

SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Joist and Joist Girders.
- B. Anchors and Bolts.
- C. Fasteners and Accessories.
- D. Grout.

1.02 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for steel joists will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for steel joists indicated in the Bid Schedule of the Bid Form.
- B. Lump Sum: If the Bid Schedule indicates a lump sum for steel joists, the lump-sum method of measurement and payment will be in accordance with Section 01 20 00, Price and Payment Procedures, Article 1.03.
- C. Unit Prices: If the Bid Schedule indicates a unit price for steel joists, the unit-price method of measurement and payment will be as follows:
 - 1. Measurement:
 - a. Steel joists will be measured for payment per each joist for each type and size, installed complete in place.
 - b. Accessories, bridging, painting, and grouting will not be measured separately for payment; such items will be considered incidental to the steel joist installation.
 - 2. Payment: Steel joists will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.02.C.1.

1.03 REFERENCES

- A. American National Standards Institute (ANSI)/American Institute of Steel Construction (AISC):
 - 1. ANSI/AISC 360 Specification for Structural Steel Buildings
 - 2. ANSI/AISC 303 Code of Standard Practice for Steel Buildings and Bridges.
- B. American Society for Testing and Materials (ASTM):

1. ASTM A36/A36M Standard Specification for Carbon Structural Steel
 2. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 3. ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod, 60,000 psi Tensile Strength
 4. ASTM A449 Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Threaded, 120/105/90 ksi Minimum Tensile Strength, General Use
 5. ASTM A563 Standard Specification for Carbon and Alloy Steel Nuts
 6. ASTM F436/F436M Standard Specification for Hardened Steel Washers Inch and Metric Dimensions
- C. Steel Joist Institute (SJI):
1. Standard Specifications, Load Tables & Weight Tables for Steel Joists & Joist Girders
 2. Standard Specifications for Open Web Steel Joists, K-Series
 3. Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series
 4. Standard Specifications for Joist Girders
 5. Technical Digest #8, "Welding of Open Web Steel Joists and Joist Girders"

1.04 SUBMITTALS

- A. General: Refer to Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Shop Drawings: Submit detailed Shop Drawings of steel joists and joist-girders and related miscellaneous metalwork, showing sizes, details of fabrication and construction, locations of hardware, anchors, and accessories, and erection and installation details.
- C. Certification: Submit evidence of SJI membership, or evidence that designs of indicated joists and girders have been checked and accepted by SJI.
- D. Inspection Reports: Submit inspection results of required inspections in accordance with the requirements of Article 2.03 herein.

1.05 QUALITY ASSURANCE

- A. Fabricators' Qualifications: Fabricator shall be a member of the Steel Joist Institute, or shall be a manufacturer who regularly produces steel joists of the K-, LH-, or DLH-Series, or joist girders conforming to SJI's Specifications and Load Tables and whose designs have been checked and accepted by the Institute.
- B. Qualifications of Welders and Welding Procedures: Refer to Section 05 05 22, Metal Welding, for requirements. Comply also with requirements of SJI's Technical Digest #8, "Welding of Open Web Steel Joists and Joist Girders."

PART 2 – PRODUCTS

2.01 MATERIALS AND FABRICATION

- A. Joists and Joist Girders: Materials and fabrication (or design and manufacture) of joists shall conform with the referenced SJI Standard Specifications for the type or types of joists and joist girders indicated. Provide horizontal bridging for top and bottom chords as indicated.
 - 1. Joists and girders shall be of the following types as indicated:
 - a. Open web steel joists (K-Series);
 - b. Longspan steel joists (LH-Series);
 - c. Deep longspan steel joists (DLH-Series); and
 - d. Joist Girders (G).
- B. Accessories:
 - 1. Anchors and Bolts: Bolts and studs, nuts, and washers shall conform with ASTM A307, A449, A563, and F436/F436M, as applicable. Bolts and studs, nuts, and washers shall be hot-dip galvanized in accordance with ASTM A153/A153M.
 - 2. Fasteners and Accessories: Provide anchors and fasteners, washers, straps, and accessories required for a complete and finished installation. Fasteners shall be stainless steel, galvanized steel, or cadmium plated, or other approved non-corrodible metal. Baseplates or bearing plates shall be steel plate conforming to ASTM A36/A36M.
- C. Grout: High-Strength, non-shrink grout conforming to requirements of Section 03 61 11, Non-Shrink Grout.

2.02 SHOP PAINTING

- A. Steel joists and joist girders shall be properly cleaned and painted in accordance with the referenced SJI Standard Specifications. Conform also with applicable provisions of Section 05 12 00, Structural Steel Framing, for painting of steel for the location.

2.03 INSPECTIONS AND TESTS

- A. The Contractor shall require joist manufacturer's inspection as required by the SJI Standard Specifications. Inspection results shall be submitted to the Engineer as specified in Article 1.04 herein.
- B. Materials, fabrication, and welds may be inspected by the Engineer in the manufacturer's factory. Inspection method will be visual. The Engineer reserves the right to perform additional inspections and tests on work that is questionable or suspect. Tests will be non-destructive type.
- C. The Contractor will bear the cost for the Engineer's inspection and tests, if such inspections and tests reveal failure of portions of the work to comply with requirements indicated in these Specifications. The Contractor shall bear all costs made necessary by such failures including those of repeated testing and inspections.

PART 3 – EXECUTION

3.01 ERECTION

- A. Erect steel joists and joist girders as indicated and in accordance with the reviewed and accepted submittals and the SJI Standard Specifications for the type of joists and joist girders indicated. Conform also with applicable requirements of AISC 360 "Specification for Structural Steel Buildings."
- B. Align and adjust joists accurately before fastening. Tolerances shall conform with AISC 303 "Code of Standard Practice for Steel Buildings and Bridges." Fastening of splices of compression members shall be performed after the abutting surfaces have been brought into contact. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled. Splices will be permitted only where indicated.
- C. Set joists accurately at the established lines and levels. Joists shall be plumb and level (with indicated allowance for camber) before bolting is commenced. Temporary bracing shall be provided as required and shall be kept in position until completion of erection, anchorage, and bridging.
- D. Install support bases, bearing plates, and the ends of top chords, that require grouting, exactly at the proper level by means of steel wedges and by means of adjustment nuts on anchor bolts.
- E. Grouting shall conform with the requirements specified in Section 03 61 11, Non-Shrink Grout.
- F. Install horizontal bridging for top and bottom chords as indicated and in accordance with the SJI Standard Specifications.

3.02 FIELD PAINTING

- A. After erection, spot paint and touch up all field bolts, field welds, and abrasions to the shop coat. Clean surfaces properly as required for paint adherence and as required to prevent corrosion. Use same paint as was used for shop painting.

END OF SECTION 05 21 00