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**METAL FABRICATION**

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**PART 1 GENERAL****1.1 Description of Work**

- .1 General Conditions and Division 1 shall govern Work of this section.

**1.2 Quality Assurance**

- .1 Personnel:
- .1 All welding shall be performed by a firm or company who have been certified by the Canadian Welding Bureau to the requirements of CSA W47.1, "Certification of Companies for Fusion Welding Structural Steel".
- .2 Codes and Standards:
- .1 Comply with all pertinent building codes and regulations.
- .2 Comply with CSA S16, "Steel Structures for Buildings", of the Canadian Standards Associations.
- .3 Comply with CSA W59.1, "General Specification for Welding of Steel Structures (Metal-Arc Welding)", of the Canadian Standards Association.
- .4 Comply with ASTM A 242 or A 588 for weathered steel (Cor-Ten).
- .3 Conflicting Requirements: The more stringent requirements shall govern conflicts between building codes and regulations, the reference standards of their specifications.

**3.1 Submittals**

1. Certificates: Within ten (10) days after notice of award of Contract, submit to the Consultant test certificates of the chemical and physical analysis for all the material proposed to be supplied and installed under this portion of the Work in accordance with Section [01700 Contract Closeout, Takeover & Warranties](#).
2. Proof of Qualification: Within ten (10) days after award of Contract, submit to the Consultant a copy welding certification and a list of all qualified welders to be used on this portion of the Work in accordance with Section [01700 Contract Closeout, Takeover & Warranties](#).

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3. Within fourteen (14) days of completion of all welded Work, submit certification by a Registered Professional Engineer in the Province of Ontario that all welds have been produced in accordance with the Contract Document drawings and specifications.
4. Shop Drawings:
  1. After execution of purchase order (PO), and before any metal fabrication items are delivered to the site, submit complete shop drawings for structures, features and decorative metal to the Consultant for review in accordance with Section [01330 Submittals](#) of these Specifications.
  2. Include with the shop drawings a bill of material, including quantities, materials, sizes and nominal weights.
  3. Show all locations, markings, sizes and shapes, and indicate all methods of connecting, anchoring, bracing and attaching to the Work of other trades.
  4. Show all shop and field welds by the current recommended symbols of the American Welding Society.
  5. Shop drawings to be certified by a structural engineer.
  6. Prepare and submit shop drawings for Cor-Ten products.

**3.2 Product Handling**

- .1 Deliver and Storage:
  - .1 Deliver and store materials to prevent damage.
  - .2 Handle materials so as to prevent permanent damage.
- .2 Protection:
  - .1 Provide adequate protection of materials and the Work of this Section from damage by other trades.
  - .2 Protect the Work of all other trades from damage resulting from the Work of this Section.
- .3 Replacement:
  - .1 In the event of damage, make repairs or replacements

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necessary to the approval of the Consultant at no additional cost to the Owner.

**PART 2 PRODUCTS****2.1 Bars, Plates, Shapes, Brackets, and Hangers:**

- .1 All bar, plates and shapes shall be new hot dipped galvanized, free from rust and meet the requirements of CSA G40.21 M 300 W.
- .2 Galvanized custom brackets and plates required for all exposed connectors.

**2.2 Bolts and Nuts:**

- .1 High Strength Bolts: All machine bolts, nuts and washers shall meet requirements of ASTM A325.
- .2 Anchor Bolts: Anchor bolts shall be steel and meet the requirements of ASTM A307.

**2.3 Steel Pipe**

- .1 All steel pipes shall be hot dipped galvanized, seamless tubing, HSS or SCH40 to sizes as noted on drawings.

**2.4 Structural Steel Sections:**

- .1 Structural steel, hollow structural steel (H.S.S) and schedule 40 components to be hot dipped galvanized to the sizes, shapes and dimensions shown on the drawings to CAN/CSA G40.21, M300W.
- .2 Bars – Solid steel bars hot dipped galvanized per shape and size specified on the drawing.

**2.5 Weathered Steel (Cor-Ten)**

- .1 Cor-Ten steel shall meet or exceed ASTM A 242 or A588 yield strength 345 MPa, tensile strength (480 MPa) for light medium rolled shapes and plates up to 19mm thickness.

**2.6 Galvanizing**

- .1 Galvanizing shall conform to ASTM A123 for structural shapes and ASTM A153 for miscellaneous steel and hardware. Zinc used for coating shall conform to the specification for slab, zincm ASTM Designation B6.

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- .2 All ornamental and other steel components are to be hot dipped galvanized.

**2.7 PAINT**

- .1 Prime Paint for Site Cuts or Welds to Galvanized Steel: Cold galvanized compound; galvafruid, LPS, or approved alternate.
- .2 Apply sealer and epoxy primer 2 coats. Apply 1.5-2.5 mills by polyester powder coating.
- .3 Finish Paint for Galvanized Steel: topcoat (3.2 mills, polyester powder coat), shop application.
- .4 Colour: to be confirmed by Consultant prior to fabrication.

**2.8 Other Materials**

- .1 All other materials, not specifically described but required for a complete and proper installation, shall be new, first quality of their respective kinds and subject to the review of the Consultant.

**PART 3 EXECUTION****3.1 Surface Conditions**

- 1. Inspection:
  - 1. Inspect the existing Work of all other trades on which the Work of this Section is dependant, and verify that all such Work is complete to the extent that the installation of metal fabrication items may commence.
  - 2. Make all required measurements in the field to ensure proper and adequate fit of the items to be installed.
  - 3. Verify that all metal fabrication items may be installed in accordance with all pertinent codes and regulations, the original design, the reviewed shop drawings and the referenced standards.
  - 4. Errors and Omissions: Report all errors and omissions that may affect the installation of this Work to the Consultant. Do not proceed with the installation in areas where errors and omissions occur until such errors and omissions have been resolved.

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**3.2 Fabrication****.1 General:**

- .1 Fabricate all items in accordance to reviewed shop drawings.
- .2 Ornamental Work to be hand forged where applicable.
- .3 Fabricate all items in accordance with the reviewed shop drawings and the referenced standards.

**.2 Holes:**

- .1 Make all holes by punching or drilling. Burned holes will not be accepted.

**3.3 Welding****.1 General:**

- .1 Welds shall be completed in accordance with the details shown on the drawings or as specified.
- .2 Welds, welding equipment, procedures, etc. Shall conform to CSA Specification 516, W59 and the National Building Code.
- .3 All welding shall be done by personnel qualified in accordance with CSA Specification W47.

**.2 Site Conditions:**

- .1 The Contractor shall note that the site is exposed and that welding operations must be suitably protected against the direct action of weather.
- .2 The following provisions shall also apply:
  1. No welding shall be done when the temperature of the base metal is lower than 18 Degrees Celsius, except with the express consent of the Consultant who will specify the precautions to be taken.
  2. At temperatures below 0 Degrees Celsius, the surfaces of all areas within 75mm of the point where a weld is to be started shall be heated to a temperature at least warm to the hand before welding is commenced.

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**3.4 Installation**

- .1 Co-ordination: Co-ordinate the installation of all items with that of related trades to ensure orderly and timely progress of the Work.
- .2 Compliance: Erect and install all items in accordance with the reviewed shop drawings and the referenced standards.
- .3 Tolerances: Align all items straight, plumb and level with a tolerance of not more than 1mm in 1metre.
- .4 Correction of Errors:
  - .1 Immediately report to the Consultant and the fabricator any fabrication error, which prevents the proper erection of the items.
  - .2 Do not proceed until the Consultant approves the method of correction proposed.

**3.5 Finishing**

- .1 Finish all ornamental steel components with approved finish as per drawing. Provide colour sample for approval prior to construction.
  - .1 HSS compounds and other solid or hollow steel components shall be pre-galvanized steel with a zinc coating weight of 275g/m<sup>2</sup>, or hot dipped galvanized steel with a minimum coating weight of 600/m<sup>2</sup>. Hollow components shall be galvanized on all surfaces.
  - .2 All painted galvanized components to be acid-cleaned followed with a sealed and high-build epoxy primer 1.5 to 2.5 mills. All field cuts or welds must be thoroughly cleaned and primed with two (2) coats of cold galvanized compound, followed with an organic, zinc-rich primer, followed with a high-build epoxy primer. All components to be finished with top coats 3.20 mills of polyester powder coated applied, semi-gloss.

**3.6 Clean-Up**

- .1 Upon completion of the Work of the Section, remove all material, trash, debris, equipment and tools. Leave the site in a neat and orderly condition acceptable to the Consultant.

**END OF SECTION - 05500**