

AJS Series I-Joists
Boise Cascade Wood Products L.L.C.

PR-L310

Revised January 28, 2018

Products: AJS[®] Series I-Joists

Boise Cascade Wood Products L.L.C., 70 rue Industrielle, St. Jacques, New Brunswick E7B 1T1
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www.bc.com

1. Basis of the product report:
 - 2018, 2015, 2012, and 2009 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 104.11 Alternative materials and R502.1.2 Prefabricated wood I-joists
 - 2012 and 2009 IRC: Sections R104.11 Alternative materials and R502.1.4 Prefabricated wood I-joists
 - ASTM D5055-13e1, D5055-13, D5055-09, and D5055-05 recognized by the 2018 IBC and IRC, 2015 IBC and IRC, 2012 IBC and IRC, and 2009 IBC and IRC, respectively
 - University of New Brunswick Wood Science and Technology Centre Reports WSTC2011-018, WSTC2012-014
 - APA Reports T2013P-25, T2014P-40, T2015P-08, and T2016P-47, and other qualification data
2. Product description:

The AJS[®] Series I-joists covered by this report, as described in Table 1, are made with lumber flanges and OSB webs in accordance with the in-plant manufacturing standard approved by APA.
3. Design properties:

Table 2 lists the design properties for AJS Series I-joists. The allowable spans for AJS Series I-joists covered by this report shall be in accordance with the recommendations provided by the manufacturer (www.bc.com/wood/ewp).
4. Product installation:

AJS Series I-joists covered by this report shall be installed in accordance with the recommendations provided by the [manufacturer](#). 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](#) or as shown in [APA Product Report PR-S201](#). AJS Series I-joists may be used in the fire rated assemblies described in the 2018, 2015, 2012, and 2009 IBC as follows:

2015 IBC ^(a)	2012 IBC ^(a)	2009 IBC ^(a)	AJS 5, 10, 20, 140, 150, 160, 170, 180, 200	AJS 20v, 110, 150v	AJS 24, 25v	AJS 190	AJS 25, 30
23-1.1	23-1.1	23-1.1	Applicable	Applicable	Applicable	Applicable	Applicable
24-1.1	24-1.1	24-1.1	NA	NA	Applicable	NA	Applicable
25-1.1	25-1.1	25-1.1	NA	NA	NA	NA	Applicable ^(b)
26-1.1	26-1.1	26-1.1	Applicable	Applicable	Applicable	Applicable	Applicable
27-1.1	27-1.1	27-1.1	Applicable	Applicable ^(c)	Applicable ^(c)	Applicable ^(c)	Applicable
28-1.1	28-1.1	28-1.1	Applicable	Applicable	Applicable	Applicable	Applicable
30-1.1	NA	NA	Applicable	Applicable ^(c)	Applicable ^(c)	Applicable ^(c)	Applicable

^(a) In accordance with Table 721.1(3) of the 2018, 2015, and 2012 IBC, and Table 720.1(3) of the 2009 IBC.

^(b) Minimum web thickness of 7/16 inch.

^(c) Minimum joist depth of 9-1/2 inches.

6. Limitations:

- a) AJS Series I-joists covered by this report shall be designed in accordance with the code using the design properties specified in this report.
- b) AJS Series I-joists covered by this report are limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent.
- c) AJS Series I-joists covered by this report are produced at the Boise Cascade Wood Products L.L.C. facility in St. Jacques, New Brunswick under a quality assurance program audited by APA.
- d) This report is subject to re-examination in one year.

7. Identification:

The AJS Series prefabricated wood I-joists described in this report are identified by a label bearing the manufacturer's name (Boise Cascade Wood Products L.L.C.) and/or trademark, the APA assigned plant number (1108), the I-joist series, the APA logo, the report number PR-L310, and a means of identifying the date of manufacture. AJS-150, AJS-20, AJS-24 and AJS-25 are permitted to be labelled as NJ40H, NJ60H, NJ40U and NJ60U, respectively.

Table 1. Description of AJS Series I-joists ^(a)

Joist Series	Joist Depths (in.)	Flanges			Web	
		Material	Dimension		Material	Thickness (in.)
			Depth (in.)	Width (in.)		
AJS-5	9-1/2 – 11-7/8	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-10	9-1/2 – 16	Proprietary Spruce	1-1/2	2-1/2	OSB	3/8
AJS-20	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-20v	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-110	9-1/4 – 16	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-140	9-1/2 – 16	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-150	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-150v	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-160	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-170	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-180	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-190	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
	18 – 20					7/16
AJS-200	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-24	9-1/4 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
AJS-25	9-1/2 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
	18 – 24					7/16
AJS-25v	9-1/4 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
AJS-30	18 – 24	MSR Lumber	1-1/2	3-1/2	OSB	7/16

^(a) Referenced dimensions are nominal. Tolerances are as specified in the in-plant quality manual.

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

Joist Series	Permitted to be Labelled as	Joist Depth (in.)	EI ^(b) (x10 ⁶ lbf-in. ²)	M ^(c) (lbf-ft)	V ^(d) (lbf)	End Reaction ^(e, m) (lbf)				Intermediate Reaction ^(g, m) (lbf)				Uniform Vertical Load Capacity (plf)	K ⁽ⁱ⁾ (x10 ⁶ lbf)
						1-1/2 in. Brg. Length		3-1/2 in. Brg. Length		3-1/2 in. Brg. Length		5-1/4 in. Brg. Length			
						w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff		
AJS-5	NA	9-1/2	182	2,175	1,160	950	1,200	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	310	2,820	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
AJS-10	NA	9-1/2	232	2,960	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	394	3,835	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	578	4,620	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	786	5,355	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS 20	NJ60H	9-1/2	232	3,410	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	394	4,420	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	578	5,320	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	786	6,170	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS 20v ^(k)	NA	9-1/4	218	3,675	1,130	1,075	1,075	1,120	1,120	2,350	2,450	2,850	2,950	2,000	5.1
		9-1/2	232	3,795	1,160	1,075	1,075	1,145	1,145	2,350	2,450	2,850	2,950	2,000	5.2
		11-1/4	347	4,620	1,400	1,175	1,175	1,355	1,355	2,500	2,800	3,000	3,250	2,000	6.2
		11-7/8	394	4,915	1,490	1,175	1,175	1,425	1,425	2,500	2,800	3,000	3,250	2,000	6.6
		14	579	5,920	1,790	1,175	1,175	1,475	1,665	2,500	3,150	3,000	3,500	2,000	7.8
		16	789	6,865	2,065	1,175	1,175	1,475	1,885	2,500	3,500	3,000	3,500	2,000	8.9
AJS 110	NA	9-1/4	135	1,805	1,125	950	1,230	1,170	1,480	2,350	2,450	2,350	2,450	1,875	5.0
		9-1/2	144	1,865	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-1/4	218	2,270	1,400	955	1,310	1,205	1,595	2,390	2,800	2,390	2,800	1,680	6.2
		11-7/8	248	2,415	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	367	2,910	1,790	960	1,420	1,250	1,700	2,415	3,130	2,415	3,130	1,500	7.8
		16	504	3,315	2,065	970	1,500	1,285	1,800	2,440	3,435	2,440	3,435	1,340	9.0
AJS-140	NA	9-1/2	182	2,450	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	310	3,175	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	457	3,825	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	623	4,435	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS 150	NJ40H	9-1/2	194	2,820	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	331	3,650	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	487	4,390	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	664	5,090	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0

Table continues on following page.

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

Joist Series	Permitted to be Labelled as	Joist Depth (in.)	EI ^(b) (x10 ⁶ lbf-in. ²)	M ^(c) (lbf-ft)	V ^(d) (lbf)	End Reaction ^(e, m) (lbf)				Intermediate Reaction ^(g, m) (lbf)				Uniform Vertical Load Capacity (plf)	K ⁽ⁱ⁾ (x10 ⁶ lbf)
						1-1/2 in. Brg. Length		3-1/2 in. Brg. Length		3-1/2 in. Brg. Length		5-1/4 in. Brg. Length			
						w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff		
AJS 150v ^(j)	NA	9-1/4	182	2,740	1,130	1,075	1,075	1,120	1,120	2,350	2,450	2,850	2,950	2,000	5.1
		9-1/2	194	2,820	1,160	1,075	1,075	1,145	1,145	2,350	2,450	2,850	2,950	2,000	5.2
		11-1/4	292	3,430+	1,400	1,175	1,175	1,355	1,355	2,500	2,800	3,000	3,250	2,000	6.2
		11-7/8	332	3,650	1,490	1,175	1,175	1,425	1,425	2,500	2,800	3,000	3,250	2,000	6.6
		14	488	4,390	1,790	1,175	1,175	1,475	1,665	2,500	3,150	3,000	3,500	2,000	7.8
		16	667	5,090	2,065	1,175	1,175	1,475	1,885	2,500	3,500	3,000	3,500	2,000	9.0
AJS-160	NA	9-1/2	207	3,057	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	352	3,959	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	517	4,767	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	705	5,527	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS-170	NA	9-1/2	219	3,300	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	372	4,270	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	547	5,140	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	746	5,960	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS-180	NA	9-1/2	232	3,640	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	394	4,710	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	578	5,675	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	786	6,580	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
AJS 190	NA	9-1/4	229	3,770	1,125	950	1230	1,170	1,480	2,350	2,450	2,350	2,450	1,875	5.1
		9-1/2	244	3,895	1,160	950	1240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-1/4	365	4,740	1,400	955	1310	1,205	1,595	2,390	2,800	2,390	2,800	1,680	6.2
		11-7/8	414	5,045	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	608	6,070	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	827	7,040	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0
		18	1,100	8,045	3,010	--	2,160 ^(f)	--	2,620	--	4,720	--	4,720	2,700 ^(h)	12.1
		20	1,402	8,990	3,240	--	2,160 ^(f)	--	2,980	--	4,780	--	5,110		13.5
AJS-200	NA	9-1/2	257	4,155	1,160	950	1,240	1,175	1,480	2,350	2,450	2,350	2,450	1,875	5.2
		11-7/8	435	5,385	1,490	955	1,335	1,215	1,595	2,390	2,800	2,390	2,800	1,680	6.6
		14	638	6,485	1,790	960	1,420	1,250	1,700	2,430	3,130	2,430	3,130	1,500	7.8
		16	868	7,515	2,065	970	1,500	1,285	1,800	2,465	3,435	2,465	3,435	1,340	9.0

Table continues on following page.

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

Joist Series	Permitted to be Labelled as	Joist Depth (in.)	EI ^(b) (x10 ⁶ lbf-in. ²)	M ^(c) (lbf-ft)	V ^(d) (lbf)	End Reaction ^(e, m) (lbf)				Intermediate Reaction ^(g, m) (lbf)				Uniform Vertical Load Capacity (plf)	K ⁽ⁱ⁾ (x10 ⁶ lbf)
						1-1/2 in. Brg. Length		3-1/2 in. Brg. Length		3-1/2 in. Brg. Length		5-1/4 in. Brg. Length			
						w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff	w/o Brg. Stiff	w/ Brg. Stiff		
AJS 24	NJ40U	9-1/4	253	3,880	1,125	950	1,230	1,170	1,480	2,600	2,850	2,600	2,850	1,875	5.2
		9-1/2	270	4,005	1,160	950	1,240	1,175	1,480	2,600	2,850	2,600	2,850	1,875	5.3
		11-1/4	403	4,875	1,400	955	1,310	1,205	1,595	2,690	3,190	2,690	3,190	1,680	6.3
		11-7/8	457	5,190	1,490	955	1,335	1,215	1,595	2,690	3,190	2,690	3,190	1,680	6.7
		14	670	6,250	1,790	960	1,420	1,250	1,700	2,770	3,500	2,770	3,500	1,500	7.9
		16	911	7,245	2,065	970	1,500	1,285	1,800	2,850	3,800	2,850	3,800	1,340	9.1
AJS 25	NJ60U	9-1/2	322	5,370	1,160	950	1,240	1,175	1,480	2,600	2,850	2,600	2,850	1,875	5.3
		11-7/8	545	6,960	1,490	955	1,335	1,215	1,595	2,690	3,190	2,690	3,190	1,680	6.7
		14	798	8,380	1,790	960	1,420	1,250	1,700	2,770	3,500	2,770	3,500	1,500	7.9
		16	1,082	9,720	2,065	970	1,500	1,285	1,800	2,850	3,800	2,850	3,800	1,340	9.1
		18	1,427	10,975	3,010	--	2,240 ^(f)	--	2,620	--	4,720	--	4,720	3,200 ^(h)	12.3
		20	1,813	12,270	3,240	--	2,490 ^(f)	--	2,980	--	5,110	--	5,110	3,200 ^(h)	13.7
		22	2,249	13,455	3,470	--	2,490 ^(f)	--	3,150	--	5,230	--	5,505	2,700 ^(h)	15.0
24	2,737	14,625	3,690	--	2,490 ^(f)	--	3,320	--	5,345	--	5,900	2,700 ^(h)	16.5		
AJS 25v ^(l)	NA	9-1/4	302	5,200	1,130	1,075	1,075	1,120	1,120	2,600	2,850	3,100	3,350	2,000	5.3
		9-1/2	322	5,370	1,160	1,075	1,075	1,145	1,145	2,600	2,850	3,100	3,350	2,000	5.4
		11-1/4	480	6,540	1,400	1,250	1,250	1,370	1,370	2,760	3,200	3,250	3,700	2,000	6.4
		11-7/8	545	6,960	1,490	1,250	1,250	1,440	1,440	2,760	3,200	3,250	3,700	2,000	6.8
		14	798	8,380	1,790	1,250	1,250	1,490	1,680	3,020	3,500	3,500	4,000	2,000	8.0
		16	1,082	9,720	2,065	1,250	1,250	1,490	1,900	3,020	3,800	3,500	4,000	2,000	9.1
AJS-30	NA	18	1,575	13,905	3,010	--	2,240 ^(f)	--	2,620	--	4,720	--	4,720	3,200 ^(h)	12.3
		20	1,998	15,540	3,240	--	2,490 ^(f)	--	2,980	--	5,110	--	5,110	3,200 ^(h)	13.7
		22	2,477	17,040	3,470	--	2,490 ^(f)	--	3,150	--	5,230	--	5,505	2,700 ^(h)	15.0
		24	3,012	18,525	3,690	--	2,490 ^(f)	--	3,320	--	5,345	--	5,900	2,700 ^(h)	16.5

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

- ^(a) The tabulated values are design values for normal duration of load. All values, except for EI, K, and vertical load capacity shall be permitted to be adjusted for other load durations as permitted by the code except that the adjusted end and intermediate reaction values shall not exceed the adjusted compressive capacities perpendicular to grain of the bearing plate supporting the I-joist in accordance with the NDS..
- ^(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) Interpolation of the end reaction between 1-1/2- and 3-1/2-inch bearing, with or without bearing stiffeners, respectively, shall be permitted.
- ^(f) End reaction design value is for a minimum 1-3/4-inch bearing.
- ^(g) Interpolation of the intermediate reaction between 3-1/2- and 5-1/4-inch bearing, with or without bearing stiffeners, respectively, shall be permitted.
- ^(h) Web stiffeners shall be required at each end of the I-joist when used as a blocking panel. Web stiffener installation shall be as prescribed by the manufacturer. The distance between stiffeners must not exceed 24 inches.
- ⁽ⁱ⁾ 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.

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

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

where:

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

^(j) AJS 150v meets PRI-40 series design values at 9-1/2-in., 11-7/8-in., 14-in. and 16-in. depths.

^(k) AJS 20v meets PRI-60 series design values at 9-1/2-in., 11 7/8-in., 14-in. and 16-in. depths.

^(l) AJS 25v meets PRI-80 series design values at 11-7/8 in., 14-in. and 16-in. depths.

^(m) The tabulated *reference* design reaction values, R_r , are for normal duration of load and are permitted to be adjusted for other load durations in accordance with the NDS, provided the *adjusted* design reaction, R_r' , does not exceed the flange bearing capacity, as calculated in accordance with Eq. 3.

$$P_{c,l}' = F_{c,l}' \ell_b (w_f - 0.15) \geq R_r' \quad [3]$$

where:

- $P_{c,l}'$ = Flange bearing capacity (lb),
- $F_{c,l}'$ = 425 psi for end reactions, 470 psi for 3 1/2-inch intermediate reactions, and 455 psi for 5 1/4-inch intermediate reactions,
Note: The $F_{c,l}'$ values listed above have included the bearing area factor (c_b in the NDS) and shall not be further adjusted for any load duration,
- ℓ_b = Bearing length (in.), and
- w_f = Nominal width of the flange (in.).

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