

SECTION 05 21 00 – STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes furnishing and installing the following types of steel joists as indicated on the Drawings:
 - 1. Open-web steel joists, of the type(s) indicated on the Drawings.

1.3 RELATED WORK

- A. Related Work of Other Sections:
 - 1. Section 05 12 00 – Structural Steel Framing.
 - 2. Section 05 31 00 – Steel Decking.
 - 3. Section 05 50 00 – Metal Fabrications.
 - 4. Section 06 10 53 – Miscellaneous Rough Carpentry.

1.4 REFERENCE STANDARDS

- A. All reference standards must be the most recent and current standards applicable at the time of bidding.
- B. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, U.S.A.
 - 1. ASTM A 307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 2. ASTM A 325 - High-Strength Bolts for Structural Steel Joints.
- C. SJI: Steel Joist Institute, Suite A, 1205 48th Avenue North, Myrtle Beach, SC 29577 U.S.A.
 - 1. Standard Specifications for Open Web Steel Joists, K, and LH Series.
- D. AWS: American Welding Society, P.O. Box 351040, 550 N.W. LeJeune Road, Miami, Florida 33135, U.S.A.
 - 1. AWS D1.1 - Structural Welding Code, Steel.
 - 2. AWS B3.0 - Welding Procedure and Performance Qualification.
- E. SSPC: Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, Pennsylvania 15213, U.S.A.
 - 1. Paint 15 - Steel Joist Shop Paint.
- F. FS: Federal Specifications, (General Services Administration), Specifications Unit (WFSIS), 7th and D Streets, S.W., Washington, D.C. 20406, U.S.A.

1. TT-P-636D - Primer Coating, Alkyd, Wood and Ferrous Metal.
- G. AISI: American Iron and Steel Institute, 1133 15th Street N.W., Suite 300, Washington, D.C. 20005 U.S.A.
 1. Specification for Cold-Formed Steel Structural Members.

1.5 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. Shop Drawings: Showing layout, mark, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, accessories; splice and connection locations and details; and attachments to other construction.
- C. Welding certificates.
- D. Mill certificates.
- E. Research/evaluation reports.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.
- B. Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
- C. SJI Specifications: Comply with SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, "Specifications"), applicable to types of joists indicated.
- D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code—Steel," and AWS D1.3, "Structural Welding Code—Sheet Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Handle the open web steel joists with extreme care to avoid bending, twisting or other damage.
- C. Place blocking to keep the open web steel joists off the ground. Place blocking at bearing plates only, with the webs vertical.
- D. Store the open web steel joists to allow the total drainage of water from all parts.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI's "Specifications" for chord and web members.
- B. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers; plain, uncoated.
- C. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers; plain, uncoated.

2.2 PRIMERS

- A. Primer: SSPC-Paint 15, Type I, red oxide; FS TT-P-636, red oxide; or manufacturer's standard shop primer complying with performance requirements of either of these red-oxide primers.

2.3 STEEL JOISTS

- A. Manufacture steel joists according to SJI's "Specifications," with steel-angle top- and bottom-chord members, and as follows:
 - 1. Manufacture steel joists of the type(s) indicated according to "Standard Specifications for Open Web Steel Joists, K-Series," with steel-angle top- and bottom-chord members, under slung ends, and parallel top chord.
 - 2. Manufacture LH-series DLH-series steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series," with end and top-chord arrangements indicated.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

2.4 JOIST ACCESSORIES

- A. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications," and of the types noted on the Structural Drawings
- B. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 FABRICATION

- A. Fabricate the open web steel joists in accordance with the AISC and the SJI Standard Specifications and as set forth in this Section. Verify the drawing dimensions, seat conditions and configurations and the loading conditions and criteria before starting the fabrication.
- B. Fabricate the open web steel joists straight and free of twist.
- C. Provide bottom and top joist chord extensions where indicated or as required.

- D. Spacers, if used, between chord members shall be neat, evenly spaced and shall not extend beyond the face of the chords.
- E. Camber the open web steel joists to accommodate the dead load deflection or as indicated on the Drawings.

2.6 SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- B. Apply 1 shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Do not install joists until supporting construction is in place and secured.

3.2 INSTALLATION

- A. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
- B. Do not permit the erection of the steel decking until the open web steel joists are fully braced and connected adequately.
- C. Do not overload the open web steel joists beyond the rated capacity of the individual joists at any time during the construction operations. Exercise special attention to limit the temporary construction loading on the open web steel joists which are not braced fully and which are not capable of carrying their rated load until they become fully braced.
- D. Obtain the Architect/Engineer's review and approval before any field cutting or altering of the open web steel joists and or the corresponding bridging and connections.
- E. Extend the open web steel joist seats to the center line of the supporting beams minus 1/4 of an inch when bearing on both sides of the supporting beams, and a minimum of 2 1/2 inches past the center line when bearing on one side only unless otherwise noted on the Structural Drawings.
- F. During erection, provide the required temporary bracing as a result of the anticipated induced loads and stresses. Maintain this temporary bracing until all final connections are made, the bridging is in place and the steel decking secured permanently to the open web steel joists.
- G. Coordinate the proper placement of all anchorages in construction as required for the support of the bearing plates and angles.

- H. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Field weld the open web steel joist seats to the supporting members, after alignment and positioning. Use E70XX electrodes.
- I. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.
- J. Bolt joists to supporting steel framework using high-strength structural bolts, unless otherwise indicated. Comply with RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- K. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.
- L. After the complete erection, prime welds, abrasions and surfaces not otherwise shop primed. Use a primer consistent with the shop coat primer.

END OF SECTION 05 21 00