

**SECTION 05 21 00
STEEL JOIST FRAMING**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //---// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies open web, longspan, and deep longspan steel joists // and joist girders //.

1.2 RELATED WORK

- A. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.
B. Finish Painting: Section 09 91 00, PAINTING.

1.3 DESIGN REQUIREMENTS

- A. Design all elements with the latest published version of applicable Codes.

1.4 TOLERANCES

- A. Deviation from a straight line between ends of any installed joist must not exceed 10 mm in 3 m (3/8 inch in 10 feet).

1.5 REGULATORY REQUIREMENTS

- A. STEEL JOIST INSTITUTE: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders.

1.6 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIRMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // _____// requirements.

1.7 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop and Erection Drawings: Complete.
1. Fabrication drawings including details and schedules for the fabrication and assembly of each joist.
 2. Erection drawings showing the size and location of each joist, bridging, cross bracing, bearing details, connections, welds, bolts and bearing plates.

C. Certificates: STEEL JOIST INSTITUTE compliance.

SPEC WRITER NOTES:

1. Indicate design loads, including uplift loads on drawings. Include snow drift loads by diagram. Slope roofs to preclude ponding.

D. Design Calculations: If requested by the RE/COR, submit complete calculations covering the design of all members and connections. Calculations must be specifically applicable to the joists supplied. Calculations are to be stamped and sealed by an engineer registered in the State where the project is located.

1.8 QUALITY ASSURANCE

- A. Provide documentation that the joist manufacturer is a member of the Steel Joist Institute and has satisfactorily completed work of a similar scope and nature.
- B. Pre-Installation Conference: Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

1.9 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

B. American Institute of Steel Construction (AISC):

1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (Latest Edition).
2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition).

- C. American Society for Testing and Materials (ASTM):
- A307-12 Carbon Steel Bolts, Studs, and Threaded Rods
400 MPa (60,000 psi) Tensile Strength
- A325-09 Structural Bolts, Steel, Heat Treated, 800/700
MPa (120/105 ksi) Minimum Tensile Strength
- A490-12 Heat-Treated Steel Structural Bolts, Alloy
Steel, Heat Treated, 1000 MPa (150 ksi) Minimum
Tensile Strengths
- D. American Welding Society (AWS):
- D1.1-08 Structural Welding Code - Steel
- E. SSPC: The Society for Protective Coatings:
Steel Structures Painting Manual, Volumes 1 and 2
- F. Steel Joist Institute (STEEL JOIST INSTITUTE):
Standard Specifications, Load Tables and Weight Tables for Steel Joists
and Joist Girders (Latest Edition)

SPEC WRITER NOTES:

1. Update material requirements to agree with applicable requirements (types, grades, classes, and other related items) specified in the referenced Applicable Publications.

PART 2 - PRODUCTS**2.1 OPEN WEB STEEL JOISTS**

- A. K-Series conforming to STEEL JOIST INSTITUTE standard specifications.

2.2 LONGSPAN STEEL JOISTS AND DEEP LONGSPAN STEEL JOISTS

- A. LH-Series and DLH-Series conforming to STEEL JOIST INSTITUTE standard specifications.

2.3 ACCESSORIES - FITTINGS

- A. Accessories and fittings, including end supports and bridging, in accordance with standard STEEL JOIST INSTITUTE specification under which joists were designed.
- B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.
- C. High-strength bolts, including nuts and washers: ASTM A325 or A490 heavy hexagon structural bolts.

PART 3 - EXECUTION**3.1 FABRICATION**

- A. Fabricate and assemble in accordance with applicable standard STEEL JOIST INSTITUTE specification:

1. Make chord splices with full penetration welds capable of developing the ultimate strength in tension of the parent material. Make no allowance for the strength of back-up bars or other material incidental to welding.
2. Provide shop-welded connection plates at panel points to receive supplemental framing.

SPEC WRITER NOTES:

1. Size and spacing of holes in chords for securing wood nailers and other work should be shown on the drawings.
3. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
4. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable STEEL JOIST INSTITUTE specifications.

SPEC WRITER NOTES:

1. Delete below if no ceiling materials attached directly to bottom chords (not suspended)
5. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with STEEL JOIST INSTITUTE specifications. Provide bridging anchors for ends of bridging lines terminating at walls or beams. Provide bridging adequate to resist the loads indicated on the Contract Documents.
6. End Anchorage: Provide end anchorages, including bearing plates, to secure joists to adjacent construction, complying with STEEL JOIST INSTITUTE specifications, unless otherwise indicated. Design all end anchorages to resist a minimum net uplift of 1.6 kPa (35 pounds per square foot) of supported area.
7. Provide supplemental steel support framing for metal deck where normal deck bearing is precluded by other framing members and minor openings.

3.2 SHOP PAINTING

- A. Shop paint in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Shop paint joists and accessories with a rust-inhibiting primer paint. For joists which will be finish painted, limit paint to a primer which is compatible with specified finish paint. In high humidity areas, shop

paint joists with a zinc-rich primer to receive top coats per the paint system manufacturer's recommendations.

3.3 ERECTION

- A. Install joists in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Handle joists in a manner to avoid damaging of joists. Remove damaged joists from site, except when field repair is approved and such repairs are satisfactorily made in accordance with manufacturer's recommendations.

SPEC WRITER NOTES:

- 1. Standard specs indicate joists supported on concrete or masonry must rest on steel bearing plates. Plates to be designed and shown by the Structural Engineer. Minimum size 100 mm x 150 mm (4 inch x 6 inch) wide for K-series, 150 mm x 230 mm (6 inch x 9 inch) for LH and DLH series.
- C. Accurately set joists and end anchorage in accordance with the applicable STEEL JOIST INSTITUTE standard specification. Secure joists resting on masonry or concrete bearing surfaces by welding or bolting to the steel bearing plates as indicated on the Contract Documents. Secure bridging and anchoring in place prior to application of any construction loads. Distribute any temporary loads so that carrying capacity of any joist is not exceeded.

3.4 FIELD PAINTING

- A. Clean abraded, corroded, and field welded areas and touch up with same type of paint used in shop painting.
- B. Finish painting of steel surfaces is specified in Section 09 91 00, PAINTING.

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