

STANDARD SPECIFICATION
JANUARY 2010

DIVISION 5

SECTION 5C STRUCTURAL STEEL

5C.01 GENERAL: Comply with all of the Contract Documents.

5C.02 SCOPE OF WORK:

- A. Refer to "Scope Of Work Section"
- B. Provide structural steel as shown on drawings, including work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice".
- C. Related Sections:
 - 1. Section-5A - Miscellaneous and Ornamental Metals.
 - 2. Section-5B - Metal Stairs.
 - 3. Section-5D - Metal Decking.

5C.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of latest codes and standards of following, except otherwise indicated:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges", except that Paragraph 4.2.1 is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings".
 - 2. AISC "Specifications of the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary".
 - 3. AISC "Specifications for Structural Joints using ASTM-A-325 or A-490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 4. American Welding Society (AWS) D1.1 "Structural Welding Code for Steel".
 - 5. ASTM-A-6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
 - 6. New York City Building Code.
- B. Qualifications for Welding Work: If required, qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

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1. Provide certification that welders to be employed in, work have satisfactorily passed AWS qualification tests.
- C. Source Quality Control: Materials and fabrication are subject to inspection and tests by a qualified inspection agency.
- D. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated.

5C.04 SUBMITTALS:

A. Product Data:

Submit producer's specifications and installation instructions as specified. Include laboratory test reports and other data to show compliance with specifications.

1. Structural Steel, including mill reports.
 2. High-strength bolts, including nuts and washers.
 3. Structural steel primer paint.
 4. Shrinkage - resistant grout.
- B. Shop Drawings: Submit shop drawings prepared under the supervision of, and bear the seal of, a New York State Licensed Professional Engineer, including complete details and schedules for fabrication and assembly of structural steel to Architect/Engineer for review prior to installation..
1. Include fabrication details and other pertinent data. Indicate type and size welds by standard AWS A2.1 and A2.4 symbols.
 2. Provide setting drawings, templates, and directions for installation of anchorage to be installed by others.
- C. Test Reports: Where required, submit reports of test on bolted and welded connections. Indicate type(s) of tests conducted and test results.

5C.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to ensure uninterrupted progress of work, including anchor bolts and anchorage devices.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground. Protect steel members and packaged materials from erosion and deterioration.

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1. Do not store materials on structure in a manner that might affect supporting structures. Repair or replace damaged materials.

5C.06 MATERIALS:

A. Metal Surfaces, General:

For exposed members, use only materials which are smooth and free of surface blemishes. Remove blemishes prior to application of surface finishes.

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| B. | <u>Structural Steel Shapes, Plates and Bars:</u> | ASTM-A-36. |
| C. | <u>Cold-Formed Steel Tubing:</u> | ASTM-A-500, Grade B. |
| D. | <u>Hot-Formed Steel Tubing:</u> | ASTM-A-501. |
| E. | <u>Anchor Bolts:</u> | ASTM-A-307. |
| F. | <u>Unfinished Threaded Fasteners:</u> | ASTM-A-307, Grade A, regular low-carbon steel bolts and nuts. |
| G. | <u>High-Strength Threaded Fasteners:</u> | Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, complying with ASTM-A-325, unless otherwise indicated. |
| H. | <u>Electrodes for Welding:</u> | Comply with AWS Code. |
| I. | <u>Structural Steel Primer Paint:</u> | SSPC - Paint 13. |
| J. | <u>Non-metallic Shrinkage - Resistant Grout:</u> | Pre-mixed, non-staining product complying with CE-CRD-C621. |
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1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Euco N.S.; Euclid Chemical Co.
 - b. Crystex; L & M Construction Chemicals
 - c. Masterflow 713; Master Builders
 - d. Five Star Grout; U.S. Grout Corp.
 - e. Upcon; Upco Chem. Div., USM Corp.

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5C.07 FABRICATION:

- A. Shop Fabrication and Assembly: Fabricate items of structural steel in accordance with AISC specifications and as indicated on final shop drawings. Provide camber where indicated.
1. Fabricate members for delivery which will expedite erection.
 2. Where finishing is required, complete assembly and then provide finish surfaces free of markings, burrs, and other defects.
- B. Connections: Weld or bolt shop connection, as indicated.
1. Bolt field connections, except where welded connections or other connections are indicated.
 2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
 3. Provide unfinished bolts only for connections of secondary framing members to primary members and for temporary bracing.
- C. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM-A-325 or A-490 Bolts" (RCRBSJ).
- D. Welded Construction: Comply with AWS Code for procedures, and quality of welds, and methods used in correcting welds. Assemble and weld built-up sections without warp.
- E. Holes for Other Work: Provide holes required for securing or for passage of other work through steel framing members.
- F. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical brick expansion joints as indicated on drawings.

5C.08 SHOP PAINTING:

- A. General: Shop paint structural steel, except where embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.
1. Do not paint surfaces to be welded or high-strength bolted.
 2. Do not paint surfaces to receive sprayed-on fireproofing.

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3. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat.
- B. Surface Preparation: Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
1. SP-1 "Solvent Cleaning".
 2. SP-3 "Power Tool Cleaning".
 3. SP-6 "Commercial Blast Cleaning", where indicated.
- C. Painting: Immediately after surface preparation, apply primer paint in accordance with manufacturer's instructions to provide dry film thickness of not less than 1.5 mils., and for full coverage of joints, corners, edges and exposed surfaces.

5C.09 ERECTION:

- A. Temporary Shoring and Bracing: Provide temporary shoring and bracing until final connections are made. Provide temporary guy lines for proper alignment of structure.
- B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- C. Setting Bases and Bearing Plates: Clean bearing surfaces and bottom of base and bearing plates.
1. Tighten anchor bolts after supported members have been positioned and plumbed. Cut protruding wedges or shims, flush with edge of base or bearing plate before grouting.
 2. Pack grout solidly under bases or plates to ensure that no voids remain. For proprietary grout materials, comply with manufacturer's instructions.
- D. Field Assembly: Set structure accurately to lines and elevations indicated before permanently fastening. Clean surfaces which will be in permanent contact before assembly. Compensate for discrepancies in elevations and alignment. Comply with AISC tolerances.
1. Splice members only where indicated on accepted shop drawings.
 2. Comply with AISC Specifications for bearing, adequacy of connections, alignment, and removal of paint adjacent to field welds.

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3. Do not enlarge unfair holes by burning or with drift pins, except in secondary members. Ream holes that must be enlarged to admit bolts.
- E. Cutting: Do not use cutting torches on primary structural framing. Cutting may be permitted on secondary members when acceptable. Finish field-cut sections to a sheared appearance.
- F. Touch-Up Painting: Clean field connections, and abraded shop paint. Paint exposed areas using shop paint, to provide minimum dry film thickness of 1.5 mils.

5C.10 QUALITY CONTROL:

- A. If required, engage a New York City approved testing and inspection agency to inspect and test high- strength bolted connections and welded connections.
- B. Testing agency shall interpret tests and report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced. At any time before final acceptance, to reject material not complying with specified requirements, may be rejected.
- D. Correct deficiencies in structural steel work and perform additional tests, at Contractor's expense.
- E. Bolted Connections: Inspect or test in accordance with AISC specifications, as required for Controlled Inspection by the New York City Building Code.
- F. Welding: Inspect and test structural steel, as required for Controlled Inspection by the New York City Building Code and as follows:
 1. Conduct inspections and tests as required. Record types and locations of defects and work performed to correct deficiencies.
 2. Perform visual inspection of all welds.

5C.11 GUARANTEES:

- A. Guarantee all items of work furnished and installed under this Section for (1) one year, in addition to manufacturer's standard warranties. All guarantees to be from the date, when **Final Certificate of Occupancy** is issued from Department of Buildings.

END OF SECTION