

SECTION 05120 - STRUCTURAL STEEL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes structural steel
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section, "Quality Control," for independent testing agency procedures and administrative requirements.
 - 2. Division 3 Section, "Cast-in-Place Concrete," for installing anchors set in concrete.
 - 3. Division 4 Section, "Unit Masonry," for installing anchors set in unit masonry.
 - 4. Division 5 Section, "Metal Fabrications," for loose, steel bearing plates and miscellaneous steel framing.
 - 5. Division 9 Section, "Painting," for surface preparation and prime painting.
- C. Structural Performance: Design structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated in accordance with the, "Manual of Steel Construction," of the AISC.
- D. Submittals: In addition to Product Data and mill test reports on structural steel and bolts, submit Shop Drawings detailing fabrication of structural steel components, including connections, splices, holes, welds, and bolts. Contract Drawings in any form, shall not be submitted for shop drawings.
- E. Quality Assurance:
 - 1. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance. The Installer shall have an established quality assurance program. Documentation showing participation in the "AISC Erector Certification Program" or another industry approved program shall be provided.
 - 2. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work. The Fabricator shall have an established quality assurance program. Documentation showing participation in the "AISC Fabricator Certification Program" or another industry approved program shall be provided.
 - 3. Approved Fabricator: The fabricator shall be approved by the Building Official in accordance with Chapter 17 (Structural Tests and Special Inspections) of the International Building Code latest addition with any applicable local or state amendments. Submit Certificate of Compliance with this requirement to the Engineer and Special Inspector.

- F. Comply with applicable provisions of the following specifications and documents:
1. AISC's, "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 2. ASTM A 6 (ASTM A 6M), "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
 3. Research Council on Structural Connections' (RCSC), "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- G. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code--Steel."
1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- H. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

1.3 PRODUCTS

- A. Structural Steel Shapes, Plates, and Bars: ASTM A572, Grade 50 (wide flange shapes), all other shapes ASTM A 36 (ASTM A 36M), carbon steel.
- B. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.
- C. Steel Pipe: ASTM A53 (Schedule 40, minimum).
- D. Anchor Rods, Bolts, Nuts: ASTM A 36 (ASTM A 36M), un-headed rods.
- E. Anchor Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers, unbolted.
- F. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, unbolted.
- G. Primer for Interior or Concealed Materials: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer. Primer shall be compatible with any field applied coatings, see Division 09. **Color shall match joists.**
- H. Primer for Exterior Ferrous Metal: Two coats modified alkyd primer, Series FD88 Azeron Primer by Tnemec Company, Inc., light gray color, 2.0 to 3.5 mils DFT each, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- I. Nonmetallic, Shrinkage-Resistant Grout: Premixed, ASTM C 1107, of consistency suitable

for application.

- J. Fabrication: Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
1. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
 2. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - a. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.
 3. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
- K. Shop Priming: Shop prime steel, except surfaces embedded in concrete or mortar, surfaces to be field welded, surfaces to be high-strength bolted with slip-critical connections, and surfaces to receive sprayed-on fireproofing.
1. Surface Preparation for Concealed Materials: SSPC-SP 3, "Power Tool Cleaning."
 2. Surface Preparation Exterior Materials (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning".
 3. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5-mils (0.038-mm) unless otherwise indicated. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 4. Touchup Painting: Cleaning and touchup painting of field welds, abraded area, and rust spots, as required after erection and before proceeding with field painting, are included in Division 09 Section, "Painting".

1.4 EXECUTION

- A. Erect structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. The contractor alone, shall be responsible for all errors of fabrication and for the correct fitting of all members.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates and set on wedges, shims, or setting nuts as required.
1. Tighten anchor bolts, cut off wedges or shims flush with edge of base or bearing plate, and pack grout solidly between bearing surfaces and plates.
- C. Maintain erection tolerances of structural steel within AISC's, "Code of Standard Practice for Steel Buildings and Bridges."
- D. Install and tighten high-strength bolts according to RCSC's, "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.
- E. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
- F. Shop and Field Quality Control: Owner will engage an independent testing and inspecting agency to perform shop and field inspections and tests and to prepare test reports.
1. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
 2. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
 3. High-strength bolted connections will be tested and inspected according to RCSC's, "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 4. In addition to visual inspection, welded connections will be inspected and tested according to AWS D1.1 procedures.

END OF SECTION 05120