

Metal – Metal Fabrications  
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**PART 1 GENERAL**

**1.1 REFERENCES**

.1 ASTM International

- .1 ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for Generalities Service.
- .3 ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .4 ASTM F594 - Standard Specification for Stainless Steel Nuts.
- .5 ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- .6 ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.



.2 CSA Group

- .1 CSA G40.20/G40.21- General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 Not used
- .3 CSA S16 – Design of Steel Structures
- .4 CSA W48 - Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59 - Welded Steel Construction (Metal Arc Welding) [Metric].



.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 WHMIS Safety Data Sheets (SDS)

.4 The Master Painters Institute (MPI)

- .1 Architectural Painting Specification Manual – latest edition.

**1.2 DELIVERABLE SUBMITTAL FOR APPROVAL/INFORMATION**

.1 Technical Data Sheet:

- .1 Submit technical data sheets and associated manufacturer's instructions and printed product literature for tubing, pipe, sections, plates and bolts. These technical data sheets shall include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two (2) copies of the SDS data sheets as per WHMIS regulation.
  - .1 In case of paint, primers and other finishing products applied on site, indicate VOC content (g/L).

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- .2 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered and licensed in Quebec, Canada.
  - .2 Shop drawings must indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

**1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance of materials with specified performance criteria and physical characteristics.
- .2 Certifications: submit product certificates signed by manufacturer, showing compliance of materials with specified performance criteria and physical characteristics.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in their original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in an off-ground location that is clean, dry and well-ventilated in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new materials.

**PART 2 PRODUCTS**

**2.1 MATERIALS**



- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Steel pipe: to ASTM A53/A53M, Class B.
- .3 Welding materials: to CSA W59.



- .4 Welding electrodes: to CSA W48 Series.
- .5 Anchor bolts: to ASTM F593. Nuts to ASTM F593. Washers SS316. Unless specified otherwise on drawings.
- .6 Structural bolts: to ASTM A-325, galvanized.
- .7 Grout: non-shrink, non-metallic, flowable, and a resistance of 25 MPa at 24 hours.
- .8 Grating: to ASTM A36/A36M

**2.2 METAL FABRICATION**

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- .1 Work shall be square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws, unless specified otherwise. Screws shall be made of stainless steel.
- .3 Where possible, work shall be delivered assembled and ready for erection.
- .4 Exposed welds shall be continuous on the entire joint length. File or grind exposed welds to have a smooth and flush surface.

### **2.3 SHOP PAINTING AND GALVANIZING**

- .1 All structural components shall be galvanized to CAN/CSA-G164 (600g/m<sup>2</sup>). Provide design arrangements to allow the galvanization of the entire structure.
- .2 Bollards and beacons shall be painted in black.
- .3 Painting of galvanized steel for bollards and beacons:
  - .1 Preparation of SSPC-SP16 steel with a minimum profile of 1.5 mils.
  - .2 Shop painting of galvanized steel:
    - .1 Paint weld joints and sharp edges with a brush before applying the intermediate and finishing layers using spray gun.
    - .2 One layer of primer: hot dip galvanization.
    - .3 One intermediate layer: Amerlock 2, 6 to 7 mils dry.
    - .4 One finishing layer (epoxy polysiloxane coating): Amercoat PSX 700 4 to 6 mils dry.
  - .3 Color
    - .1 Intermediate: middle grey
    - .2 Finish: black
- .4 Contractor shall select a paint system equivalent to the system described above. It will be subject to approval by Parks Canada Agency.

### **2.4 BOLTS**

- .1 Bolts shall be made of stainless steel as specified on drawings.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- .1 Condition assessment: before the installation of metal works, ensure that the condition of substrates/supports, which were previously installed under other Sections or Contracts, are acceptable for the implementation of the work in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrates/supports in the presence of Parks Canada Agency.

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- .2 Immediately inform Parks Canada Agency of any unacceptable conditions upon discovery.
- .3 Proceed with installation only after unacceptable conditions are remedied and a written approval to proceed is received from Parks Canada Agency.

**3.2 ERECTION**

- .1 Carry out welding work in accordance with CSA W59, unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, true and accurately aligned and fitted with tight joints and intersections.
- .3 Provide suitable means of anchorage accepted by Parks Canada Agency such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices shall match finish and be compatible with material through which they pass.
- .5 Provide required inputs to work by other trades in accordance with supplied nomenclature and shop drawings.
- .6 Make field connections with bolts in conformance with CSA S16 or by welding, as specified.
- .7 Deliver setting templates and items to be buried in concrete and casted in masonry to their correct locations.

**3.3 GALVANIZING**

- .1 Galvanizing
  - .1 Certificate of Compliance
    - .1 For each delivery of galvanized steel, Contractor shall provide to Parks Canada Agency a certificate of compliance containing the following information:
      - .1 Galvanizing company;
      - .2 Galvanizing date and place;
      - .3 Coating thickness;
      - .4 Coating adhesion;
      - .5 Coating quality.
  - .2 Reception check
    - .1 The reception check carried out by Parks Canada Agency consists of performing tests for thickness, adhesion and coating quality in accordance with ASTM A123/ A123M “Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products”.
  - .3 Surfaces preparation
    - .1 Surfaces to be galvanized shall be clean, free of paint, grease, rust, etc. Deposits and residues from welding work, mill scale and paint or thick rust deposits shall be removed by appropriate methods. Final stripping shall be done by submerging in a caustic solution followed by rinsing with clean water and submerged in dilute sulfuric or hydrochloric acid.

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After stripping, the parts shall be submerged in an aqueous solution of zinc chloride and ammonium.

- .4 Galvanizing process
  - .1 Galvanization shall be performed in accordance with ASTM A123 / A123M "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products".
  - .2 Bottom flange steel surfaces of the girders and bearings that are in contact with the welds to secure beam supports shall be ground after galvanizing.
  - .3 The minimum thickness of galvanization is 100 µm, except for HSS steel tubes, where the minimum thickness is 75 µm.
- .5 Protection of galvanized elements
  - .1 Protect galvanized elements from damage during handling and storage.
  - .2 Protect adequately elements that are in contact with the lifting equipment, such as cables and chains.
  - .3 Galvanized elements, except for reinforcement, shall be properly stored to ensure that air is circulating between the parts, water is not accumulating and drip freely, and there is no metal-to-metal contact of the galvanized parts. During the installation of the galvanized retainers, Contractor is fully responsible for ensuring that there is no white rust on these parts.
- .6 Repair after galvanizing
  - .1 Damaged surfaces less than 2.5 cm wide shall be repaired by adding 2 coats of zinc-rich plaster with a minimum of 87% zinc metal in the dry film. Plus, on a same piece, total surface to be repaired by Zinc-rich coating shall be less than 0.5% of the total surface of the piece. Damaged surfaces shall first be cleaned in accordance with SSPC-SP 11 "Power Tool Cleaning to Bare Metal". The minimum total thickness of the dry film coating shall be 130 µm.
  - .2 Damaged surfaces with a width greater than 2.5 cm and a part with a damaged surface greater than 0.5% of its total area shall be re-galvanized or repaired by metallization. To do so, damaged surfaces shall first be cleaned in accordance with SSPC-SP 5 / NACE N° 1 "White Metal Blast Cleaning" or SSPC-SP 11 "Power Tool Cleaning to Bare Metal". The minimum thickness of the metallized coating is 130 µm.

### **3.4 CLEANING**

- .1 Final Cleaning: remove and dispose surplus materials, rubbish, tools and equipment from site in accordance with Parks Canada Agency's requirements.

### **3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to material caused by the installation of metal works.

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**END OF SECTION**