



I-Joist Selection and Specification

AN EXCERPT OF THE ENGINEERED WOOD CONSTRUCTION GUIDE





I-JOIST SELECTION AND SPECIFICATION

I-joists are “I”-shaped engineered wood structural members designed for use in residential and nonresidential construction. The product is prefabricated using sawn or structural composite lumber flanges and OSB webs, bonded together with exterior type adhesives. To simplify the specification and use of I-joists, APA introduced the APA Performance Rated I-Joist (PRI). The I-joist is limited to a $L/480$ live load maximum deflection (where L = span) for glued-nailed residential floor applications, which provides superior floor performance.

APA Performance Rated I-Joists are identified by their net depth followed by a designation, such as PRI-30, which relates to the joist strength and stiffness. APA PRIs are available in four depths: 9-1/2, 11-7/8, 14 and 16 inches.

Most manufacturers supply I-joists to distributors and dealers in lengths up to 60 feet. These are then cut to frequently used lengths such as 16 to 36 feet. Check local supplier for availability.

APA PRI-400

APA PRIs are manufactured in accordance with *APA Standard PRI-400, Performance Standard for APA EWS I-Joists, Form X720*. This Performance Standard provides an easy-to-use table of allowable spans for applications in residential floor construction, allowing designers and builders to select and use I-joists from various member manufacturers using just one set of span tables. APA PRIs are recognized in ICC-ES ESR-1405.

Residential Floor Spans

Some APA PRIs include in their trademarks allowable spans for uniformly loaded residential floor construction at various I-joist spacings. The specific I-joist needed is easily determined by selecting the span and then choosing the I-joist that meets the span, spacing and loading criteria. See Tables 11 and 12.

For more information on selecting APA I-joists and for design tables, refer to *APA Performance Rated I-Joists, Form Z725*.

I-Joist Storage and Handling

Store, stack and handle I-joists with the webs vertical and keep joists level. Do not store I-joists in direct contact with the ground. Maintain at least 12 inches between the ground and the I-joists. Protect I-joists from weather and use stickers to separate the bundles. If I-joists are delivered wrapped, do not open bundles until time of installation.

TABLE 11

ALLOWABLE SPANS FOR APA EWS PERFORMANCE-RATED I-JOISTS—SIMPLE SPAN ONLY^{a,b,c,d,e}

Depth	Joist Series	Simple Spans			
		On Center Spacing			
		12"	16"	19.2"	24"
9'-1/2"	PRI-20	16'-2"	14'-10"	14'-0"	13'-1"
	PRI-30	17'-1"	15'-7"	14'-9"	13'-9"
	PRI-40	17'-9"	16'-3"	15'-4"	14'-4"
	PRI-50	17'-10"	16'-4"	15'-5"	14'-5"
	PRI-60	18'-8"	17'-1"	16'-1"	15'-0"
11'-7/8"	PRI-20	19'-3"	17'-8"	16'-8"	15'-7"
	PRI-30	20'-4"	18'-7"	17'-7"	16'-5"
	PRI-40	21'-2"	19'-4"	18'-3"	16'-8"
	PRI-50	21'-2"	19'-5"	18'-4"	17'-1"
	PRI-60	22'-2"	20'-3"	19'-2"	17'-10"
	PRI-70	23'-0"	20'-11"	19'-9"	18'-5"
	PRI-80	24'-6"	22'-4"	21'-0"	19'-7"
	PRI-90	25'-2"	22'-11"	21'-8"	20'-2"
14"	PRI-40	24'-0"	21'-11"	20'-6"	18'-4"
	PRI-50	24'-1"	22'-0"	20'-9"	19'-5"
	PRI-60	25'-2"	23'-0"	21'-9"	20'-3"
	PRI-70	26'-1"	23'-9"	22'-5"	20'-11"
	PRI-80	27'-9"	25'-4"	23'-10"	22'-2"
	PRI-90	28'-7"	26'-0"	24'-6"	22'-10"
16"	PRI-40	26'-7"	24'-3"	22'-1"	19'-9"
	PRI-50	26'-8"	24'-4"	23'-0"	20'-2"
	PRI-60	27'-11"	25'-6"	24'-0"	22'-5"
	PRI-70	28'-10"	26'-4"	24'-10"	23'-1"
	PRI-80	30'-9"	28'-0"	26'-5"	24'-7"
	PRI-90	31'-7"	28'-9"	27'-1"	25'-3"

- a. Allowable clear span applicable to simple-span residential floor construction with a design dead load of 10 psf and live load of 40 psf. The live load deflection is limited to span/480.
- b. Spans are based on a composite floor with glued-nailed sheathing meeting the requirements for APA Rated Sheathing or APA Rated STURD-I-FLOOR conforming to PS 1, PS 2, CSA O325 or CSA O437 with a minimum 19/32 Performance Category (40/20 or 20 oc) for a joist spacing of 19.2 inches or less, or 23/32 Performance Category (48/24 or 24 oc) for a joist spacing of 24 inches. Adhesive shall meet ASTM D3498 or APA Specification AFG-01. Spans shall be reduced 12 inches when the floor sheathing is nailed only.
- c. Minimum bearing length shall be 1-3/4 inches for the end bearings.
- d. Bearing stiffeners are not required when I-joists are used with the spans and spacings given in this table, except as required by hanger manufacturers.
- e. This span chart is based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties in Table 7 of *APA Performance Rated I-Joists, Form Z725*.

TABLE 12

ALLOWABLE SPANS FOR APA EWS PERFORMANCE-RATED I-JOISTS—MULTIPLE SPAN ONLY^{a,b,c,d,e}

Depth	Joist Series	Multiple Spans			
		On Center Spacing			
		12"	16"	19.2"	24"
9'-1/2"	PRI-20	17'-7"	16'-1"	15'-3"	13'-5"
	PRI-30	18'-7"	17'-0"	16'-0"	15'-0"
	PRI-40	19'-4"	17'-8"	16'-4"	14'-7"
	PRI-50	19'-5"	17'-9"	16'-9"	15'-7"
	PRI-60	20'-4"	18'-7"	17'-6"	16'-4"
11'-7/8"	PRI-20	21'-0"	19'-2"	16'-9"	13'-5"
	PRI-30	22'-1"	20'-3"	18'-10"	15'-0"
	PRI-40	23'-0"	20'-5"	18'-7"	16'-7"
	PRI-50	23'-1"	21'-1"	19'-11"	16'-1"
	PRI-60	24'-2"	22'-1"	20'-10"	19'-5"
	PRI-70	25'-0"	22'-10"	21'-6"	18'-6"
	PRI-80	26'-8"	24'-3"	22'-11"	21'-3"
	PRI-90	27'-6"	25'-0"	23'-6"	21'-10"
14"	PRI-40	25'-11"	22'-5"	20'-5"	18'-3"
	PRI-50	26'-3"	23'-11"	20'-2"	16'-1"
	PRI-60	27'-6"	25'-1"	23'-8"	19'-9"
	PRI-70	28'-5"	25'-11"	23'-2"	18'-6"
	PRI-80	30'-3"	27'-7"	25'-11"	23'-11"
	PRI-90	31'-2"	28'-4"	26'-8"	24'-10"
16"	PRI-40	27'-11"	24'-2"	22'-0"	19'-8"
	PRI-50	29'-0"	24'-3"	20'-2"	16'-1"
	PRI-60	30'-5"	27'-9"	24'-9"	19'-9"
	PRI-70	31'-5"	27'-10"	23'-2"	18'-6"
	PRI-80	33'-6"	30'-6"	28'-9"	23'-11"
	PRI-90	34'-5"	31'-4"	29'-6"	26'-7"

- a. Allowable clear span applicable to multiple-span residential floor construction with a design dead load of 10 psf and live load of 40 psf. The end spans shall be 40% or more of the adjacent span. The live load deflection is limited to span/480.
- b. Spans are based on a composite floor with glued-nailed sheathing meeting the requirements for APA Rated Sheathing or APA Rated STURD-I-FLOOR conforming to PS 1, PS 2, CSA O325 or CSA O437 with a minimum 19/32 Performance Category (40/20 or 20 oc) for a joist spacing of 19.2 inches or less, or 23/32 Performance Category (48/24 or 24 oc) for a joist spacing of 24 inches. Adhesive shall meet ASTM D3498 or APA Specification AFG-01. Spans shall be reduced 12 inches when the floor sheathing is nailed only.
- c. Minimum bearing length shall be 1-3/4 inches for the end bearings and 3-1/2 inches for the intermediate bearings.
- d. Bearing stiffeners are not required when I-joists are used with the spans and spacings given in this table, except as required by hanger manufacturers.
- e. This span chart is based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties in Table 8 of *APA Performance Rated I-Joists, Form Z725*.

When handling I-joists with a crane on the job site (“picking”), take a few simple precautions to prevent damage to the joists and injury to the work crew: pick I-joists in bundles as shipped by the supplier, orient the bundles so that the webs of the I-joists are vertical and pick the bundles using a spreader bar if necessary. Do not twist or apply loads to the I-joists when they are horizontal. Never use or try to repair a damaged I-joist.

I-joists are not stable until completely installed and will not carry any load until fully braced and sheathed. Do not allow workers to walk on joists until the joists are fully installed and braced. To avoid accidents, brace and nail each I-joist as it is installed, using hangers, blocking panels, Rim Board® and/or cross-bridging at joist ends and over each support. For additional storage and handling recommendations, refer to *APA Builder Tips: APA Performance Rated I-Joist Storage, Handling, and Safety Recommendations*, Form Z735. An example of I-joist trademark is shown below.



APA Performance Rated I-Joist Specification Guide

The following is a guide for specifying APA Performance Rated I-Joists (PRI) to be used in residential floor applications. These structural products are available in net depths of 9-1/2, 11-7/8, 14 and 16 inches and can be used for simple- or multiple-span floor construction. Exterior use, or use of wood I-joists in other than dry conditions, is not recommended.

A. General

1. APA PRIs shall be furnished and installed as shown by the approved building plans and installation instructions.
2. The designation of APA PRIs shall be based on the applicable loading, joist spacing and spans shown in the plans. PRIs may be selected using Tables 11 and 12. For non-uniform loading conditions requiring an engineering analysis, see Table 8 of *APA Performance Rated I-Joists*, Form Z725, for PRI joist design properties.

The specification for I-joists required for a specific floor application shall include joist depth, designation, length and number of pieces required.

Example: 21 pieces—APA 9-1/2" PRI-40 x 30 feet long

3. All accessory products such as I-joist blocking panels, rim boards, squash blocks, web stiffeners, etc., shall be provided and installed in accordance with the applicable installation details shown in *APA Performance Rated I-Joists*, Form Z725.
4. APA trademarked structural glued laminated timber (glulam) or approved structural composite lumber (SCL) shall be furnished for load-bearing joist headers. The depth of these components shall be specified to match the I-joist depth when flush framing is required.

The contractor shall use approved connection hardware (joist hangers) as specified in the plans. Such hardware shall be compatible with the width and depth of APA PRIs furnished, to provide flush nailing surfaces at adjoining members and to prevent rotation.

B. Manufacture

1. **Materials, Manufacture and Quality Assurance**—Product quality shall conform to the manufacturer’s approved quality manual, with quality assurance inspection services provided by APA in accordance with building code requirements and the applicable APA Product Report or code evaluation report.
2. **Trademarks**—I-joists shall be marked with the APA trademark indicating conformance with the manufacturing, quality assurance and marking provisions of APA PRI-400, *Performance Standard for APA I-Joists*, Form X720, or the applicable manufacturer’s APA Product Report or code evaluation report.
3. **Job Site Shipment**—I-joists shall be protected from direct exposure to weather prior to installation.

I-Joist Selection and Specification

We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:

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