

SECTION 052100

STEEL JOISTS AND JOIST GIRDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Open web steel joists; with bridging, attached seats, and anchors.
- B. Erection of open web steel joists; with bridging, attached seats, and anchors.

1.02 RELATED SECTIONS

- A. Section 05120 - Structural Steel.
- B. Section 05300 - Steel Deck: Support framing for small openings in deck.
- C. Section 05500 - Metal Fabrications: Non-framing steel fabrications.
- D. Section 09900 - Painting.

1.03 REFERENCES

- A. ASTM A36 - Structural Steel.
- B. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- C. ASTM A307 - Carbon Steel Threaded Standard Fasteners.
- D. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- E. AWS D1.1 - Structural Welding Code.
- F. FS TT-P-636 - Primer Coating, Alkyd, Wood and Ferrous Metal.
- G. SJI - Standard Specifications for Open Web Steel Joists K Series.
- H. SJI - Standard Specifications for Longspan Steel Joists LH Series and Deep Longspan Steel Joists DLH Series.
- I. SSPC - Steel Structures Painting Council.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. General: Review of submittals will be for general consideration only. Compliance with requirements for materials, fabrication, erection, and dimensions shall be Contractor's responsibility.
- C. Manufacturer's Data: For record only, submit one copy of manufacturer's specifications and installation instructions for each type of joist and its accessories. Include manufacturer's certification as required to show compliance with these specifications. Indicate by transmittal form that a copy of each instruction has been distributed to the Erector.
- D. Shop Drawings:
 - 1. Do not reproduce structural drawings for shop drawing purposes.
 - 2. Indicate standard designations, configuration, sizes, spacing, locations of joists and joist leg extensions and piece marks.
 - 3. Joist coding, bridging, connections, attachments, and accessories.
 - 4. Cambers.
 - 5. Submit certification that special joists and joist girders with special loadings are designed in accordance with the S.J.I. Specification.
- E. Structural calculations for all Special Joists sealed by a Professional Structural Engineer with a valid state seal where the building is located.
- F. Welders' Certificates: For record only, submit manufacturer's certificates under provisions of Section 01300 that welders employed on the Work have met AWS verification within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with SJI Standard Specifications, Load Tables, and Weight Tables, including headers and other supplementary framing. The fabricator shall be a member of the Steel Joist Institute and shall have approval from that Institute for the joists and joist girders supplied for this project. Only Joists and Joist Girders approved by SJI will be accepted.
- B. The manufacturer shall design special joists and joist girders to support the loads noted on the plans and load diagrams. The joist and joist girder manufacturer shall be solely responsible for the design of the joists and joist girders and shall submit a letter of certification stamped by a Professional Engineer registered in the State of Maine stating that all special joists and joist girders are designed in accordance with the S.J.I. Specification to safely support all loads noted on the Contract Documents.
- C. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

- A. Fabricator: Company specializing in performing the work of this Section with minimum eight years experience.
- B. Erector: Company specializing in performing the work of this Section with minimum eight years experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01600 and to SJI requirements.
- B. Store and protect products under provisions of Section 01600 and to SJI requirements.
- C. Protect joists from distortion or damage.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel: Comply with SJI and AISC specifications.
- B. High-strength Threaded Fasteners: ASTM A325 or A490 as required, heavy hexagon structural bolts with nuts and hardened washers.
- C. Unfinished Threaded Fasteners: ASTM A307, grade A, regular hexagon type, low carbon steel.
- D. Primer: FS TT-P-636 or SSPC-SP-15-68T, Type 1, gray color.
- E. Structural Steel for Supplementary Framing and Joist Leg Extensions: ASTM A36.
- F. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 FABRICATION

- A. General: Fabricate steel joists in accordance with SJI and AISC Specification.
- B. Top and bottom chord members shall be limited in shape to angles or structural tees for all joists.
- C. Holes in Chord Members: Provide holes in chord members where shown for securing other work to the steel joists; however, deduct the area of holes from the area of the chord when calculating the strength the member.
- D. Ceiling Extensions: Provide ceiling extensions in areas having ceilings attached directly to

joist bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support the ceiling construction. Maintain ½" clear distance from the finished wall surface unless otherwise indicated.

- E. Extended Ends: Provide extended top chords as shown on the drawings.
- F. Bridging:
 - 1. Provide horizontal or diagonal type bridging for "open web" joists, complying with AISC-SJI "Specifications."
 - 2. Provide horizontal and diagonal type bridging for "longspan" joists, complying with AISC-SJI "Specifications."
 - 3. Provide bridging anchors for ends of all bridging lines terminating at walls or beams.
 - 4. Bridging shall be bolted or welded as shown on design drawings.
- G. End Anchorage: Provide end anchorages to secure joists to adjacent construction complying with SJI and AISC Specifications, unless otherwise indicated.
- H. Fabricate joist girders so joists framing onto top chord load the joist girders at panel points.
- I. Provide the same depth bearing seat for all joist girders.
- J. Header Units: Provide header units to support joists at openings not framed with structural shapes.

2.03 FINISH

- A. After inspection and before shipping, prepare all surfaces by removing loose scale, rust, and other foreign materials. Preparation shall be equivalent to SSPC-SP2 "Hand Tool Cleaning".
- B. Immediately after surface preparation, apply one shop coat of primer paint to steel joists and accessories, unless otherwise indicated, by spraying, dipping, or other methods to provide a continuous dry paint film thickness of not less than 2.0 mils.
- C. Shop prime joists using a gray color primer.
- D. Field finish/paint all exposed joists. Color to be selected by Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 ERECTION

- A. Erect and bear joists on supports. Place and secure steel joists in accordance with SJI and AISC Specifications and as herein specified.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment until completion of erection and installation of permanent bridging and bracing.
- C. Anchors: Furnish anchor bolts and other required devices to be built into masonry construction. Furnish templates as may be necessary for the accurate location of anchors in other work.
 - 1. Furnish unfinished threaded fasteners for anchor bolts, unless otherwise indicated.
- D. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate location and spacing before permanently fastening.
 - 1. Provide temporary bridging, connections, and anchors as required to provide lateral stability during construction.
 - 2. Where "open web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.
- E. Bridging: Install bridging immediately after joist erection, before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
- F. Fastening Joists: Field weld joists to supporting steel framework in accordance with SJI and AISC specifications for the type of joists used. Coordinate welding sequence and procedure with the placing of joists.
 - 1. Provide unfinished threaded fasteners for bolted connections except where high-strength bolts or welded connections are shown.
 - 2. Provide High-strength threaded fasteners for bolted connections of steel joists to steel columns, and at other location where shown, installed in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- G. Coordinate placement of anchors in masonry construction for securing bearing plates.
- H. Frame floor and roof openings greater than 24 inches with supplementary framing.
- I. Do not permit erection of decking until joists are braced, bridged, and secured.
- J. Do not field cut or alter structural members without approval of joist fabricator.

3.03 TOUCH-UP PAINTING

- A. After joist installation, paint all field bolt heads and nuts, and abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before

painting. Use the same type of paint as used for shop painting.

3.04 ERECTION TOLERANCES

- A. Tolerances shall be within limits of AISC "Code of Standard Practice" and SJI requirements.

3.05 PROTECTION

- A. Do not use members for storage nor working platforms until permanently secured.
- B. Do not exceed load capacity of joists with construction loads.
- C. Members damaged by shipping and handling shall be repaired or replaced. Fabricator's representative shall inspect damaged members and provide alternative methods for corrections.

3.06 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01400.
- B. The Owner shall employ a testing laboratory acceptable to Engineer to perform visual inspection of all field welds according to AWS

END OF SECTION