Series I-Joists shall be in accordance with the recommendations provided by the manufacturer (www.internationalbeams.com) and with APA EWS Standard PRI-400, *Performance Standard for APA EWS I-Joists (Limit States Design)*, Form EWS E720CA (www.apawood.org/resource-library), for depths contained in the PRI Series.

4. Product installation:
    IB Series I-Joists shall be installed in accordance with the recommendations provided by the manufacturer (see link above) and APA *I-Joist Construction Details – Canadian Limit States Design – Performance Rated I-Joists in Floor and Roof Framing*, Form E715CA (see link above). Permissible web holes and cantilever reinforcements shall be in accordance with the recommendations provided by the manufacturer, and with APA E715CA for products contained in the PRI Series.

5. Fire-rated assemblies:
    Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer (see link above) or Table A-9.10.3.1.B of NBCC.

6. Limitations:
    a) IB Series I-Joists shall be designed in accordance with the code using the design properties specified in this report.
    b) IB 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) All IB Series I-Joists are produced at International Beams' facility in Pohénégamook, Quebec, and only IB400 and IB600 series I-joists at International Beams' facility in Tillsonburg, Ontario, under a quality assurance program audited by APA.

    d) This report is subject to re-examination in one year.

7. Identification:

The IB Series prefabricated wood I-joists described in this report are identified by a label bearing the manufacturer's name (International Beams) and/or trademark, the APA assigned plant number (1033 for the Pohénégamook plant or 1114 for the Tillsonburg plant), the I-joist depth and series, the APA logo, the report number PR-L252C, and a means of identifying the date of manufacture. IB400 and IB600 in depths of 241 mm (9-1/2 in.) through 406 mm (16 in.) are permitted to be labeled as RFPI-40S and RFPI-60S, respectively, when using the design values specified in CCMC 13323-R.

Table 1. Description of IB Series of I-Joists [a,b]

Joist Series	Joist Depths, mm (in.)	Flanges			Web	
		Material	Dimension		Material	Thickness, mm (in.)
			Depth, mm (in.)	Width, mm (in.)		
IB400	235 – 406 (9-1/4 – 16)	Proprietary SPF	38 (1-1/2)	64 (2-1/2)	OSB	9.5 (3/8)
IB600	235 – 508 (9-1/4 – 20)	MSR	38 (1-1/2)	64 (2-1/2)	OSB	9.5 (3/8)
IB800	235 – 508 (9-1/4 – 20)	MSR	38 (1-1/2)	89 (3-1/2)	OSB	9.5 (3/8)
IB900	302 – 610 (11-7/8 – 24)	MSR	38 (1-1/2)	89 (3-1/2)	OSB	11 (7/16)

[a] Referenced dimensions are nominal. Tolerances are as specified in the in-plant quality manual.

[b] The Tillsonburg plant is only qualified to produce the IB400 and IB600 series.

Table 2. Factored Resistances of IB Series I-Joists [a]

Joist Series	Joist Depth, mm (in.)	Also Qualified for	EI[b], 10^6 kN – mm² (10^6 lbf-in.²)	M_r[c], N-m (lbf-ft)	V_r[d], N (lbf)	VLC_r[e], kN/m (plf)	K[f], 10^6 N (10^6 lbf)
IB400	235 (9-1/4)	NA	531 (185)	6,122 (4,515)	8,109 (1,823)	48.7 (3,340)	21.40 (4.81)
	241 (9-1/2)	PRI-40	568 (198)	6,314 (4,657)	8,320 (1,870)	48.7 (3,340)	21.97 (4.94)
	286 (11-1/4)	NA	849 (296)	7,690 (5,672)	9,864 (2,218)	48.7 (3,340)	26.02 (5.85)
	302 (11-7/8)	PRI-40	964 (336)	8,186 (6,038)	10,391 (2,336)	48.7 (3,340)	27.49 (6.18)
	356 (14)	PRI-40	1,418 (494)	9,854 (7,268)	12,286 (2,762)	48.7 (3,340)	32.38 (7.28)
	406 (16)	PRI-40	1,931 (673)	11,422 (8,424)	14,042 (3,157)	48.7 (3,340)	37.01 (8.32)
IB600	235 (9-1/4)	NA	631 (220)	8,434 (6,221)	9,478 (2,131)	48.7 (3,340)	21.40 (4.81)
	241 (9-1/2)	PRI-60	674 (235)	8,704 (6,420)	9,619 (2,162)	48.7 (3,340)	21.97 (4.94)
	286 (11-1/4)	NA	1,022 (356)	10,598 (7,817)	10,637 (2,391)	48.7 (3,340)	26.02 (5.85)
	302 (11-7/8)	PRI-60	1,145 (399)	11,275 (8,316)	11,023 (2,478)	48.7 (3,340)	27.49 (6.18)
	356 (14)	PRI-60	1,679 (585)	13,575 (10,012)	12,286 (2,762)	48.7 (3,340)	32.38 (7.28)
	406 (16)	PRI-60	2,293 (799)	15,740 (11,609)	14,042 (3,157)	48.7 (3,340)	37.01 (8.32)
	457 (18)	NA	3,002 (1,046)	17,803 (13,131)	15,797 (3,551)	42.6 (2,920)	41.64 (9.36)
	508 (20)	NA	3,742 (1,304)	19,697 (14,528)	17,552 (3,946)	36.5 (2,500)	46.26 (10.40)
IB800	235 (9-1/4)	NA	881 (307)	11,940 (8,806)	9,759 (2,194)	48.7 (3,340)	21.40 (4.81)
	241 (9-1/2)	NA	936 (326)	12,324 (9,090)	9,864 (2,218)	48.7 (3,340)	21.97 (4.94)
	286 (11-1/4)	NA	1,415 (493)	15,007 (11,069)	10,812 (2,431)	48.7 (3,340)	26.02 (5.85)
	302 (11-7/8)	PRI-80	1,584 (552)	15,965 (11,775)	11,128 (2,502)	48.7 (3,340)	27.49 (6.18)
	356 (14)	PRI-80	2,316 (807)	19,235 (14,187)	12,286 (2,762)	48.7 (3,340)	32.38 (7.28)
	406 (16)	PRI-80	3,139 (1,094)	22,302 (16,449)	14,042 (3,157)	48.7 (3,340)	37.01 (8.32)
	457 (18)	NA	4,147 (1,445)	25,109 (18,519)	16,148 (3,630)	44.1 (3,020)	41.64 (9.36)
	508 (20)	NA	5,163 (1,799)	27,917 (20,591)	18,254 (4,104)	39.6 (2,710)	46.26 (10.40)
IB900	302 (11-7/8)	PRI-90	1,733 (604)	19,900 (14,677)	13,515 (3,038)	48.7 (3,340)	27.49 (6.18)
	356 (14)	PRI-90	2,537 (884)	23,971 (17,680)	14,919 (3,354)	48.7 (3,340)	32.38 (7.28)
	406 (16)	PRI-90	3,441 (1,199)	28,492 (21,015)	16,358 (3,677)	48.7 (3,340)	37.01 (8.32)
	457 (18)	NA	4,491 (1,564)	32,213 (23,759)	17,622 (3,962)	44.1 (3,020)	51.24 (11.52)
	508 (20)	NA	5,693 (1,984)	35,652 (26,296)	18,921 (4,254)	39.6 (2,710)	56.94 (12.80)
	559 (22)	NA	7,051 (2,458)	39,057 (28,807)	20,185 (4,538)	30.4 (2,080)	62.63 (14.08)
	610 (24)	NA	8,566 (2,986)	42,417 (31,285)	21,484 (4,830)	30.4 (2,080)	68.32 (15.36)

(Footnotes on following page)

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, VL_r, 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-joists in a simple-span application, use Eqs. 1 and 2.

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

$$\text{Center-Point Load:} \qquad \delta = \frac{P L^3}{48\,EI} + \frac{2\,PL}{K} \qquad\qquad [2]$$

where δ = calculated deflection (mm or in.), ω = unfactored uniform load (kN/mm or lbf/in.),
            P = unfactored concentrated load (kN or lbf),   L = design span (mm or in.),
            EI = bending stiffness of the I-joist (kN-mm² or lbf-in.²), and   K = coefficient of shear deflection (kN or lbf).

Table 3. Additional Factored Resistances of IB Series I-Joists [a,b,c]

Joist Series	Joist Depth, mm (in.)	Also Qualified for	Factored End Reactions, N (lbf)									
			38 mm (1-1/2 in.) Bearing		44 mm (1-3/4 in.) Bearing		70 mm (3 in.) Bearing		89 mm (3-1/2 in.) Bearing		102 mm (4 in.) Bearing	
			No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.
IB400	235 (9-1/4)	NA	7,793 (1,752)	8,109 (1,823)	7,828 (1,760)	8,109 (1,823)	8,109 (1,823)	8,109 (1,823)	8,109 (1,823)	8,109 (1,823)	8,109 (1,823)	8,109 (1,823)
	241 (9-1/2)	PRI-40	7,863 (1,768)	8,320 (1,870)	7,934 (1,784)	8,320 (1,870)	8,320 (1,870)	8,320 (1,870)	8,320 (1,870)	8,320 (1,870)	8,320 (1,870)	8,320 (1,870)
	286 (11-1/4)	NA	8,249 (1,854)	9,513 (2,139)	8,460 (1,902)	9,548 (2,146)	9,408 (2,115)	9,864 (2,218)	9,864 (2,218)	9,864 (2,218)	9,864 (2,218)	9,864 (2,218)
	302 (11-7/8)	PRI-40	8,425 (1,894)	9,970 (2,241)	8,636 (1,941)	10,040 (2,257)	9,619 (2,162)	10,391 (2,336)	10,285 (2,336)	10,391 (2,336)	10,391 (2,336)	10,391 (2,336)
	356 (14)	PRI-40	8,846 (1,989)	11,444 (2,573)	9,092 (2,044)	11,549 (2,596)	10,215 (2,296)	12,286 (2,762)	10,882 (2,433)	12,286 (2,762)	10,882 (2,446)	12,286 (2,762)
	406 (16)	PRI-40	9,303 (2,091)	12,813 (2,880)	9,513 (2,139)	12,953 (2,912)	10,215 (2,296)	14,042 (3,157)	10,882 (2,433)	14,042 (3,157)	10,882 (2,446)	14,042 (3,157)
IB600	235 (9-1/4)	NA	7,793 (1,752)	8,109 (1,823)	7,934 (1,784)	9,478 (2,131)	8,109 (1,823)	9,478 (2,131)	8,109 (1,823)	9,478 (2,131)	8,109 (1,823)	9,478 (2,131)
	241 (9-1/2)	PRI-60	7,863 (1,768)	8,320 (1,870)	8,004 (1,799)	9,619 (2,162)	8,320 (1,870)	9,619 (2,162)	8,320 (1,870)	9,619 (2,162)	8,320 (1,870)	9,619 (2,162)
	286 (11-1/4)	NA	8,249 (1,854)	9,513 (2,139)	8,530 (1,918)	10,637 (2,391)	9,408 (2,115)	10,637 (2,391)	9,864 (2,218)	10,637 (2,391)	9,864 (2,218)	10,637 (2,391)
	302 (11-7/8)	PRI-60	8,425 (1,894)	9,970 (2,241)	8,706 (1,957)	11,023 (2,478)	9,619 (2,162)	11,023 (2,478)	10,285 (2,312)	11,023 (2,478)	10,391 (2,336)	11,023 (2,478)
	356 (14)	PRI-60	8,846 (1,989)	11,444 (2,573)	9,373 (2,107)	12,286 (2,762)	10,250 (2,304)	12,286 (2,762)	10,882 (2,446)	12,286 (2,762)	10,882 (2,446)	12,286 (2,762)
	406 (16)	PRI-60	9,303 (2,091)	12,813 (2,880)	9,970 (2,241)	13,515 (3,038)	10,496 (2,360)	13,831 (3,109)	10,882 (2,446)	14,042 (3,157)	10,882 (2,446)	14,042 (3,157)
	457 (18)	NA	NA	NA	10,566 (2,375)	14,709 (3,307)	10,742 (2,415)	15,340 (3,449)	10,882 (2,446)	15,797 (3,551)	10,882 (2,446)	15,797 (3,551)
	508 (20)	NA	NA	NA	10,882 (2,422)	15,867 (3,567)	10,882 (2,446)	16,815 (3,780)	10,882 (10,446)	17,552 (3,946)	10,882 (2,446)	17,552 (3,946)

(Footnotes on Page 6)

Table 3. Additional Factored Resistances of IB Series I-Joists [a,b,c] (Continued)

Joist Series	Joist Depth, mm (in.)	Also Qualified for	Factored End Reactions, N (lbf)									
			38 mm (1-1/2 in.) Bearing		44 mm (1-3/4 in.) Bearing		70 mm (3 in.) Bearing		89 mm (3-1/2 in.) Bearing		102 mm (4 in.) Bearing	
			No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.	No B.S.	B.S.
IB800	235 (9-1/4)	NA	7,793 (1,752)	8,109 (1,823)	7,934 (1,784)	9,689 (2,178)	8,109 (1,823)	9,689 (2,178)	8,109 (1,823)	9,689 (2,178)	8,109 (1,823)	9,759 (2,194)
	241 (9-1/2)	NA	7,863 (1,768)	8,320 (1,870)	8,004 (1,799)	9,864 (2,218)	8,320 (1,870)	9,864 (2,218)	8,320 (1,870)	9,864 (2,218)	8,320 (1,870)	9,864 (2,218)
	286 (11-1/4)	NA	8,249 (1,854)	9,513 (2,139)	8,530 (1,918)	10,812 (2,431)	9,408 (2,115)	10,812 (2,431)	9,864 (2,218)	10,812 (2,431)	9,864 (2,218)	10,812 (2,431)
	302 (11-7/8)	PRI-80	8,425 (1,894)	9,970 (2,241)	9,022 (2,028)	11,128 (2,502)	9,619 (2,162)	11,128 (2,502)	10,285 (2,312)	11,128 (2,502)	10,391 (2,336)	11,128 (2,502)
	356 (14)	PRI-80	8,846 (1,989)	11,444 (2,573)	9,373 (2,107)	12,286 (2,762)	10,250 (2,304)	12,286 (2,762)	10,882 (2,446)	12,286 (2,762)	10,882 (2,446)	12,286 (2,762)
	406 (16)	PRI-80	9,303 (2,091)	12,813 (2,880)	9,970 (2,241)	14,042 (3,157)	10,496 (2,360)	14,042 (3,157)	10,882 (2,446)	14,042 (3,157)	10,882 (2,446)	14,042 (3,157)
	457 (18)	NA	NA	NA	10,566 (2,375)	15,937 (3,583)	10,742 (2,415)	16,059 (3,610)	10,882 (2,446)	16,148 (3,630)	11,233 (2,525)	16,148 (3,630)
	508 (20)	NA	NA	NA	10,882 (2,433)	17,271 (3,883)	10,882 (2,433)	17,839 (4,010)	10,882 (2,446)	18,254 (4,104)	11,584 (2,604)	18,254 (4,104)
IB900	302 (11-7/8)	PRI-90	8,425 (1,894)	9,970 (2,241)	9,829 (2,210)	11,128 (2,502)	11,444 (2,573)	12,006 (2,699)	12,673 (2,762)	12,673 (2,849)	13,234 (2,975)	13,515 (3,038)
	356 (14)	PRI-90	8,846 (1,989)	11,444 (2,573)	9,829 (2,210)	12,286 (2,762)	11,444 (2,573)	13,129 (2,952)	12,673 (2,762)	13,761 (3,094)	13,234 (2,975)	14,919 (3,354)
	406 (16)	PRI-90	9,303 (2,091)	12,813 (2,880)	9,970 (2,241)	14,042 (3,157)	11,514 (2,588)	15,376 (3,457)	12,673 (2,762)	16,358 (3,677)	13,234 (2,975)	16,358 (3,677)
	457 (18)	NA	NA	NA	10,566 (2,375)	15,937 (3,583)	11,233 (2,525)	16,885 (3,796)	11,760 (2,644)	17,622 (3,962)	13,234 (2,975)	17,622 (3,962)
	508 (20)	NA	NA	NA	10,882 (2,446)	17,341 (3,898)	11,374 (2,557)	18,184 (4,088)	11,760 (2,644)	18,816 (4,230)	13,234 (2,975)	18,921 (4,254)
	559 (22)	NA	NA	NA	10,321 (2,320)	18,219 (4,096)	11,128 (2,502)	19,132 (4,301)	11,760 (2,466)	19,799 (4,471)	13,234 (2,975)	20,185 (4,538)
	610 (24)	NA	NA	NA	10,321 (2,320)	20,220 (4,546)	11,128 (2,502)	20,536 (4,617)	11,760 (2,466)	20,782 (4,672)	13,234 (2,975)	21,484 (4,830)

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 and APA E715CA.

Table 4. Additional Factored Resistances of IB Series I-Joists [a,b,c]

Joist Series	Joist Depth, mm (in.)	Permitted to Be Labeled as	Factored Intermediate Reactions, N (lbf)			
			89 mm (3-1/2 in.) Bearing		140 mm (5-1/2 in) Bearing	
			No Stiffeners	Stiffeners	No Stiffeners	Stiffeners
IB400	235 (9-1/4)	NA	15,165 (3,409)	16,218 (3,646)	16,218 (3,646)	16,218 (3,646)
	241 (9-1/2)	PRI-40	15,165 (3,409)	16,639 (3,741)	16,639 (3,741)	16,639 (3,741)
	286 (11-1/4)	NA	17,552 (3,946)	19,623 (4,411)	19,728 (4,435)	19,728 (4,435)
	302 (11-7/8)	PRI-40	17,552 (3,946)	19,658 (4,419)	19,728 (4,435)	20,782 (4,672)
	356 (14)	PRI-40	17,552 (3,946)	19,833 (4,459)	21,765 (4,893)	24,257 (5,453)
	406 (16)	PRI-40	17,552 (3,946)	20,009 (4,498)	21,765 (4,893)	25,626 (5,761)
IB600	235 (9-1/4)	NA	15,165 (3,409)	18,956 (4,261)	16,218 (3,646)	18,956 (4,261)
	241 (9-1/2)	PRI-60	15,165 (3,409)	19,237 (4,325)	16,639 (3,741)	19,237 (4,325)
	286 (11-1/4)	NA	17,552 (3,946)	21,273 (4,782)	19,728 (4,435)	21,273 (4,782)
	302 (11-7/8)	PRI-60	17,552 (3,946)	21,589 (4,853)	19,728 (4,435)	22,045 (4,956)
	356 (14)	PRI-60	17,552 (3,946)	22,572 (5,074)	21,765 (4,893)	24,257 (5,453)
	406 (16)	PRI-60	17,552 (3,946)	23,520 (5,288)	21,765 (4,893)	25,626 (5,761)
	457 (18)	NA	17,552 (3,946)	24,046 (5,406)	21,765 (4,893)	26,223 (5,895)
	508 (20)	NA	17,552 (3,946)	24,222 (5,445)	21,765 (4,893)	26,820 (6,029)
IB800	235 (9-1/4)	NA	16,218 (3,646)	18,956 (4,261)	16,218 (3,646)	18,956 (4,261)
	241 (9-1/2)	NA	17,341 (3,898)	19,237 (4,325)	17,341 (3,898)	19,237 (4,325)
	286 (11-1/4)	NA	19,728 (4,435)	21,273 (4,782)	19,728 (4,435)	21,273 (4,782)
	302 (11-7/8)	PRI-80	19,728 (4,435)	22,045 (4,956)	19,728 (4,435)	22,045 (4,956)
	356 (14)	PRI-80	21,203 (4,767)	24,573 (5,524)	21,765 (4,893)	24,573 (5,524)
	406 (16)	PRI-80	21,765 (4,893)	28,083 (6,313)	21,765 (4,893)	28,083 (6,313)
	457 (18)	NA	21,765 (4,893)	29,663 (6,669)	21,765 (4,893)	29,663 (6,669)
	508 (20)	NA	21,765 (4,893)	30,541 (6,866)	21,765 (4,893)	30,541 (6,866)
IB900	302 (11-7/8)	PRI-90	23,555 (5,295)	23,555 (5,295)	23,555 (5,295)	23,555 (5,295)
	356 (14)	PRI-90	23,555 (5,295)	24,783 (5,571)	23,555 (5,295)	25,696 (5,777)
	406 (16)	PRI-90	23,555 (5,295)	27,522 (6,194)	23,555 (5,295)	28,715 (6,455)
	457 (18)	NA	23,555 (5,295)	29,979 (6,740)	23,555 (5,295)	32,577 (7,324)
	508 (20)	NA	23,555 (5,295)	32,296 (7,260)	23,555 (5,295)	35,104 (7,892)
	559 (22)	NA	23,555 (5,295)	34,753 (7,813)	23,555 (5,295)	35,631 (8,010)
	610 (24)	NA	23,555 (5,295)	36,157 (8,128)	23,555 (5,295)	36,157 (8,128)

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 and APA E715CA.

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