

SECTION 05 12 00 – STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SCOPE

- A. The extent of Structural Steel is as shown on the Contract Documents and as herein specified. The General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

1.2 GENERAL PROVISIONS

- A. Standard Specifications and Codes issued by professional organizations and governmental agencies are specified hereinafter by basic designations and only the latest editions and revisions thereto shall apply to the work of this Section.
- B. Applicable Standard Specifications and Codes:
 - 1. The 2015 International Building Code with Current New York State Supplement.
 - 2. Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings issued by the American Institute of Steel Construction. (AISC).
 - 3. AWS D1.1 "Structural Welding Code – Steel" issued by the American Welding Society (AWS).
 - 4. "Specification for Structural Joints Using ASTM A325 or A490 Bolts" issued by the AISC.
 - 5. Painting Manual, Volume 2, "Systems and Specifications", as issued by the Steel Structures Painting Council (SSPC).
 - 6. "Code of Standard Practice for Steel Buildings and Bridges" as issued by the AISC.
- C. In case of any conflict between the referenced standards and these specifications, the one having more stringent requirements shall prevail.
- D. Coordination: Carry out the work of this Section in coordination and cooperation with contiguous work of other trades and/or Contracts involved.

1.3 SHOP DRAWINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a preinstallation conference.

- A. Submit Shop Drawings for the Architect's approval in accordance with the provisions of Section 013300.
- B. The submittals shall include the following:

1. Erection plans: Shall be submitted for approval as early as possible.
 2. Standard and special details: Submit standard and special details for approval as soon as possible.
 3. Shop drawings shall indicate type, size and dimensions of all welds, and shall include details of the surface preparation and shop painting.
 4. The details shall be made in such a way as to avoid having steel connections, bracing, etc. interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.
 5. Shop drawings submitted electronically shall follow proper channels of submission as established with the owner and the design team. In addition, provisions of the General Conditions, as well as Section 013300 shall be followed as established for hard copy submissions. Shop drawings shall be submitted under a separate cover, include the title block and clearly identify the project on each drawing. Provide all other pertinent information and include the general contractor's review comments and review status on the electronic submission.
- C. No fabrication shall be undertaken until respective shop drawings are marked "No Exception Taken" or "No Exception Except as Noted".

1.4 ALTERATIONS AND ADDITIONS TO EXISTING STEEL STRUCTURE

- A. The Contractor shall verify existing conditions before submitting shop drawings for approval, including:
1. Dimensions and elevations.
 2. Sizes.
 3. Acceptable condition (not deteriorated or damaged).
- B. The Contractor shall notify the Architect of any varying or interfering conditions affecting the alterations or additions so that the design may be adjusted to suit.
- C. The Contractor shall carefully fit new connections to safe and acceptable tolerances.
- D. Cutting of existing steel shall be done with extreme care. Do not over cut. Shore and brace whenever safety is questionable.

Verify available warranties and warranty periods for fire extinguishers with manufacturers.

PART 2 - PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products. For an explanation of options and Contractor's product selection procedures, see Section 01 60 00 "Product Requirements."

2.1 MATERIALS

- A. Structural Steel shall conform to the following unless otherwise noted:
 - 1. Channels, angles, plates and bars – ASTM A36
 - 2. Round HSS – ASTM A53, Grade B
 - 3. Square and rectangular HSS - ASTM A500, Grade B
 - 4. HP shapes – ASTM A572, Grade 50
 - 5. All others – ASTM A992, Grade 50
- B. Bolts shall be ASTM A325, or A490. A307 may be used, if approved by the Structural Engineer of Record.
- C. High Strength Bolts:
 - 1. Bolts: Use ASTM A325 or A490 bolts manufactured by Infasco or approved equal. ASTM F1852 twist-off type tension control bolts produced by manufacturer may be used if approved by the Structural Engineer of Record.
 - 2. Hardened washers: Use ASTM F436 washers manufactured by Infasco or approved equal.
 - 3. Heavy hex nuts: Use only ASTM A563 heavy hex nuts manufactured by Infasco or Unytite Inc.
 - 4. Galvanized Bolts: Where shown or noted as galvanized, bolts nuts and washers shall be hot-dip galvanized in compliance with ASTM A153. Nuts shall be lubricated in accordance with ASTM A563. Rotational capacity tests shall be performed on each assembly lot.
- D. Filler Metal:
 - 1. Electrodes: As required for matching base metal as specified in AWS "Structural Welding Code-Steel".
 - 2. The electrodes and flux used for submerged arc welding shall be provided by the same manufacturer. The flux shall be free of contamination from dirt, mill scale and other foreign material. Fused flux used in welding shall not be reused.
 - 3. Filler metal for welding of new to existing steel shall be determined based on the test results conducted by a testing laboratory approved by the Structural Engineer of Record.
- E. Paint for Shop Coat, except as otherwise required for compatibility with finish paints as specified in Section 099000, shall be "Azeron H.S. Primer No. 88-555" by Tnemec, or a comparable suitable product by DuPont or Glidden.

PART 3 - EXECUTION

3.1 DESIGN AND WORKMANSHIP

- A. Unless otherwise specified or indicated, the design, fabrication and erection of steel work included in this Contract shall conform to the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, by the American Institute of Steel Construction, and the regulations of the Building Code, including all amendments made thereto, whichever is the more restrictive.
- B. Existing Conditions:
 - 1. Visit the project site and advise the Architect of any discrepancy or conflict. Field verify existing construction requirements, existing conditions, restrictions and clearances which may affect structural steel erection.
 - 2. Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Do not proceed until unsuitable conditions have been corrected. Consider all conditions which will affect satisfactory erection of the structural steel.
- C. Erection:
 - 1. Check the alignment and elevations of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify and obtain Structural Engineer of Record's approval of methods proposed for correcting errors prior to proceeding with corrections.
 - 2. Drift pins may be used only to align the erected parts. They shall not be used in such manner as to distort or damage the steel.
 - 3. Make all necessary provisions for temporary shoring and bracing with connections of sufficient strength to sustain the imposed loads and for completion of erection where structural members are temporarily left out for erection at a later date.
 - 4. Base and Bearing Plates:
 - a. Clean concrete and masonry bearing surfaces of deleterious materials and roughen as necessary to provide adequate bond. Clean bottom surface of base and bearing plates immediately prior to erection.
 - b. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
 - c. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims. Cut off protruding parts flush with edges of base or bearing plates prior to packing with grout.
 - d. Pack grout solidly between bearing surfaces and steel or plates. Ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure as per manufacturer's specifications.

3.2 HIGH STRENGTH BOLTING

- A. High Strength Bolts shall be installed as per "Specification for Structural Joints using ASTM A325 or A490 Bolts".

3.3 WELDING

A. Materials and Workmanship:

1. Welding shall be done in accordance with the Building Department and Fire Department Regulations and the requirements of the AWS "Structural Welding Code-Steel", referenced herein.
2. Peening: Used only after permission for its use is obtained from the Architect.
3. Protection, storage and drying of welding electrodes shall be as specified in AWS "Structural Welding Code-Steel".
4. Groove welds shall be complete penetration welds unless otherwise shown.

B. Welders and Welding Operators:

1. Welders and welding operators to be employed for this work must be qualified as prescribed in AWS "Structural Welding Code-Steel" and carry current certification as required by the Department of Buildings.
2. All costs for qualifying welders will be borne by the Contractor.

3.4 SURFACE PRAPARATION AND PAINTING

- A. All steel shall be cleaned in accordance with SSPC SP-2 "Hand Tool Cleaning", except as specified below for "Architectural Steel".

- B. After fabrication, steel shall receive a shop coat of paint to provide 2.0 - 4.0 mils dry film thickness, except for the following:

1. Members to be encased in concrete.
2. Areas within 2" of field welds.
3. Contact surfaces of high-strength bolted connections.
4. Surfaces receiving shear studs rebar dowels, etc.
5. Milled surfaces (protect with an approved rust- inhibitive coating readily removable prior to erection, or of a type not requiring removal).
6. Members which will receive cementitious fireproofing.
7. Members to be galvanized.

- C. After erection all damaged areas in the shop-coat, loosened scale, rust, exposed surfaces of bolts, nuts and washers, and all field welds and unpainted areas shall be cleaned to the same standards as for the shop coat and spot painted with the same paint used for the shop coat, at same film thickness.
- D. Steel surfaces which will be inaccessible after erection and are not concrete encased shall be painted prior to erection with an additional coat of shop paint.

END OF SECTION 05 12 00