

SECTION 05120**STRUCTURAL STEEL****PART ONE – GENERAL:****1.1 REFERENCES:**

Reference specifications shall be a part of these specifications the same if fully written herein and shall constitute minimum requirements for structural steel, unless modified herein.

- A. Specification for Structural Steel Buildings (March 9, 2005) by The American Institute of Steel Construction, Inc. (AISC)
- B. Seismic Provisions for Structural Steel Buildings (March 9, 2005) including Supplement No. 1 (November 16, 2005) (These provisions are applicable when the seismic response modification coefficient, R, is greater than 3, regardless of the seismic design category).
- C. Specification for Structural Joints using ASTM A325 or A490 bolts (June 30, 2004) by Research Council on Structural Connections (RCSC)
- D. Code of Standard Practice for Steel Buildings and Bridges (March 18, 2005) by The American Institute of Steel Construction, Inc. (AISC)
- E. Welding: AWS D1.1-2004 Structural Welding Code-Steel by American Welding Society (AWS)

1.2 SUMMARY OF WORK:

Refer to the drawings for locations and quantity of structural steel required in this project.

1.3 SUBMITTALS:

- A. Shop Drawings:
 - 1. Clearly show all dimensions, typical and special details. Fabrication shall not begin until after the Architect's review and approval. Shop drawings will not be reviewed prior to Contractor's review and approval.
 - 2. All details and notes appearing on the contract drawings and giving information for the erection of structural steel shall be shown. Shop drawings will not be reviewed without such information.
 - 3. Provide complete connection information. Fabricator shall select and complete the connection details using the LRFD method.
 - 4. End shear connections for all structural beams shall be designed with $\frac{3}{4}$ " diameter A325 bolts. Unless noted otherwise, end connections for non-composite beams shall be designed to resist 50% of the maximum total uniform loads given in tables 3-6, 3-8 and 3-9 in Part 3 of the 13th Edition of the AISC Steel Construction Manual. If a higher value is given on the drawings, end connection shall be designed for that higher load. Composite beams shall be designed for the loads shown on the drawings.

PART TWO – PRODUCTS:**2.1 MATERIALS:**

- A. Structural steel rolled W Shapes shall conform to ASTM A992 Grade 50. All other structural steel rolled shapes and plates shall conform to ASTM A36 as a minimum.
- B. All hollow structural sections (HSS Rectangular, Square or Round) shall conform to ASTM A 500, Grade B.
- C. Structural steel Pipe shall conform to ASTM A 53, Type E or S. Grade B.
- D. Anchor bolts shall conform to ASTM F1554 Grade 36, unless noted otherwise.

- E. Connection bolts, nuts and washers for structural members shall conform to ASTM A 325 unless noted otherwise. Bolts specified as A 307 shall conform to ASTM A 307.
- F. Welding electrodes for shop and field welds shall conform to AWS D1.1 for matching filler metal requirements, with E70XX as minimum. All weld filler metal shall be capable of producing welds that have a minimum charpy V-notch toughness of 20 ft-lb at 0 degrees F.
- G. All steel and connections shall be galvanized. Steel members shall be hot-dipped after fabrication and chemically treated for proper paint bonding in finish paint coatings. All components of connectors shall galvanized.

PART THREE – EXECUTION:

- 3.1** Installation: Structural steel shall be erected in accordance with approved shop drawings and in conformance with the referenced specifications.
- 3.2** Structural steel detailing shall conform to the AISC Specification, AISC Steel Construction Manual, AISC Code of Standard Practice and as applicable, The Seismic Provisions for Structural Steel Buildings (2005) including Supplement No. 1 (2005).
- 3.3** Welding shall conform to the Standards of the American Welding Society. All welding shall be performed by AWS Qualified Certified Welders. If a fillet weld is shown or implied, the minimum size shall be 3/16" unless noted otherwise.
- 3.4** Splicing of structural steel members where not detailed on the contract documents is prohibited without the prior approval of the Structural Engineer as to location, type of splice and connection to be made.
- 3.5** Any fully restrained (FR) moment connection, noted as "FR" connection on the drawings shall be designed and detailed in accordance with Part 12 of The AISC Steel Construction Manual (13th Edition).
- 3.6** Where members are shown framing into each other but no connection is specified, the connection shall be accomplished with a 3/16" fillet weld all around. (ie: Where angle bracing is shown but no end connection specified)
- 3.7** If a deformed reinforcement bar is to be welded to a structural steel member or plate, the bar material shall conform to ASTM A 706 (Weldable rebar)
- 3.8** Deformed bar anchors (DBA) shall conform to ASTM A 496 and shall be automatically end welded with suitable welding equipment in the shop or in the field.
- 3.9** Headed concrete anchors (HCA) shall conform to ASTM A 108 and shall be automatically end welded with suitable welding equipment in the shop or in the field.
- 3.10** Steel shall be cleaned of rust, loose mill scale and other foreign materials where required for proper fabrication, fitting up or welding.
- 3.11** All steel shall be galvanized unless noted otherwise. For any non-galvanized steel that is directly exposed to the wetting effects of weather and all steel that is to be permanently exposed to view shall be shop painted with a standard rust inhibiting primer that is compatible with the final coat of paint. Surface preparation and painting shall be in accordance with the provisions in AISC Code of Standard Practice for Steel Buildings and Bridges and as specified in The Steel Structures Painting Council (SSPC) Manuals. Steel areas to be welded or to be contact surfaces of friction type connections shall not be painted until after connections have been made. Touch up all areas damaged prior to final placement. All steel that is to be fire protected with spray-applied material should not be painted.

- 3.12** Structural steel connections not detailed on the contract documents shall be designed and detailed in accordance with the AISC Construction Manual and AISC Detailing for Steel Construction.
- 3.13** All connection bolts shall be 3/4" diameter unless noted otherwise.
- All beam connections shall be Snug-Tightened joints unless noted otherwise. All bracing connections shall be slip-critical joints unless noted otherwise. Use Twist-off-Type Tension-Bolt Pretensioning for slip-critical joints.
- 3.14** Temporary Bracing and Erection: The steel members are designed for their final in-place condition with all building components properly connected and completed. Provide temporary bracing to secure and protect members until construction is complete.
- 3.15** Fully grout under all column base plates, and beam and joist bearing plates, with non-shrink grout as indicated on the drawings.
- 3.16** Shop and field testing of welded and bolted connections shall be done by an independent testing agency selected and paid for by the Owner. The following shall be minimum testing criteria as applicable:
- A. All welds shall be visually inspected.
 - B. Fillet welds for beam and girder shear connection plates or angles (10% at random) shall be checked by magnetic particle method for final pass only.
 - C. Ultrasonically test 100% of all full penetration welds.
 - D. Check 25% of bolts in each shear connection (2 minimum).
 - E. Check 25% of column splice fillet welds by magnetic particle on last layers.
 - F. All bolted connections shall be tested in accordance with the AISC Specification for Structural Joints using ASTM A325 or A490 Bolts.
 - G. The structural steel fabricator and erector shall schedule all work to allow the above testing requirements to be completed.
- 3.17** All steel stairs shall be designed and detailed by the stair manufacturer for the live load of 100 psf as well as all applicable life safety codes. Steel drawings shall bear the seal of a Professional Engineer registered in the same state as the project location.

END OF SECTION