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**PREFABRICATED  
WOOD I-JOIST: 2001 AND 2007 CBC**

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**IR 23-9**

References:  
2007 California Building Code, Section 2303.1.2  
ICC ES AC-014  
National Design Specification for Wood Construction (NDS-2005)

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Discipline: Structural

This Interpretation of Regulations (IR) is intended for use by the Division of the State Architect (DSA) staff, and as a resource for design professionals, to promote more uniform statewide criteria for plan review and construction inspection of projects within the jurisdiction of DSA which includes State of California public elementary and secondary schools (grades K-12), community colleges and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

This IR is reviewed on a regular basis and is subject to revision at any time. Please check the DSA web site for currently effective IRs. Only IRs listed in the document at <http://www.dgs.ca.gov/dsa/Resources/IRManual.aspx> at the time of plan submittal to DSA are considered applicable.

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**Purpose:** This Interpretation of Regulation (IR) clarifies qualification and quality control/assurance requirements for acceptance of prefabricated wood I-joists for use in projects submitted to the Division of the State Architect (DSA) for review. This IR does not apply to open web trusses. This IR is applicable to projects submitted under the 2001 or the 2007 California Building Code (CBC).

**Background:** A prefabricated wood I-joist is a structural member manufactured with sawn or structural composite lumber flanges and structural panel webs composed of either plywood or oriented strand board (OSB) bonded together with exterior-type adhesives, forming an "I" cross sectional shape.

**1. ACCEPTANCE CRITERIA:** I-joists may be accepted on DSA projects based on the following criteria:

- 1.1 I-joists must have a valid evaluation report issued by a qualified independent evaluation agency prescribed in DSA [IR A-5](#).
- 1.2 The evaluation report shall indicate compliance with all the following building codes and standards:
  - 2006 IBC
  - ASTM D5055-04
  - ICC-ES AC-14
- 1.3 The evaluation report shall also require a quality control/assurance program complying with the requirements of ICC AC-14 and ASTM D5055-04. See Section 4, below.

**2. DESIGN REQUIREMENTS:**

- 2.1 Joists shall only be used for dry conditions of use and must be protected from weather exposure during construction.
- 2.2 Joists shall be designed in accordance with AF&PA NDS-2005, Chapter 7 and the appropriate evaluation report.
- 2.3 Lateral and rotational supports shall be provided at all bearing locations per AF&F NDS 2005 Section 7.3.5. Lateral and rotational support may be provided by joist hangers complying with ICC AC13, Section 3.3.
- 2.4 Bridging shall be provided in accordance with manufacturer's requirements and the product's evaluation report. Additional bridging may be required to provide lateral

support for the bottom chord when it is in compression (i.e. wind uplift, large cantilevers, etc.).

- 2.5 Design flexure, shear and bearing shall be determined through ASTM D5055-04 procedures, and as listed in the evaluation report.
  - 2.6 Deflection shall be computed per the evaluation report and shall not exceed limits defined in CBC Table 1604A.3., evaluation report, or the manufacturer's recommendation, whichever is more restrictive. As a reference, National Design Specification for Wood Construction (NDS-2005) Section C7.4.5 recommends a deflection limit of  $L/480$  for floor joists live load.
    - 2.6.1 NDS-2005 Section C7.4.5 also recommends the consideration of creep deflection for unique applications, such as heavy dead loads, may be in accordance with NDS Section 3.5.2.
  - 2.7 I-Joist blocking panels may be used for shear transfer if allowed by the evaluation report. Shear transfer capacity is limited to the allowable shear capacity specified in the evaluation report. Shear transfer nailing (size and spacing) shall be determined by calculations and must conform to manufacturer's requirements.
- 3. DETAILING CONSIDERATIONS:** Follow the manufacturer's detailing and construction requirements. Connection details shall be designed to minimize the potential for splitting of wood members and I-Joists. In the event of splitting, a repair procedure shall be submitted to DSA for review and approval on a project specific basis. The following are typical conditions where splitting may occur:
- 3.1 Solid sawn lumber flange connections at bearing locations (e.g. wall top plates).
  - 3.2 Tie strap or other connector hardware (end distance and spacing of nails).
  - 3.3 Web stiffeners material and size (comply with the manufacturer's requirements).
  - 3.4 I-joist chord, or web filler, that is a part of a wall anchorage system (attachment must meet the requirements of ASCE 7-05 Section 12.11.2).
  - 3.5 I-Joist flange receiving diaphragm sheathing nails (the minimum thickness and width of the flange shall meet applicable CBC code requirements, i.e. edge distance, minimum nail penetration per CBC Tables 2306.3.1, 2306.3.2, and 2306.4.1).
  - 3.6 Shear transfer nailing at I-Joist blocking panels.
- 4. I-JOIST QUALITY CONTROL/ASSURANCE:** Continuous independent inspection of wood I-joist fabrication is not required. Only mills that qualify under an approved QA/QC program shall provide I-joists. The quality assurance program shall meet the following requirements:
- 4.1 ASTM D5055, Sections 8,9, and 10
  - 4.2 ICC-ES AC14, Appendix A, Quality Assurance Guidelines for Prefabricated Wood I-joists, promulgated by the Wood I-joists Manufacturers Association, or ICC-ES approved equivalent such as APA QA Policy for Performance Rated I-Joists.
  - 4.3 ICC-ES AC 14 Appendix B.
  - 4.4 Unannounced audits by a third party auditor of a qualified inspection agency shall be performed, per ICC-ES AC14. All quality control reports resulting from such audits must be maintained by the manufacturers and made available to DSA upon request.