

SECTION 05120
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 - Manual of Steel Construction - Allowable Stress Design (ASD) or Load and Resistance Factor Design (LRFD)
- B. AISC - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, 9th Edition.
- C. ASCE 7 - American Society of Civil Engineers – Wind Loads
- D. ASTM 992- Structural Steel, ASTM A36, Channels, plates
- E. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe
- F. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality
- G. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- H. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware
- I. ASTM A242/A242M - High-Strength Low-Alloy Structural Steel.
- J. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- K. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- L. ASTM A449 - Quenched and Tempered Steel Bolts and Studs.
- M. ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
- N. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- O. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- P. ASTM A514 - High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
- Q. ASTM A529 - Structural Steel with 42 KSI Minimum Yield Point ½" Maximum Thickness
- R. ASTM A563 - Carbon and Alloy Steel Nuts
- S. ASTM A568 - General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet
- T. AWS A2.0 - Symbols for Welding, Brazing and Nondestructive Examination.
- U. AWS D1.1 - Structural Welding Code
- V. FM - Roof Assembly Classifications
- W. SSPC (Steel Structures Painting Council) - Paint Manual.
- X. UL - Fire Resistance Directory
- Y. Florida Building Code.

1.3 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals
- 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 A2.0 welding symbols. Indicate net weld lengths.
5. Shop Drawings shall be dated, signed and sealed by a Specialty Engineer registered in The State of Florida.

1.4 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Procedures for submittals
- 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. Maintain one copy of each document on site.
- C. Fabricator: Company specializing in performing the work of this section with minimum five years documented experience.
- D. Erector: Company specializing in performing the work of this section with minimum five years documented experience.
- E. Design connections not detailed on the drawings shall be done under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Florida.

1.6 REGULATORY REQUIREMENTS

- A. Structural steel design and construction shall comply with Florida Building Code, ASCE 7-98 – Wind loads, and American Institute of Steel Construction, AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings, 9th Edition."
- B. Conform to UL, FM and Warnock Hersey Assembly.

1.7 DELIVERY, STORAGE AND PROTECTION

- A. Section 01600 - Materials and Equipment: Transport, handle, store and protect product.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Steel Members: ASTM A36 and A992, Grade 50.
- B. Structural Tubing: ASTM A500, Grade B. ASTM A501.
- C. Pipe: ASTM A53, 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 for galvanized members.
- F. Anchor Bolts: ASTM A307 and A36.
- G. Welding Materials: AWS D1.1; type required for materials being welded.

- H. Sliding Bearing Plates: Teflon coated.
- I. Grout: 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. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut and washer connectors.
- C. Develop required camber of members.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-2.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete and high strength bolted.
- C. Galvanize structural steel members to ASTM A123. Provide minimum 1.25 oz/sq ft galvanized coating.
- D. All structural or miscellaneous steel exposed to earth or weather shall be hot dipped galvanized (G90).

2.4 SOURCE QUALITY CONTROL AND TESTS

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

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of existing conditions prior to beginning work

3.2 ERECTION

- A. Allow for erection loads, and for 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. Ceilings, pipes, etc. are not to be hung from metal deck or the bottom truss chord. Attach to the top chord of steel truss/joist.
- I. Provide protection of structural steel from corrosion – base plates, anchor angles embedded in concrete or soil.

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 01400 - Quality Assurance: Field inspection, testing of bolt torque, welds and torque of fasteners.

END OF SECTION