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SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

Adjust list below to suit Project.

1. K-series steel joists.
2. KCS-type K-series steel joists.
3. K-series steel joist substitutes.
4. Long-span steel joists.
5. Joist girders.
6. Joist accessories.

1.2 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. LEED Submittal:

Retain subparagraph below if recycled content is required for LEED-NC or LEED-CI Credits MR 4.1 and MR 4.2.

1. Product Data for Credit MR 4.1[**and Credit MR 4.2**]: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
 - a. Include statement indicating costs for each product having recycled content.
- C. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
- D. Welding certificates.
- E. Manufacturer certificates.
- F. Mill Certificates: For bolts.
- G. Field quality-control test and inspection reports.

- H. Research/Evaluation reports.

1.3 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A manufacturer certified by the Steel Joist Institute (SJI) to manufacture joists complying with SJI standard specifications and load tables.
- B. **SJI Specifications:** Comply with SJI's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, SJI's "Specifications") that are applicable to types of joists indicated.
- C. **Welding:** Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. **Steel:** Comply with SJI's "Specifications" for web and steel-angle chord members.

Retain subparagraph below if recycled content is required for LEED-NC or LEED-CI Credits MR 4.1 and MR 4.2. The Steel Recycling Institute indicates that hollow structural shapes, pipe, and steel plates are made by the basic oxygen furnace method, which typically has 23 percent postconsumer recycled content and 1.5 percent preconsumer recycled content, and rolled structural shapes and bars are made by the electric arc furnace method, which typically has 57.5 percent postconsumer recycled content and 6.5 percent preconsumer recycled content.

1. **Recycled Content:** Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than **[50] [60] <Insert number>** percent.
- 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.

Select one finish from options in subparagraph below.

1. **Finish:** **[Plain, uncoated] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].**
- C. **High-Strength Bolts, Nuts, and Washers:** ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

Select one finish from options in subparagraph below.

1. Finish: **[Plain]** **[Hot-dip zinc coating, ASTM A 153/A 153M, Class C]** **[Mechanically deposited zinc coating, ASTM B 695, Class 50]**.

D. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.2 K-SERIES STEEL JOISTS

Retain this Article if Project uses open-web K-series steel joists.

A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

1. Joist Type: **[K-series steel joists]** **[and]** **[KCS-type K-series steel joists]**.

Retain paragraph below if K-series joist substitutes of 2-1/2-inch- (64-mm-) deep sections are required for spans less than 96 inches (2400 mm).

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.3 LONG-SPAN STEEL JOISTS

Retain this Article if Project uses either LH- or DLH-series steel joists. LH-series joists may be used in floor or roof decks; DLH-series joists are limited to use in roof decks.

A. Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type as follows and end and top-chord arrangements indicated.

1. Joist Type: **[LH-series steel joists]** **[and]** **[DLH-series steel joists]**.

2.4 JOIST GIRDERS

Retain this Article if Project uses steel joist girders.

A. Manufacture joist girders according to "Standard Specifications for Joist Girders" in SJI's "Specifications," with steel-angle top- and bottom-chord members and with end and top-chord arrangements as indicated.

2.5 JOIST ACCESSORIES

Retain one of two paragraphs below. Bridging refers to permanent bridging.

- A. Bridging: Provide bridging anchors and number of rows of **[horizontal]** **[or]** **[diagonal]** bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.

Retain first paragraph below if ceiling will be attached to bottom of joists. See Evaluations.

- C. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface, unless otherwise indicated.
- D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.6 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories. Apply 1 coat of shop primer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. 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.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

Retain paragraph below if field welding joists to steel bearing plates or steel framework.

- C. Field weld joists to supporting steel **[bearing plates]** **[and]** **[framework]**. 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.

Retain one of first two paragraphs below for bolting joists to steel framework. Retain first paragraph if mild-strength carbon-steel bolts are required; retain second if high-strength structural bolts are required.

- D. Bolt joists to supporting steel framework using carbon-steel bolts.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connections' "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- F. 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.

3.2 FIELD QUALITY CONTROL

Delete this Article if not required. Retain first option in paragraph below if Owner engages agency; retain second option if Contractor engages agency. If retaining second option, retain requirement for field quality-control test and inspection reports in Part 1 "Submittals" Article.

- A. Testing Agency: [**Owner will engage**] [**Engage**] a qualified independent testing and inspecting agency to inspect [**field welds**] [**and**] [**bolted connections**] and to perform field tests and inspections and prepare test and inspection reports.

END OF SECTION 052100