SECTION 05210 - OPEN WEB STEEL JOISTS

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing the open web steel joists as indicated, including horizontal and diagonal bridging, connections, splices, plates, clips, bolts, anchors, and tee hangers for ceilings. The intent of these Specifications is to provide a complete and adequate structural system in place, integrating open web steel joists with the other structural elements, such as walls, columns, roof and floor slabs.

B. The WORK also includes coordination of design, assembly, testing and installation.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 05120 Structural Steel
2. Section 05300 Metal Decking
3. Section 05500 Miscellaneous Metalwork
4. Section 09800 Protective Coating

1.3 CODES

A. The WORK of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:

1. Uniform Building Code
2. Uniform Mechanical Code
3. Uniform Plumbing Code
4. Uniform Fire Code
5. National Electrical Code

1.4 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1.	ASTM A 36	Specification for Structural Steel.
2.	ASTM A 242	Specification for High-Strength Low-Alloy Structural Steel.
3.	ASTM A 570	Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
4.	ASTM A 572	Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.

5. ASTM A 607 Specification for Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy Columbium and/or Vanadium.

6. AISC The American Institute of Steel Construction Manual.

7. AWS D1.1 The American Welding Society Code for Welding in Building Construction.

8. SJI The Steel Joists Institute Standard Specifications.

9. SSPC Steel Structures Painting Council Specifications.

1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted in compliance with Section 01300:

1. All CONTRACTOR's shop drawings, erection drawings, and design calculations. Design calculations, erection drawings, and shop drawings shall be sealed by a civil/structural engineer registered in the State of California. Design calculations shall be complete for the particular unit or system utilized and shall include maximum stresses in individual members, and other information pertinent to the design.

2. Complete design calculations for all the connections between the steel joists and all the supporting elements of the walls, beams and columns.

3. Shop and erection drawings shall include the following:

General layout plan with overall dimensions.

Fabrication and erection details.

Connections and anchoring details.

Bridging size, location and connection details.

Size and location of all openings.

Size and location of all mechanical and electrical equipment supported by the roof system which may affect the design for fabrication.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. **Delivery of Materials**: Products shall be delivered bearing the name of the manufacturer.

B. **Storage**: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. All buildings shall be designed to meet the structural and fire requirements of the latest edition of the applicable building code and governing fire codes.

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NTS: This specification presumes that the design loadings will be listed on the Structural Drawings.

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B. All open web steel joist members and their connections shall be designed in accordance with the latest Steel Joist Institute Specifications to support all dead, live and lateral loads as indicated or as called for by applicable codes and as follows:

1. Wind load as per governing building code.

2. Special loads due to weight of mechanical and electrical equipment or other items.

3. Seismic loads.

2.2 MATERIALS

A. **General:** Materials utilized in the work but not specifically mentioned in this Section shall be governed by the latest applicable ASTM Specifications.

B. Joists will be inspected by the CONSTRUCTION MANAGER before shipment to ensure compliance of materials and workmanship with the requirements of these Specifications.

C. The dimensions indicated for the roof open web steel joists, as well as depth of members and thickness of chords, are for general design control purposes. Minor variations from these dimensions, if required to accommodate manufacturing standards, shall be allowed.

D. **Steel:** The steel used in the manufacture of chord and web sections shall conform to the ASTM Specifications listed in Part 1.

E. **Mechanical Properties:** The yield strength used as basis for the design stress shall be 50,000 psi. Mill certificates shall be submitted to the CONSTRUCTION MANAGER for all materials for review and approval before fabrication can begin.

[F. **Design Verification Test:** The manufacturer shall, at the time of design review by the CONSTRUCTION MANAGER and/or independent agency, verify by tests that his design will provide a minimum safety of 1.65 on the theoretical design capacity of all members. Such tests shall be evaluated considering the actual yield strength of the members of the test joists.]

G. **Welding:** All welding shall conform to the latest Steel Joist Institute Specifications and AWS D1.1.

H. **Bridging**: Unless indicated otherwise, bridging shall conform to SJI recommendations.

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NTS: The Steel Structures Painting Council Specification 12 Type I covers commercial blast cleaning and application of inorganic zinc prime coats. If joists are in severe condition atmospheres, i.e., wastewater process buildings, etc., a top coat from Section 09800 must be specified.

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I. **Paint:** Joists, before shipment, shall be given a double primed shop paint that conforms to Steel Structures Painting Council Specifications 12, Type I.

After erecting and welding are complete, welds and scarred surfaces on the joists shall be given a touch-up coat of the same paint as shop coat [and the entire system shall be protected with the specified top coat in accordance with Section 09800].

PART 3 -- EXECUTION

3.1 ERECTION REQUIREMENTS

A. **Handling and Erection:** Handling and erection shall be in accordance with the latest Steel Joist Institute Specifications and the following:

1. Care shall be exercised at all times to avoid damage through careless handling during unloading, storing, and erecting.

2. Erection of all steel joists shall be performed by personnel experienced in this type of work.

3. Sequence of erection shall be thoroughly outlined prior to starting and any special sequence required by the drawings or specifications, if any, shall be strictly adhered to.

4. Base lines and elevations shall be established by the CONTRACTOR prior to the start of erection.

5. Bearing surfaces shall be prepared to a true and level line.

6. Fabricator shall provide all the equipment necessary to safely erect and place all joists. Each element shall be set in proper position as shown on the reviewed erection plans, accurately plumbed, and anchored securely to the supporting structural elements.

7. As soon as joists are erected, all bridging shall be completely installed and the joists permanently fastened into place before the application of any loads.

8. Field welding shall not damage the joists. The total length of weld at any one point on cold-formed members whose yield strength has been attained by cold working and whose as-formed strength is used in the design shall not exceed 50 percent of the overall developed width of the cold-formed section.

B. **Completion:** All units shall be in place, properly and completely anchored and approved before any finishes are applied. Any damaged units, where in the opinion of the CONSTRUCTION

MANAGER, suitable and adequate repairs cannot be made, will be rejected, whether or not delivered or erected; and whole, approved replacement units shall be provided at no additional cost to the OWNER.

**** END OF SECTION ****