

**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. Shop Drawings, Product Data, and Samples, Section 01 33 23
 B. Special Inspections, Section 01 45 35
 C. Cast-in-Place Concrete, Section 03 30 00
 D. Unit Masonry, Section 04 20 00
 E. Structural Steel: Section 05 12 00
 F. Finish Painting: Section 09 91 00

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:
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: Submit complete calculations covering the design of all members and connections for special joist. 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.
- E. Welding certificates.

1.8 QUALITY ASSURANCE

- A. Joist manufacturer is a member of the Steel Joist Institute, SJI, certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications." and has satisfactorily completed work of a similar scope and nature.
 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

Spec Writer Note: Retain "Welding Qualifications" Paragraph below if field welding is required. If retaining, also retain "Welding certificates" Paragraph in "Informational Submittals" Article.

- B. Welding Qualifications: Qualify field-welding procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. 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.

C. American Society for Testing and Materials (ASTM):

F3125/F3125M-19e1: Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 830 MPa (120 ksi) and 1040 MPa (150 ksi) Minimum Tensile Strength, Inch and Metric Dimensions

D. American Welding Society (AWS):

D1.1/D1.1M-20 Structural Welding Code - Steel

E. Association for Materials Protection and Performance (AMPP) Steel Structures Painting Manual, Volumes 1 and 2

F. Steel Joist Institute (SJI):

ANSI/SJI 100-20 Standard Specification for K-Series, LH-Series, DLH-Series Open Web Steel Joists and for Joist Girders.

SPEC WRITER NOTES:

1. Update product 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. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

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. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction 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

SPEC WRITER NOTES:

Retain first paragraph below if repairs to galvanized bolts or bearing plates are required.

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Touchup Painting:

SPEC WRITER NOTES:

Retain first subparagraph below if on-site paint repair is included in this Section. Touchup painting may be unnecessary if building is closed in immediately and in-service conditions require no permanent paint protection. Standard shop paint should not be considered a prime coat for a coating system and is not typically touched up.

1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists[, bearing plates,] [abutting structural steel,] and accessories.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - b. Apply a compatible primer of same type as primer used on adjacent surfaces.

SPEC WRITER NOTES:

Retain subparagraph below if touchup painting is required for Project but is not part of the Work of this Section.

2. Cleaning and touchup painting are specified in Section 09 91 00, PAINTING.B. Finish painting of steel surfaces is specified in Section 09 91 00, PAINTING.

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