AcuJoist ACJ® Series I-Joists
AcuTruss Industries 1996, Ltd.

PR-L342
Revised May 27, 2023

Products: AcuJoist ACJ® Series I-Joists
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1. Basis of the product report:
   - 2021, 2018, 2015, and 2012 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.2 Prefabricated wood I-joists
   - 2021, 2018, and 2015 International Residential Code (IRC): Sections 104.11 Alternative materials, and R502.1.2 and R802.1.8 (2021 and 2018 IRC only) Prefabricated wood I-joists
   - 2012 IRC: Sections R104.11 Alternative materials and R502.1.4 Prefabricated wood I-joists
   - ASTM D5055-16, D5055-13e1, ASTM D5055-13, and D5055-09 recognized by the 2021 IBC and IRC, 2018 IBC and IRC, 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - APA PRI-400 Performance Standard for Residential I-Joists
   - APA PRI-405 Performance Standard for Commercial I-Joists
   - 2021, 2015, and 2008 ANSI/AWC Special Design Provisions for Wind and Seismic (SPDWS) recognized in the 2021, 2018 and 2015, and 2012 IBC, respectively
   - APA Reports T2021P-23, T2022P-14, and T2023P-25, and other qualification data

2. Product description:
   AcuJoist ACJ® I-joists are described in Table 1 in accordance with the in-plant manufacturing standard approved by APA.

3. Design properties:
   Tables 2 and 3 list the allowable design properties for the AcuJoist ACJ I-joists covered by this report. The allowable spans for AcuJoist ACJ I-joists qualified as the PRI series shall be permitted in accordance with the APA *Performance Rated I-Joists*, Form Z725, and APA *PRI-405 Performance Standard for Commercial I-Joists* (www.apawood.org/resource-library).

4. Product installation:
   AcuJoist ACJ I-joists covered by this report shall be installed in accordance with the recommendations provided by the manufacturer (see link above) or the APA *Performance Rated I-Joists*, Form Z725 (see link above) for products qualified as the PRI Series. Permissible web holes and cantilever reinforcements shall be in accordance with the recommendations provided by the manufacturer or with the APA Z725 for products qualified as the PRI Series.

5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer or APA *Fire-Rated Systems*, Form W305 (see link above) for products qualified as the PRI Series.

6. Limitations:
   a) AcuJoist ACJ I-joists shall be designed in accordance with the code using the design properties specified in this report.

b) AcuJoist ACJ I-joists are limited to dry service conditions where the average equilibrium moisture content of solid-sawn lumber is less than 16%.

c) AcuJoist ACJ I-joists are produced in Kelowna, BC, Canada under a quality assurance program audited by APA.

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

7. Identification:

The AcuJoist ACJ I-joists described in this report are identified by a label bearing the manufacturer's name (AcuTruss Industries 1996, Ltd.) and/or trademark, the APA assigned plant number 1138, the I-joist series designation and depth, the APA logo, the report number PR-L342, and a means of identifying the date of manufacture.

Table 1. Description of AcuJoist ACJ I-Joists[a]

I-Joist Series	Also Qualified for	I-Joist Depths (in.)	Flanges					Web	
			Material	G	Dimension		Material	Thickness (in.)
					Depth (in.)	Width (in.)		
ACJ-40	PRI-40	9-1/2 – 16	Proprietary SPF	0.42	1-1/2	2-1/2	OSB	3/8
ACJ-80	PRI-80	11-7/8 - 16	MSR SPF	0.46	1-1/2	3-1/2	OSB	3/8
	C1	18						

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

Table 2. Design Properties (Allowable Stress Design) for AcuJoist ACJ I-Joists[a]

I-Joist Depth (in.)	I-Joist Series	EI[b] (10^6 lbf-in.^{2})	M[c] (lbf-ft)	V[d] (lbf)	VLC[e] (lbf/ft)	K[f] (10^6 lbf)
9-1/2	ACJ-40	184	2,735	1,120	2,000	4.94
11-7/8	ACJ-40	313	3,545	1,420	2,000	6.18
	ACJ-80	518	6,940	1,420	2,000	6.18
14	ACJ-40	459	4,370	1,710	2,000	7.28
	ACJ-80	756	8,360	1,710	2,000	7.28
16	ACJ-40	625	5,070	1,970	2,000	8.32
	ACJ-80	1024	9,690	1,970	2,000	8.32
18	ACJ-80	1329	10,900	2,500	1,750	11.52

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 the normal duration of load. All values, except for EI, VLC, and K, shall be adjusted for other load durations in accordance with 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) Uniform vertical load capacity of the I-joist.

(f) Coefficient of shear deflection (K). For calculating the uniform load and center-point load deflections of the I-joist in a simple-span application, use Eqs. 1 and 2.

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

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

where
δ = calculated deflection (in.),
P = concentrated load (lbf),
EI = bending stiffness of the I-joist (lbf-in.^{2}), and

ω = uniform load (lbf/in.),
L = design span (in.),
K = coefficient of shear deflection (lbf-ft/in.).

Table 3. Reaction Capacities (Allowable Stress Design) for AcuJoist ACJ I-Joists[a]

I-Joist Depth (in.)	I-Joist Series	Intermediate Reaction (lbf) 3-1/2 in. Brg. Length Without Brg. Stiffeners	End Reaction[b] (lbf)			
			1-3/4 in. Brg. Length With Brg. Stiffeners		4 in. Brg. Length With Brg. Stiffeners	
			No	Yes	No	Yes
9-1/2	ACJ-40	2,160	1,080	1,080	1,120	1,120
11-7/8	ACJ-40	2,500	1,200	1,200	1,420	1,420
	ACJ-80	2,760	1,280	1,280	1,420	1,420
14	ACJ-40	2,500	1,200	1,200	1,550	1,710
	ACJ-80	3,020	1,280	1,280	1,550	1,710
16	ACJ-40	2,500	1,200	1,200	1,550	1,970
	ACJ-80	3,020	1,280	1,280	1,550	1,970
18	ACJ-80	3,355	1,400	2,035	1,625	2,395

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf = 4.448 N, 1 psi =6.895 kPa.

[a] The tabulated values are design values for the 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 Z725.

I-Joist Depth	I-Joist Series	Maximum adjusted reaction capacity[b,c] (lbf)					
		1-3/4 in. Brg. Length Brg. Stiffeners		3-1/2 in. Brg. Length Brg. Stiffeners		4 in. Brg. Length Brg. Stiffeners	
		No	Yes	No	Yes	No	Yes
All	ACJ-40	1,750		3,495		3,995	
	ACJ-80	3,080		6,155		7,035	

[b] Interpolation between bearing lengths is permitted.
[c] The maximum adjusted reaction capacity shall not be adjusted for load duration.