

**SECTION 05 12 00**  
**STRUCTURAL STEEL**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Structural steel framing members, support members, sag-rods, and struts
- B. Base plates, shear stud connectors, and expansion joint plates
- C. Grouting under base plates

1.2 REFERENCES

- A. AISC - Code of Standard Practice for Steel Buildings and Bridges
- B. AISC –Steel Construction Manual
- C. AISC - Specification for Structural Steel Buildings
- D. ASCE 7 - American Society of Civil Engineers – Minimum Design Loads of Buildings and Other Structures
- E. ASTM A36/A36M, Standard Specification for Carbon Structural Steel
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless
- G. ASTM A108 - Standard Specification for Steel Bars, Carbon, and Alloy, Cold-Finished
- H. ASTM A123/A123M - Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
- I. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
- J. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel.
- K. ASTM A307 - Standard Specification for Carbon Steel and Studs, 60 000 PSI Tensile Strength
- L. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- M. ASTM A449 – Standard Specification for Hex Cap Screws, Bolts, and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
- N. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
- O. ASTM A500/A500M - Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes
- P. ASTM A501 - Standard Specification for Hot Formed Welded and Seamless Carbon Steel Structural Tubing
- Q. ASTM A514/A514M - Standard Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
- R. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
- S. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts
- T. ASTM A568/A568M - Standard Specification for Steel, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled Sheet and Cold-Rolled Sheet, General Requirements for
- U. ASTM A992/A992M – Standard Specification for Structural Steel Shapes
- V. ANSI/AWS A2.4 - Symbols for Welding, Brazing and Nondestructive Examination
- W. AWS D1.1/D1.1M - Structural Welding Code
- X. FM - Roof Assembly Classifications
- Y. SSPC (Steel Structures Painting Council) - Paint Manual

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Z. UL - Fire Resistance Directory

AA. FBC - Florida Building Code

### 1.3 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittals Procedures

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
2. Connections
3. Cambers and loads
4. Indicate welded connections with AWS A2.4 welding symbols, along with net weld lengths.
5. Indicate grade of steel.
6. State of Florida Professional Engineer shall date, sign, and seal the required Shop Drawings.

### 1.4 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittals Procedures

B. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.

C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.

D. Welders' Certificates: Certify welders employed on the Work, verifying AWS qualifications within the previous 12-months.

### 1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC Code of Standard Practice.

B. Fabricator: Company specializing in performing the work of this section with minimum five years documented experience.

C. Erector: Company specializing in performing the work of this section with minimum 5-years documented experience.

D. State of Florida Professional Structural Engineer experienced in design of connection details shall design all connections not detailed on the plans from the Architect/Engineer of record.

### 1.6 REGULATORY REQUIREMENTS

A. Structural steel design and construction shall comply with FBC, ASCE 7 – Wind loads, and American Institute of Steel Construction, AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings."

B. Conform to UL, FM, and Warnock Hersey Assembly.

### 1.7 DELIVERY, STORAGE AND PROTECTION

A. Section 01 60 00 - Materials Equipment and approved equals: Transport, handle, store and protect product

## **PART 2 PRODUCTS**

### 2.1 MATERIALS

A. Structural Steel Members: ASTM A36/A36m and A992/A992M, Grade 50

B. Structural Tubing: ASTM A500/A500M, Grade B. ASTM A501

C. Pipe: ASTM A53/A53M, Type E or S, Grade B

D. Shear Stud Connectors: ASTM A108, Grade 1015, headed, uncoated

E. Bolts, Nuts, and Washers: ASTM A307, A325 and A490 galvanized to ASTM A153/A153M for galvanized members

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- F. Anchor Bolts: ASTM A307 and A36/A36M
- G. Welding Materials: AWS D1.1; type required for materials being welded
- H. Sliding Bearing Plates: Teflon coated
- I. Grout: Use non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing, and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- J. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, provide a uniform dry film thickness of 1.5 mils
- K. Touch-up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic

## 2.2 FABRICATION

- A. Continuously seal joined members by intermittent welds and plastic filler.
  - 1. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber of members.

## 2.3 FINISH

- A. Prepare interior, unexposed, structural component surfaces in accordance with SSPC SP-2.
- B. Shop prime interior, unexposed, structural steel members. Finish coating system as specified elsewhere.
  - 1. Do not prime surfaces receiving fireproofing or field welds.
  - 2. Do not prime surfaces in contact with concrete.
  - 3. Do not prime surface of high strength bolts.
- C. All structural or miscellaneous steel exposed to earth or weather shall be hot dipped galvanized.
  - 1. All fasteners used at these locations shall also be hot dip galvanized.
- D. Galvanize structural steel members to ASTM A123/A123M; provide Special High Grade galvanized coating per ASTM B 6.
  - 1. Minimum coating thickness is 1.25 oz/sq.ft. for each side.

## 2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Provide shop testing and analysis of structural steel sections.

## **PART 3 EXECUTION**

### 3.1 EXAMINATION

- A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions prior to beginning work

### 3.2 ERECTION

- A. Allow for erection loads, and sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Field-weld components and shear studs indicated on shop drawings.
- C. Field-connect members with threaded fasteners; torque to required resistance.
- D. Do not field cut or alter structural members without approval of A/E.
- E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- F. Grout under base plates. Trowel grouted surface smooth, splay neatly to 45°.
- G. Provide nuts and lock washers for the connection of the kitchen hood hangers.
- H. Do not hang ceilings, pipes, etc. from metal deck.
  - 1. Attach anchors to the top chord of steel truss/joist.

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2. Only loads approved by structural engineer of record as shown on the structural drawings may be attached to the bottom cord of the truss or joist.
    - I. Provide protection of structural steel from corrosion – base plates, anchor angles embedded in concrete or soil.
    - J. Attach structural steel trusses to supports with either welds or mechanical fasteners.
- 3.3 ERECTION TOLERANCES
- A. Maximum Variation From Plumb:  $\frac{1}{4}$ " per story, non-cumulative
  - B. Maximum Offset from True Alignment:  $\frac{1}{4}$ "
- 3.4 FIELD QUALITY CONTROL
- A. Section 01 40 00 - Quality Control: The District may require field inspection, testing of bolt torque, welds and torque of fasteners.

END OF SECTION