

**Part 1 General**

**1.1 REFERENCES**

- .1 All codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A36/A36M Specification for Structural Steel.
  - .2 ASTM A269 standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  - .3 ASTM A276, Standard Specification for Stainless Steel bars and shapes.
  - .4 ASTM A167 Standard Specifications for Stainless and Heat-Resistant Chromium-Nickel Steel Plate, Sheet, and Strip
  - .5 ASTM A325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - .6 ASTM A325M Specification for High-Strength Bolts for Structural Steel Joints Metric.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-85.10 Protective Coatings for Metals.
- .4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
  - .1 CISC/CPMA 1 Quick-Drying, One-Coat Paint for Use on Structural Steel.
  - .2 CISC/CPMA 2 Quick-Drying, Primer for use on Structural Steel.
- .5 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-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16 Limit States Design of Steel Structures.
  - .4 CSA-S136.1 Commentary on CSA Standard S136.
  - .5 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
  - .6 CSA W48 Filler Metals and Allied Materials for Metal Arc Welding.
  - .7 CSA W55.3 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - .8 CSA W59 Welded Steel Construction (Metal Arc Welding)
- .6 Master Painters Institute
  - .1 MPI-INT 5.1 Structural Steel and Metal Fabrications.
- .7 The Society for Protective Coatings (SSPC)
  - .1 SSPC SP-6/NACE No. 3 Commercial Blast Cleaning.

## **1.2 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 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.

## **1.3 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.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Structural Steel plates and shapes: to CAN/CSA-G40.20/G40.21 Grade 300W, HSS and W sections to be Grade 350W.
- .2 Structural Steel Bolts: to ASTM A325, Nuts: to ASTM A563 Grade DH, or A194 Grade 2H, Washers: to ASTM F436
- .3 Stainless Steel pipe: to ASTM A269 standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .4 Stainless steel plates, sheets and strips: to ASTM A167 Standard Specifications for Stainless and Heat-Resistant Chromium-Nickel Steel Plate, Sheet, and Strip.
- .5 Stainless steel shapes: to ASTM A276, Standard Specification for Stainless Steel bars and shapes.
- .6 Stainless Steel Bolts : to ASTM F738 Stainless Steel Metric Bolts, Screws and Studs, Stainless Steel Nuts: to ASTM F594 Standard Specifications for Stainless Steel Nuts.
- .7 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .8 Shop paint primer: to CISC/CPMA2-75.
- .9 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 610 g/m<sup>2</sup>.

## **2.2 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
- .2 Verify all dimensions on site before preparing shop drawings or proceeding with shop work.
- .3 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .4 The general dimensions and details of the metal fabrications are shown on the drawings where practical. Such details and designs are suggested concepts of design.
- .5 Where possible, fit and shop assemble work in largest possible section, ready for erection.
- .6 Thoroughly clean all surfaces of rust, scale, grease and foreign matter prior to prime painting or galvanizing.
- .7 Continuously seal members by continuous welds where indicated. Grind smooth.

## **2.3 SHOP PAINTING**

- .1 Paint (where indicated on the drawings) in accordance with Section 09 91 23 - Painting.
- .2 Colour to match existing.
- .3 Do not paint galvanized or stainless steel sections unless indicated otherwise on the drawings.
- .4 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 and MPI INT 5.1, except where members to be encased in concrete.
- .5 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.
- .6 Apply one coat of primer in shop to steel surfaces, except:
  - .1 Surfaces to be encased in concrete.
  - .2 Surfaces and edges to be field welded.
  - .3 Faying surfaces of friction-type connections.
  - .4 Below grade surfaces in contact with soil.
- .7 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .8 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .9 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.
- .4 Touch-up galvanizing with minimum 2 coats of zinc rich primer.

### **3.2 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Contract Administrator for direction before commencing fabrication.

### **3.3 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 bearing assemblies and splices for fit and match.

### **3.4 ERECTION**

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16-01 and in accordance with reviewed erection drawings.
- .2 Make adequate provision for all erection loads, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of necessary permanent bracing.
- .3 Field connections are to be bolted wherever possible.
- .4 Field cutting or altering structural members: to approval of Contract Administrator.
- .5 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .6 Continuously seal members by continuous welds where indicated. Grind smooth.

### **3.5 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by the Contract Administrator and paid for by the City.
- .2 Provide safe access and working areas for testing on site, as required by testing agency.
- .3 Submit test reports to Contract Administrator within two weeks of completion of inspection.

### **3.6 FIELD PAINTING**

- .1 Paint (where indicated on the drawings) in accordance with Section 09 91 23 - Painting.
- .2 Colour to match existing.
- .3 Do not paint galvanized or stainless steel sections unless indicated otherwise on the drawings.

**END OF SECTION**

**Part 1        General**

**1.1            REFERENCES**

- .1 All codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A269 standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  - .2 ASTM A276, Standard Specification for Stainless Steel bars and shapes.
  - .3 ASTM A167 Standard Specifications for Stainless and Heat-Resistant Chromium-Nickel Steel Plate, Sheet, and Strip
  - .4 ASTM A325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40 Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181 Ready-Mixed, Organic Zinc-Rich Coating.
- .4 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-S16.1, Limit States Design of Steel Structures.
  - .4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding
  - .5 CSA W59 Welded Steel Construction (Metal Arc Welding).
  - .6 CSA 47.1 Classification of Companies for Fusion Welding of Steel

**1.2            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 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
    - .1 For finishes, coatings, primers and paints.
- .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.
  - .3 Include erection drawings, elevations, and details where applicable.
  - .4 Indicate welded connections using CISC standard welding symbols. Clearly indicate net weld lengths.

**1.3            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 Stainless Steel pipe: to ASTM A269 standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .2 Stainless steel plates, sheets and strips: to ASTM A167 Standard Specifications for Stainless and Heat-Resistant Chromium-Nickel Steel Plate, Sheet, and Strip.
- .3 Stainless steel shapes: to ASTM A276, Standard Specification for Stainless Steel bars and shapes.
- .4 Stainless Steel Bolts : to ASTM F 738 Stainless Steel Metric Bolts, Screws and Studs, Stainless Steel Nuts: to ASTM F594 Standard Specifications for Stainless Steel Nuts.
- .5 Welding materials: to CSA W59.
- .6 Welding electrodes: to CSA W48 Series.
- .7 Structural Steel plates and shapes: to CAN/CSA-G40.20/G40.21 Grade 300W, HSS and W sections to be Grade 350W.
- .8 Structural Steel Bolts: to ASTM A325, Nuts: to ASTM A563 Grade DH, or A194 Grade 2H, Washers: to ASTM F436
- .9 Concrete wall Anchor Bolts, Nuts and Washers: Stainless Steel HAS –E-HIT A rod anchor with HIT HY 20 or KWIK Bolt 3 Expansion Anchor bolts and nuts manufactured by Hilti (Canada) Ltd as indicated on the drawings.
- .10 Anchor Points: DBI SALA D-Ring welded anchorage connectors Model No. 2101636 Stainless Steel.
- .11 Grout: non-shrink, non-metallic cementitious SIKKA 212 or MASTERFLOW 713, flowable.

### **2.2 FABRICATION**

- .1 Verify all dimensions on site before preparing shop drawings or proceeding with shop work.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 The general dimensions and details of the metal fabrications are shown on the drawings where practical. Such details and designs are suggested concepts of design.
- .4 Where possible, fit and shop assemble work in largest possible section, ready for erection.

- .5 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .6 Thoroughly clean all surfaces of rust, scale, grease and foreign matter prior to prime painting or galvanizing.
- .7 Galvanize and prime paint items as shown. Do not shop prime surfaces in contact with or embedded in concrete or requiring field welding.
- .8 Stainless steel grain direction: one direction throughout.

### **2.3 FINISHES**

- .1 Do not paint galvanized or stainless steel sections unless indicated otherwise on the drawings.
- .2 Galvanizing: hot dipped galvanizing with zinc coating 610g/m<sup>2</sup> to CAN/CSA-G164.
- .3 Shop coat primer: to CAN/CGSB-1.40.
- .4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .5 Remove rust and postweld discoloration from stainless steel by grinding, using only stainless steel tools.
- .6 Passivate stainless steel, which was cleaned by grinding, with a solution of 12-15 percent nitric acid and 3 percent hydrofluoric acid.

### **2.4 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 5 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

## **Part 3 Execution**

### **3.1 ERECTION**

- .1 Obtain Contract Administrator's permission prior to Site cutting or making adjustments which are not part of the scheduled Work.
- .2 Install work of this Section using skilled craftsmen and in accordance with manufacturer's recommendations where applicable.
- .3 Perform welding work in accordance with CSA W59 unless specified otherwise.
- .4 Welding work to be performed by a firm certified by the Canadian Welding Bureau to the requirements of CSA W47.1 in Division 1 or 2.
- .5 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .6 Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .7 Make provisions for erection stresses and temporary bracing. Keep work in alignment at all times.

- .8 Replace items damaged in course of installation.
- .9 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .10 Provide components for building by other sections in accordance with shop drawings and schedule.
- .11 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .12 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .13 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .14 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

**3.2 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**