

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.

### **1.2 REFERENCES**

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A 36/A36M, Specification for Structural Steel.
  - .2 ASTM A 193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
  - .3 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - .4 ASTM A 325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - .5 ASTM A 325M, Specification for High-Strength Bolts for Structural Steel Joints.
  - .6 ASTM A 490M, Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).
- .2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
  - .1 CISC/CPMA 1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
  - .2 CISC/CPMA 2-75, Quick-Drying, Primer for use on Structural Steel.
- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16, Limit States Design of Steel Structures.
  - .4 CAN/CSA-S136, Cold Formed Steel Structural Members.
  - .5 CSA-S136.1, Commentary on CSA Standard S136.
  - .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
  - .7 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .8 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - .9 CSA W59, Welded Steel Construction (Metal Arc Welding).

### **1.3 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 to resist forces, moments, shears and allow for movements indicated.
- .2 Shear connections:
  - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
  - .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.
- .3 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Provinces of Manitoba, Canada for non standard connections.

### **1.4 SHOP DRAWINGS**

- .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
  - .1 Description of methods.
  - .2 Sequence of erection.
  - .3 Type of equipment used in erection.

- .4 Temporary bracings.
- .3 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Manitoba.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade as indicated or CAN/CSA-S136.
- .2 Anchor bolts: to ASTM A 36/A36M.
- .3 High strength anchor bolts: to ASTM A 193/A 93M.
- .4 Bolts, nuts and washers: to ASTM A 325 or ASTM A 325M.
- .5 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .6 Shop paint primer: to CISC/CPMA 2.
- .7 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.
- .8 Shear studs: to CSA W59, Appendix H.

### **2.2 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
- .2 Install shear studs in accordance with CSA W59.
- .3 Continuously seal members by continuous welds where indicated. Grind smooth.
- .4 Provide holes in flanges for attachment of wood nailers.

### **2.3 SHOP PAINTING**

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 except where members to be encased in concrete.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.
- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of 1.5 to 2.0 mils, except:
  - .1 Surfaces to be encased in concrete.
  - .2 Surfaces to receive field installed stud shear connections.
  - .3 Surfaces and edges to be field welded.
  - .4 Faying surfaces of friction-type connections.
  - .5 Below grade surfaces in contact with soil.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Welding: in accordance with CSA W59.

- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

### **3.2 MARKING**

- .1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark for fit and match.

### **3.3 ERECTION**

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and in accordance with reviewed erection drawings.
- .2 Field cutting or altering structural members: to approval of Contract Administrator.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

### **3.4 FIELD PAINTING**

- .1 Paint in accordance with Section 09 91 23 – Interior Painting.
  - .1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP-6 except as specified otherwise. Apply in accordance with CAN/CGSB 85.10.

**End of Section**

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 04 05 10 - Common Work Results for Masonry.
- .4 Section 04 05 19 - Masonry Anchorage and Reinforcements.
- .5 Section 05 12 23 - Structural Steel for Buildings.
- .6 Section 09 91 13 - Exterior Painting.
- .7 Section 09 91 23 - Interior Painting.

### **1.2 REFERENCES**

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A-53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A-269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3 ASTM A-307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-W59, Welded Steel Construction (Metal Arc Welding) (Imperial Version).

### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

### **1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
  - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
  - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A 53/A53M standard weight, galvanized finish.
- .3 Welding materials: to CSA W59.

- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A 307.
- .6 Stainless steel tubing: to ASTM A 269, Type 302 Seamless welded with AISI No. 4 finish.
- .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 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 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper, 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
- .3 Shop coat primer: to CAN/CGSB-1.40.
- .4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

## **2.4 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.
  - .3 Wood.

## **2.5 SHOP PAINTING**

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

## **2.6 BOLLARDS**

- .1 HSS pipe: nominal dimensions as indicated on drawings, formed to shape and sizes as indicated.
- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

# **PART 3 - EXECUTION**

## **3.1 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 Contract Administrator 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 Provide components for building by other sections in accordance with shop drawings and schedule.
  - .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
  - .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
  - .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
  - .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

### **3.2 BOLLARDS**

- .1 Install bollards in locations as indicated.

### **3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**End of Section**