

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 00 - Cast-in-Place Concrete.

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A269-10, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3 ASTM A307-12, Standard Specification for Carbon Steel Bolts and Studs, and Threaded Rod 60 000 PSI Tensile Strength.
  - .4 ASTM A325-10, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
  - .5 ASTM A123-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .6 ASTM A153-09, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
  - .7 ASTM A500-10a, Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- .2 CSA International
  - .1 CAN/CSA G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CAN/CSA S16-09, Design of Steel Structures.
  - .3 CAN/CSA W47.1-09 (R2012), Certification of Companies for Fusion Welding of Steel.
  - .4 CAN/CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .5 CAN/CSA W59-03 (R2008), Welded Steel Construction (Metal Arc Welding).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
  - .1 Material Safety Data Sheets (MSDS).
- .4 Ministry of Transportation of Ontario (MTO):
  - .1 Designated Sources of Material (DSM), 2013.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Certification:
  - .1 Provide Departmental Representative, minimum 2 weeks prior to starting steel fabrication, with copy of fabricator certification to CAN/CSA W47.1.

- .3 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, and bolts and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
    - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .4 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
  - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- .5 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Reduction Workplan highlighting recycling and salvage requirements.

#### **1.4 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Fabricator certification: to Division 1 or Division 2 of CAN/CSA W47.1:
- .3 Welder certifications: valid Canadian Welding Bureau cards for work performed.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of pallets crates, padding, packaging materials as specified in Waste Reduction Work plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Steel sections: to CAN/CSA G40.20/G40.21, Grade 350W.
- .2 Hollow Structural Sections (HSS): to CAN/CSA G40.20/G40.21, Grade 350W or ASTM A500 Grade C.
- .3 Steel plates: to CAN/CSA G40.20/G40.21, Grade 300W
- .4 Steel pipe: to ASTM A53/A53M, galvanized finish.
- .5 Welding materials: to CAN/CSA W59.
- .6 Welding electrodes: to CAN/CSA W48 Series.
- .7 Bolts: to ASTM A325, Type 1.
- .8 Anchor bolts: to ASTM A307
- .9 Zinc rich paint: listed in Zinc-Rich Touch-up, section 9.20.90 of MTO Designated Sources of Material.
- .10 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours, 35 MPa at 28 days.

**2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

**2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating to ASTM A123 or ASTM A153.

**2.4 RAILINGS**

- .1 Ensure railing is smooth, uniform and continuous.
- .2 Galvanize railings after fabrication.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 ERECTION**

- .1 Do welding work in accordance with CAN/CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA S16.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up galvanized surfaces with zinc rich paint where damaged.

### **3.3 RAILINGS**

- .1 Install pipe railings as indicated

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**