

## **SECTION 05200 – STEEL JOISTS & JOIST GIRDERS CONSTRUCTION STANDARD**

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### **PART 1: GENERAL**

#### **1.01 SCOPE OF STANDARD**

- A. This standard provides general guidance concerning the specific preferences of the University of Texas at Austin for the design, fabrication and erection of steel joist and/or joist girder structural systems.

#### **1.02 RELATED STANDARDS**

- A. Structural Systems.
- B. Structural Steel
- C. Coatings and Paint Systems

#### **1.03 REFERENCE STANDARDS**

- A. AISC Specification for Structural Steel Buildings.
- B. AISC Code of Standard Practice for Steel Buildings and Bridges.
- C. Steel Joist Institute Specifications.
- D. AISC Manual of Steel Construction.
- E. American Welding Society (AWS) D1.1 – Structural Welding Code – Steel.
- F. American Society for Testing and Materials (ASTM) – Standard Specifications.

#### **1.04 QUALITY CONTROL**

- A. The steel joist fabricator shall provide evidence of successful fabrication of steel joist systems of similar size and complexity for a continuous period of at least five (5) years immediately prior to the bid date. The joist fabricator shall also employ and have on staff a qualified structural engineer licensed in the State of Texas to prepare design calculations, shop drawings, and other structural data for steel joists and joist girders.
- B. The steel joist erector shall provide evidence of successful erection of steel joist systems of similar size and complexity for a continuous period of at least five (5) years immediately prior to the bid date.
- C. Qualifications for welding work: All welders and welding processes shall be qualified in accordance with AWS “Standard Qualification Procedure.” All welders shall have passed AWS qualification tests within the past six months.
- D. The joist erector is required to visit the project site at least 30 days prior to start of erection to review existing site conditions such as site access, clearances, utilities, adjacent structures, overhead obstructions, site topography and security requirements.

#### **1.05 SUBMITTALS**

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- A. Fabricator shall submit, as a minimum, the following:
  - 1. Mill certificates for all steel members.
  - 2. Complete shop drawings, including placement plans, member sizes, connections, connection details, bill of materials, dimensions of members and locations of splices.
  - 3. All primers, coatings and cleaning methods.
  - 4. Submit shop drawings and calculations for all structural members signed and sealed by the qualified Registered Professional Engineer (licensed in Texas) responsible for their preparation.

### **PART 2: PRODUCTS**

#### 2.01 GENERAL

- A. All steel shall be domestically manufactured, unless foreign sources are accepted by the University of Texas.
- B. Primer paint shall be compatible with subsequent paint systems to be applied.

### **PART 3: EXECUTION**

#### 3.01 ERECTION

- A. Prior to erection, erector shall check elevations of concrete and masonry bearing surfaces, locations of anchor bolts and similar devices before proceeding with erection. Report any discrepancies to U.T. project representative.
- B. Erector is responsible for all temporary shoring and bracing.
- C. Level and plumb individual members and steel frame to within AISC tolerances.

#### 3.02 QUALITY CONTROL

- A. The University of Texas will contract with an independent testing agency to provide inspection services during the course of the project. The fabricator and the erector shall provide access to all parts of the work for inspection by the testing agency to accomplish its work. The testing agency may require access to the fabricator's shop at any time during fabrication or just prior to shipment of the steel joists and/or joist girders.
- B. The University of Texas reserves the right to reject any and all materials or workmanship not complying with specified requirements at any time.
- C. Fabricator and/or erector shall correct all deficiencies and work which is not in compliance with the specified requirements. Any additional testing or inspection costs will be at the expense of the fabricator/erector.

### **PART 4: DESIGN**

#### 4.01 GENERAL

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- A. In the design of steel joist and joist girder systems, the design engineer shall take into consideration the future flexibility of the system and the need to make frequent modifications to building systems.

### 4.02 DESIGN

- A. Refer to U.T. Structural Systems standard for design loads.
- B. Live load reduction shall be in accordance with the U.T. Structural Systems standard.
- C. Deflections - Unless approved by the U.T. Structural Engineer, steel member deflections shall be limited to the following:

Live Load Only	L / 360
Dead Load + Live Load	L / 240

In addition, the engineer should give due consideration to the control of excessive floor vibration and to the control of pounding on roofs. The engineer shall also consider the affect of deflections on architectural finishes attached to the structural members. In some cases, it may be necessary to provide greater stiffness than the above deflection limits require.

- D. Floor Slabs on Metal Deck – Floor slabs may be designed as either composite or non-composite systems. The minimum slab thickness above the metal deck should be at least 3 inches. It is preferable that the concrete thickness be increased to provide any required fire separation rather than fireproofing the bottom of the metal deck.
- E. Lateral Forces – In the design of steel joist and/or joist girder systems for lateral loads, the use of a braced frame is preferred in order to reduce the chance of cracking in brittle finishes. The use of a Moment-Resisting Frame to resist lateral forces is at the discretion of the U.T. Structural Engineer.
- F. Full-Penetration Welding – Full-penetration welds are often required and even desirable for many steel connections. However, the use of full-penetration welding should be limited due to both cost and testing requirements. The engineer should give consideration to these factors when designing steel connections.
- G. Joist Bridging – All joist bridging shall be designed by the joist manufacturer. Joist bridging shall conform to all OSHA requirements for erection stability.

### 4.03 SYSTEMS TO AVOID

- A. Avoid steel joist systems with excessive span/depth ratios. Deflections should be kept within acceptable limits.
- B. Avoid the use of A-490 bolts.
- C. Steel yield strengths greater than 50 ksi.

END OF STANDARD 05200