

## **Part 1           General**

### **1.1           REFERENCES**

- .1   ASTM International
  - .1   ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2   ASTM A269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3   ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .4   ASTM A-123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .5   ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - .6   ASTM F2329, Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
- .2   CSA International
  - .1   CSA G40.20/G40.21-F04 (C2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2   CSA S16-09, Design of Steel Structures.
  - .3   CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .4   CSA W59-M03 (R2008), Welded Steel Construction (Metal Arc Welding).
- .3   Canadian General Standards Board (CGSB)
  - .1   CAN/CGSB-1.61-2004, Exterior and Interior Enamel Alkyd, Marine.
  - .2   CAN/CGSB-1.212-2004, Primer without chromate or lead, marine, for steel surfaces and light alloy.
- .4   Green Seal Environmental Standards (GS)
  - .1   GS-11-2008, 2nd Edition, Paints and Coatings.
- .5   Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1   Material Safety Data Sheets (MSDS).
- .6   The Society for Protective Coatings (SSPC)
  - .1   SSPC, Surface preparation standards.

### **1.2           ACTION AND INFORMATIONAL SUBMITTALS**

- .1   Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2   Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts. Include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit one (1) copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
  - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2 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 with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **1.4 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 off ground, in clean, dry, well-ventilated area in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new.

### **1.5 MANAGEMENT AND DISPOSAL OF WASTE**

- .1 Sort recyclable waste materials or dispose in accordance with Section 01 74 21 - Management and disposal of construction/demolition waste.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Galvanized steel: hot-dip galvanizing with a zinc coating of at least 600 g/m<sup>2</sup>, in accordance with ASTM A123/A123M standards. Drilling and welding should be done before galvanizing. Provide ventilation holes to ease galvanizing.
- .3 Steel pipe: to ASTM A53/A53M.
- .4 Welding materials: to CSA W59.

- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A307.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

## **2.2 FABRICATION**

- .1 Fabricate work 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 or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 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 600 g/m<sup>2</sup> to CAN/CSA-G164.

## **2.4 SHOP PAINTING**

- .1 Metal components, except for galvanized parts must be coated with a primer layer in a workshop.
- .2 A primer layer applied in the workshop with marine vermilion red complies with CAN/CGSB-1212 standards and/or the requirements for the product.
- .3 Two finishing layers, applied in the workshop, with the colour specified by the element comply with CAN/CGSB-1.61 standards and/or the requirements for the product.
- .4 The surfaces to be welded on site must be cleaned and should not be coated with paint.

## **2.5 PROTECTION POSTS (FIXED AND REMOVABLE)**

- .1 Manufactured according to the plans and estimates
- .2 Type of steel: 350W
- .3 Structural steel conforming to CSA G40.20 / G40.21 standards.
- .4 Preparation of the steel surface according to SSPC-SP5 white blasting standards
- .5 A primer layer applied in the workshop with marine vermilion red complies with CAN/CGSB-1212 standards and/or the requirements for the product.
- .6 Two finishing layers, applied in the workshop, with yellow colour comply with CAN/CGSB-1.61 standards and/or the requirements for the product.
- .7 Alterations may be done if the steel is exposed; the same painting system as described in 2.5 (items 5 to 6).
- .8 Grout: Non-metallic, shrinkage compensation
- .9 Concrete: 35 MPa
- .10 Anchors and attachments: As shown in the plans

## **2.6 ACCESS LADDERS**

- .1 Ladders will be made of galvanized steel and constructed as shown in the plans.

- .2 Dimensions and details: As shown in the plans
- .3 Mounting brackets: As shown in the plans
- .4 The outer ladders must be galvanized after assembly.
- .5 Alterations on the site. Automatically remove any rust and use a brush to apply two (2) generous coats of a rich zinc coating with more than 95% of zinc. Spraying will not be allowed.

## **2.7 Curb**

- .1 A galvanized steel curb will be constructed as shown in the plans.
- .2 A galvanized steel curb will be installed directly on the prefabricated concrete slabs as shown in the plans.
- .3 Anchor bolts and attachments: As shown in the plans
- .4 Alterations on the site. Automatically remove any rust and use a brush to apply two (2) generous coats of a rich zinc coating with more than 95% of zinc. Spraying will not be allowed.

## **2.8 MOORING BOLLARDS - 20 TONS**

- .1 Manufactured according to the plans and specifications
- .2 Type of steel: 350W
- .3 Anchors and attachments: As shown in the plans
- .4 Structural steel conforming to CSA G40.20 / G40.21 standards.
- .5 Relaxation, through annealing of assemblies, with any stress generated by welding.
- .6 Grout: Non-metallic, shrinkage compensation.
- .7 Concrete: 35 MPa

## **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 in accordance with manufacturer's written instructions.
  - .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 and after receipt of written approval to proceed from Departmental Representative.

### **3.2 ERECTION**

- .1 Do welding work in accordance with 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 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 rivets, field welds, bolts and burnt or scratched surfaces with primer after completion.
- .9 Install curbs, access bollards and rescue ladders where indicated and as shown in the plans

### **3.3 INSTALLATION OF EQUIPMENT AND GROUTING**

- .1 Install all mooring equipment at the indicated location and elevations.
  - .1 After tightening the anchor bolts or placing shims, inject the grout at the base of the mooring equipment.
  - .2 Ensure that the temperatures of the foundation, air, base and grout fall within the limits specified by the manufacturer of the grout.
- .2 Do not inject grout before the approval of the anchor bolt sitting and mooring terminals by the Departmental Representative.

### **3.4 ALTERATIONS ON THE SITE**

- .1 Painted steel
  - .1 Automatically remove any rust.
  - .2 A primer layer applied in the workshop with marine vermilion red complies with CAN/CGSB-1212 standards and/or the requirements for the product.
  - .3 Two finishing layers, applied in the workshop, with the colour specified by the element comply with CAN/CGSB-1.61 standards and/or the requirements for the product.
- .2 Galvanized steel
  - .1 Automatically remove any rust.
  - .2 Touch up galvanized surfaces at those spots that were damaged during welding or installation, by using a brush to apply two (2) generous coats of rich zinc coating with more than 95% of zinc. Spraying will not be allowed.

### **3.5 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 reuse/recycling or elimination in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**3.6 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**