



IB Series I-Joists International Beams

PR-L252

Revised April 19, 2018

Products: IB400, 600, 800 and 900 Prefabricated Wood I-Joists
International Beams, 240 South Pineapple Avenue, Suite 510, Sarasota, FL 34236
www.internationalbeams.com

1. Basis of the product report:
 - 2018, 2015, and 2012 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.2 Prefabricated wood I-joists
 - 2018 and 2015 International Residential Code (IRC): Sections R104.11 Alternative materials, and R502.1.2 and R802.1.8 (2018 IRC only) Prefabricated wood I-joists
 - 2012 IRC: Sections R104.11 Alternative materials and R502.1.4 Prefabricated wood I-joists
 - ASTM D5055-13e1, D5055-13, and D5055-09 recognized by the 2018 IBC and IRC, 2015 IBC and IRC, and 2012 IBC and IRC, respectively
 - Performance Standard for APA EWS I-Joists, PRI-400
 - AWC SDPWS-2015 Special Design Provisions for Wind and Seismic
 - 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, T2014P-10, T2015L-05B, and T2017P-25, and other qualification data
2. Product description:

IB Series I-joists are made with lumber flanges and OSB web, as described in Table 1, and the in-plant manufacturing standard approved by APA.
3. Design properties:

Tables 2 through 4 list the design properties for IB Series I-joists. Table 5 shows the allowable lateral shear capacities of IB Series I-Joists in diaphragm applications. The allowable spans for IB Series I-joists shall be in accordance with the recommendations provided by the manufacturer (www.internationalbeams.com), and with APA Design & Construction Guide, *Performance Rated I-Joists*, Form Z725 (www.apawood.org/resource-library) for products 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 Design & Construction Guide, *I-Joist Construction Details*, Form D710 (see link above). Permissible web holes and cantilever reinforcements shall be in accordance with the recommendations provided by the manufacturer, and with APA D710 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), APA Product Report PR-S205 (see link above), or APA Design & Construction Guide, *Fire-Rated Systems*, Form W305 (see link above) for products contained in the PRI Series. I-joists listed in this report may be used in the fire-rated assemblies described in the 2018, 2015, and 2012 IBC Table 721.1(3), as applicable, provided the I-joists meet the criteria described in the respective assemblies.

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 where the average equilibrium moisture content of solid-sawn lumber is less than 16 percent.
 - c) All IB Series I-joists are produced at International Beams' facility in Pohénégamook, Quebec and only IB400 and IB600 series I-joists are produced 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 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-L252, and a means of identifying the date of manufacture. IB400 and IB600 in depths of 9-1/2 inches through 16 inches are permitted to be labeled as RFPI-40S and RFPI-60S, respectively, when using the design values specified in APA Product Report PR-L259.

Table 1. Description of IB Series of I-Joists ^(a,b)

Joist Series	Joist Depths (in.)	Flanges				Web	
		Material	G ^(c)	Dimension		Material	Thickness (in.)
				Depth (in.)	Width (in.)		
IB400	9-1/4 – 16	Proprietary SPF	0.42	1-1/2	2-1/2	OSB	3/8
IB600	9-1/4 – 20	MSR	0.46	1-1/2	2-1/2	OSB	3/8
IB800	9-1/4 – 20	MSR	0.46	1-1/2	3-1/2	OSB	3/8
IB900	11-7/8 – 24	MSR	0.50	1-1/2	3-1/2	OSB	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.
- ^(c) Specific gravity of flanges for use in diaphragm design (see Table 5) based on oven-dry weight and oven-dry volume.

Table 2. Design Properties (Allowable Stress Design) for IB Series I-Joists^(a)

Joist Series	Joist Depth (in.)	Also Qualified for	EI ^(b) (10 ⁶ lbf-in. ²)	M ^(c) (lbf-ft)	V ^(d) (lbf)	VLC ^(e) (plf)	k ^(f) (10 ⁶ lbf)
IB400	9-1/4	NA	185	2,715	1,155	2,000	4.81
	9-1/2	PRI-40	198	2,800	1,185	2,000	4.94
	11-1/4	NA	296	3,410	1,405	2,000	5.85
	11-7/8	PRI-40	336	3,630	1,480	2,000	6.18
	14	PRI-40	494	4,370	1,750	2,000	7.28
	16	PRI-40	673	5,065	2,000	2,000	8.32
IB600	9-1/4	NA	220	3,740	1,350	2,000	4.81
	9-1/2	PRI-60	235	3,860	1,370	2,000	4.94
	11-1/4	NA	356	4,700	1,515	2,000	5.85
	11-7/8	PRI-60	399	5,000	1,570	2,000	6.18
	14	PRI-60	585	6,020	1,750	2,000	7.28
	16	PRI-60	799	6,980	2,000	2,000	8.32
	18	NA	1,046	7,895	2,250	1,750	9.36
20	NA	1,304	8,735	2,500	1,500	10.40	
IB800	9-1/4	NA	307	5,295	1,390	2,000	4.81
	9-1/2	NA	326	5,465	1,405	2,000	4.94
	11-1/4	NA	493	6,655	1,540	2,000	5.85
	11-7/8	PRI-80	552	7,080	1,585	2,000	6.18
	14	PRI-80	807	8,530	1,750	2,000	7.28
	16	PRI-80	1,094	9,890	2,000	2,000	8.32
	18	NA	1,445	11,135	2,300	1,810	9.36
20	NA	1,799	12,380	2,600	1,625	10.40	
IB900	11-7/8	PRI-90	604	8,825	1,925	2,000	6.18
	14	PRI-90	884	10,630	2,125	2,000	7.28
	16	PRI-90	1,199	12,635	2,330	2,000	8.32
	18	NA	1,565	14,285	2,510	1,810	11.52
	20	NA	1,984	15,810	2,695	1,625	12.80
	22	NA	2,457	17,320	2,875	1,250	14.08
	24	NA	2,985	18,810	3,060	1,250	15.36

(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. Values for Limit States Design in Canada are available from the manufacturer.

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

(c) Moment capacity (M) of the I-joist.

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

(e) Uniform vertical (bearing) load capacity (VLC) 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 Eqs. 1 and 2.

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

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

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 3. Intermediate Reaction (Allowable Stress Design) for IB Series I-Joists^(a)

Joist Series	Joist Depth (in.)	Also Qualified for	IR ^(c) (lbf)			
			3-1/2-in. Bearing		5-1/2-in. Bearing	
			w/o BS	w/ BS	w/o BS	w/ BS
IB400	9-1/4	NA	2,160	2,310	2,310	2,310
	9-1/2	PRI-40	2,160	2,370	2,370	2,370
	11-1/4	NA	2,500	2,795	2,810	2,810
	11-7/8	PRI-40	2,500	2,800	2,810	2,960
	14	PRI-40	2,500	2,825	3,100	3,455
	16	PRI-40	2,500	2,850	3,100	3,650
IB600	9-1/4	NA	2,160	2,700	2,310	2,700
	9-1/2	PRI-60	2,160	2,740	2,370	2,740
	11-1/4	NA	2,500	3,030	2,810	3,030
	11-7/8	PRI-60	2,500	3,075	2,810	3,140
	14	PRI-60	2,500	3,215	3,100	3,455
	16	PRI-60	2,500	3,350	3,100	3,650
	18	NA	2,500	3,425	3,100	3,735
20	NA	2,500	3,450	3,100	3,820	
IB800	9-1/4	NA	2,310	2,700	2,310	2,700
	9-1/2	NA	2,470	2,740	2,470	2,740
	11-1/4	NA	2,810	3,030	2,810	3,030
	11-7/8	PRI-80	2,810	3,140	2,810	3,140
	14	PRI-80	3,020	3,500	3,100	3,500
	16	PRI-80	3,100	4,000	3,100	4,000
	18	NA	3,100	4,225	3,100	4,225
	20	NA	3,100	4,350	3,100	4,350
IB900	11-7/8	PRI-90	3,355	3,355	3,355	3,355
	14	PRI-90	3,355	3,530	3,355	3,660
	16	PRI-90	3,355	3,920	3,355	4,090
	18	NA	3,355	4,270	3,355	4,640
	20	NA	3,355	4,600	3,355	5,000
	22	NA	3,355	4,950	3,355	5,075
	24	NA	3,355	5,150	3,355	5,150

^(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	I-Joist Series	Maximum adjusted reaction capacity ^(b) (lbf)			
		3-1/2 in. Brg. Length		5-1/2 in. Brg. Length	
		With Brg. Stiffeners		With Brg. Stiffeners	
		No	Yes	No	Yes
All	IB400	3,495		5,495	
	IB600	4,320		6,785	
	IB800	6,155		9,675	
	IB900	7,210		11,330	

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

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

Table 4. End Reaction Design Properties (Allowable Stress Design) for IB Series I-Joists^(a)

Joist Series	Joist Depth	Also Qualified for	ER ^(c) (lbf)										
			1-1/2 in. Bearing		1-3/4 in. Bearing		2-3/4 in. Bearing		3-1/2 in. Bearing		4 in. Bearing		
			w/o BS	w/ BS	w/o BS	w/ BS	w/o BS	w/ BS	w/o BS	w/ BS	w/o BS	w/ BS	
IB400	9-1/4"	NA	1,110	1,155	1,115	1,155	1,155	1,155	1,155	1,155	1,155	1,155	1,155
	9-1/2"	PRI-40	1,120	1,185	1,130	1,185	1,185	1,185	1,185	1,185	1,185	1,185	1,185
	11-1/4"	NA	1,175	1,355	1,205	1,360	1,340	1,405	1,405	1,405	1,405	1,405	1,405
	11-7/8"	PRI-40	1,200	1,420	1,230	1,430	1,370	1,480	1,465	1,480	1,480	1,480	1,480
	14"	PRI-40	1,260	1,630	1,295	1,645	1,455	1,750	1,550	1,750	1,550	1,750	1,750
	16"	PRI-40	1,325	1,825	1,355	1,845	1,455	2,000	1,550	2,000	1,550	2,000	2,000
IB600	9-1/4"	NA	1,110	1,155	1,130	1,350	1,155	1,350	1,155	1,350	1,155	1,350	1,350
	9-1/2"	PRI-60	1,120	1,185	1,140	1,370	1,185	1,370	1,185	1,370	1,185	1,370	1,370
	11-1/4"	NA	1,175	1,355	1,215	1,515	1,340	1,515	1,405	1,515	1,405	1,515	1,515
	11-7/8"	PRI-60	1,200	1,420	1,240	1,570	1,370	1,570	1,465	1,570	1,480	1,570	1,570
	14"	PRI-60	1,260	1,630	1,335	1,750	1,460	1,750	1,550	1,750	1,550	1,750	1,750
	16"	PRI-60	1,325	1,825	1,420	1,925	1,495	1,970	1,550	2,000	1,550	2,000	2,000
	18"	NA	NA	NA	1,505	2,095	1,530	2,185	1,550	2,250	1,550	2,250	2,250
20"	NA	NA	NA	1,550	2,260	1,550	2,395	1,550	2,500	1,550	2,500	2,500	
IB800	9-1/4"	NA	1,110	1,155	1,130	1,380	1,155	1,380	1,155	1,380	1,155	1,380	1,390
	9-1/2"	NA	1,120	1,185	1,140	1,405	1,185	1,405	1,185	1,405	1,185	1,405	1,405
	11-1/4"	NA	1,175	1,355	1,215	1,540	1,340	1,540	1,405	1,540	1,405	1,540	1,540
	11-7/8"	PRI-80	1,200	1,420	1,285	1,585	1,370	1,585	1,465	1,585	1,480	1,585	1,585
	14"	PRI-80	1,260	1,630	1,335	1,750	1,460	1,750	1,550	1,750	1,550	1,750	1,750
	16"	PRI-80	1,325	1,825	1,420	2,000	1,495	2,000	1,550	2,000	1,550	2,000	2,000
	18"	NA	NA	NA	1,505	2,270	1,530	2,285	1,550	2,300	1,600	2,300	2,300
20"	NA	NA	NA	1,550	2,460	1,550	2,540	1,550	2,600	1,650	2,600	2,600	
IB900	11-7/8"	PRI-90	1,200	1,420	1,400	1,585	1,630	1,710	1,805	1,805	1,885	1,925	1,925
	14"	PRI-90	1,260	1,630	1,400	1,750	1,630	1,870	1,805	1,960	1,885	2,125	2,125
	16"	PRI-90	1,325	1,825	1,420	2,000	1,640	2,190	1,805	2,330	1,885	2,330	2,330
	18"	NA	NA	NA	1,505	2,270	1,600	2,405	1,675	2,510	1,885	2,510	2,510
	20"	NA	NA	NA	1,550	2,470	1,620	2,590	1,675	2,680	1,885	2,695	2,695
	22"	NA	NA	NA	1,470	2,595	1,585	2,725	1,675	2,820	1,885	2,875	2,875
	24"	NA	NA	NA	1,470	2,880	1,585	2,925	1,675	2,960	1,885	3,060	3,060

^(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	I-Joist Series Designation	Maximum adjusted reaction capacity ^(b) (lbf)									
		1 1/2 in. Brg. Length		1-3/4 in. Brg. Length		2-3/4 in. Brg. Length		3-1/2 in. Brg. Length		4 in. Brg. Length	
		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners		With Brg. Stiffeners	
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
All	IB400	1,500		1,750		2,745		3,495		3,995	
	IB600	1,850		2,160		3,395		4,320		4,935	
	IB800	2,640		3,080		4,835		6,155		7,035	
	IB900	3,090		3,605		5,665		7,210		8,240	

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

^(c) Interpolation between bearing lengths is permitted.

Table 5. Allowable Shear (Pounds Per Foot) for Horizontal Wood Structural Panel Diaphragms Framed With IB Series I-Joists for Wind^(a) or Seismic Loading^(b,c)

Panel Grade	Common Nail Size	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Framing Members at Adjoining Panel Edges and Boundaries ^(e) (in.)	Blocked Diaphragms			Unblocked Diaphragms	
				Nail spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6) ^(f,g)			Nails Spaced 6 in. max. at supported edges ^(f,g)	
				6	4 ^(h)	2-1/2 ⁽ⁱ⁾	Case 1 (No unblocked edges or continuous joints parallel to load)	All other configurations (Cases 2, 3, 4, 5 & 6)
				Nail spacing (in.) at other panel edges (Cases 1, 2, 3, & 4)				
				6	6	4		
Structural I Grades	6d ^(d)	5/16	3	210	280	420	185	140
	8d	3/8		300	400	600	265	200
	10d	15/32		360	480	720	320	240
Sheathing, single floor and other grades covered in DOC PS 1 and PS 2	6d ^(d)	5/16		190	250	380	170	125
		3/8		210	280	420	185	140
	8d	3/8		270	360	540	240	180
		7/16		285	380	570	255	190
		15/32		300	400	600	265	200
	10d	15/32		325	430	650	290	215
		19/32		360	480	720	320	240

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf = 4.448 N, 1 lbf/ft = 0.0146 N/mm.

(Footnotes on next pages)

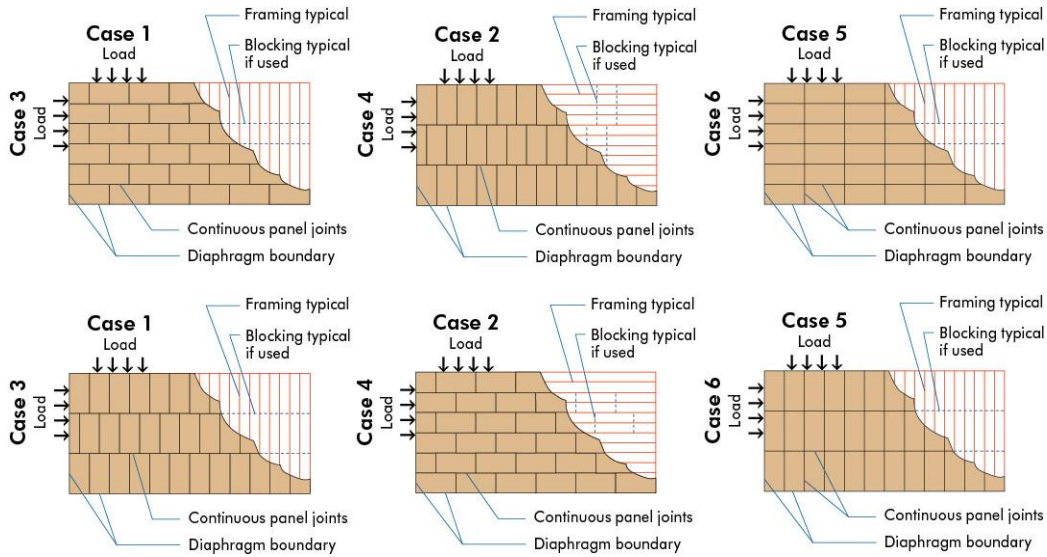


Figure 1. Diaphragm configurations

- (a) For wind load applications, the values in the table above shall be permitted to be multiplied by 1.4.
- (b) For shear loads of normal or permanent load duration as defined by the NDS, the values in the table above shall be multiplied by 0.63 or 0.56, respectively.
- (c) The tabulated allowable shear capacities are for I-joist series with flanges having a specific gravity (G) of 0.50 or higher (see Table 1). For $G < 0.50$ the allowable shear capacities shall be reduced by multiplying the allowable shear capacities by the Specific Gravity Adjustment Factor = $[1 - (0.5 - G)]$. The Specific Gravity Adjustment Factor shall not be greater than 1.
- (d) 8d common nails minimum are recommended for roofs due to negative pressures of high winds.
- (e) The minimum nominal width of framing members not located at boundaries or adjoining panel edges shall be 2 inches.
- (f) Space nails maximum 12 inches o.c. along intermediate framing members (6 inches o.c. when supports are spaced 48 inches o.c. or greater).
- (g) Fasteners shall be located 3/8 inch from panel edges (see Figures 2, 3 and 4).
- (h) Adjacent nails within a row must be staggered 1/2 inch when nail spacing is 4 inches or less (see Figure 3).
- (i) Adjacent nails within a row must be staggered 1/2 inch at adjoining panel edges when nail spacing is 2-1/2 inches o.c. (see Figure 4).

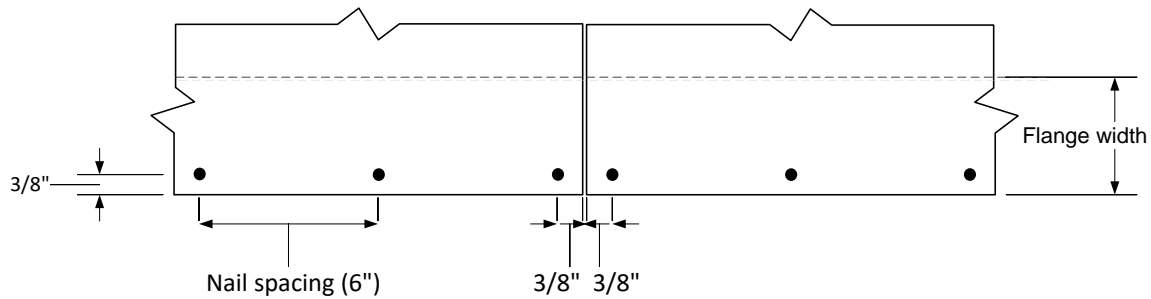


Figure 2. Non-staggered nails at diaphragm boundaries (see Footnote g), not to scale.

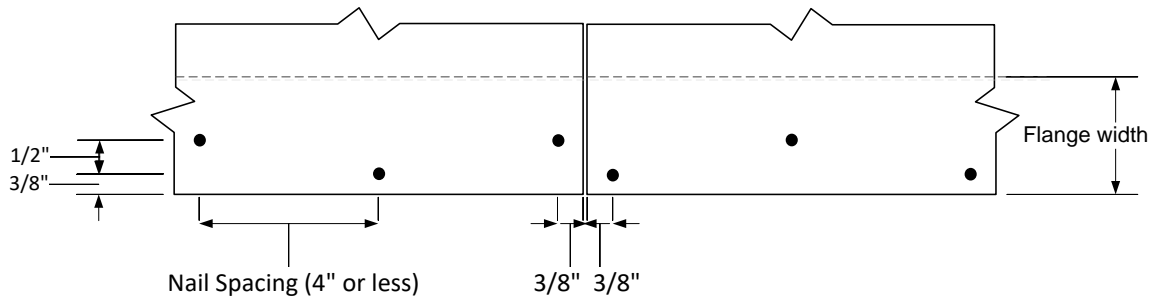


Figure 3. Staggered nails at diaphragm boundaries (see Footnote h), not to scale.

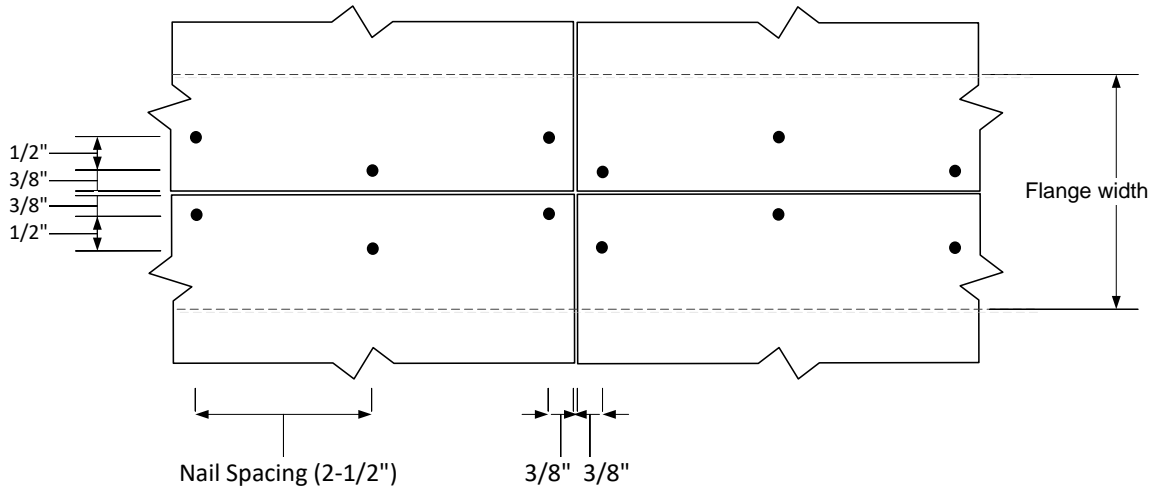


Figure 4. Staggered nails at adjoining panel edges (see Footnote i), not to scale.

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**APA – THE ENGINEERED WOOD ASSOCIATION
HEADQUARTERS**

7011 So. 19th St. ▪ Tacoma, Washington 98466
Phone: (253) 565-6600 ▪ Fax: (253) 565-7265 ▪ Internet Address: www.apawood.org

PRODUCT SUPPORT HELP DESK
(253) 620-7400 ▪ *E-mail Address:* help@apawood.org

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