

**Part 1 General**

**1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A307-00, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - .2 ASTM A325M-00, Specification for High-Strength Bolts for Structural Steel Joints [Metric].
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
  - .1 CISC/CPMA 2-75, Quick-Drying, Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
  - .1 CAN/CSA G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16-01, Limit States Design of Steel Structures.
  - .4 CAN/CSA-S136-94(R2001), Cold Formed Steel Structural Members.
  - .5 CSA-S136.1-95(R2001), Commentary on CSA Standard S136.
  - .6 CSA W47.1-92(R2001), Certification of Companies for Fusion Welding of Steel Structures.
  - .7 CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding.
  - .8 CSA W55.3-1965(R1998), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - .9 CSA W59-M1989(R2001), Welded Steel Construction (Metal Arc Welding) [Metric].

**1.2 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16, and CAN/CSA-S136, with CSA-S136.1 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 Province of Manitoba, Canada for non standard connections.

### **1.3 SHOP DRAWINGS**

- .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01330 - 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, Canada.

### **1.4 QUALITY ASSURANCE**

- .1 Provide structural steel Fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade as indicated and/or CAN/CSA-S136.
- .2 Anchor bolts: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .3 Bolts, nuts and washers: to ASTM A307 and ASTM A325M.
- .4 Welding materials: to CSA W48 Series, CSA W59 and certified by Canadian Welding Bureau.

- .5 Shop paint primer: to CISC/CPMA2.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.

## **2.2 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16, CAN/CSA-S136, and in accordance with approved shop drawings.
- .2 Continuously seal members by continuous welds where indicated. Grind smooth.
- .3 Provide holes in flanges. Weld threaded studs to flanges for attachment of wood nailers where indicated.

## **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 CISC/CMPD2-75, 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 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 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, CAN/CSA-S136 and in accordance with approved 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.

### **3.5 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Contract Administrator.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Contract Administrator.
- .3 Submit test reports to Contract Administrator within two (2) weeks of completion of inspection.
- .4 Contract Administrator will pay costs of tests only as specified in Section 01450.
- .5 Test shear studs in accordance with CSA W59.

### **3.6 FIELD PAINTING**

- .1 Paint in accordance with Section 09900 - 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 SECTION INCLUDES**

- .1 Shop fabricated ferrous metal items galvanized and prime painted.

### **1.2 RELATED SECTIONS**

- .1 Section 05121 - Structural Steel.
- .2 Section 09900 - Painting and Coatings: Paint finish.

### **1.3 REFERENCES**

- .1 AAMA 608.1 - Specification and Inspection Methods for Electrolytically Deposited Colour Anodic Finishes for Architectural Aluminum.
- .2 ANSI A14.3 - Ladders, Fixed, Safety Requirements.
- .3 ASTM A36 - Structural Steel.
- .4 ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- .5 ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .6 ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .7 ASTM A283 - Carbon Steel Plates, Shapes, and Bars.
- .8 ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- .9 ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- .10 CSA W59 - Welded Steel Construction (Metal Arc Welding).

### **1.4 SUBMITTALS FOR REVIEW**

- .1 Section 01330: Submittal Procedures.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- .3 Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

### **1.5 QUALIFICATIONS**

- .1 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS – STEEL**

- .1 Steel Sections: ASTM A36
- .2 Plates: ASTM A283.
- .3 Pipe: ASTM A53, Grade B Schedule 40.
- .4 Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153 for galvanized components.
- .5 Welding Materials: Type required for materials being welded.
- .6 Ladders: ANSI A 14.3
- .7 Shop and Touch-Up Primer: Acrylic epoxy coating shall be Cloverdale Coat; 1 Rustex 71027 Basecoat Primer (grey) for steel and Coat 2; Self Priming Speed Enamel 76 Series 76211 – Low Sheen.

### **2.2 FABRICATION**

- .1 Fit and shop assemble items in largest practical sections, for delivery to site.
- .2 Fabricate items with joints tightly fitted and secured.
- .3 Continuously seal joined members by continuous welds.
- .4 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- .5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- .6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.3 FABRICATION TOLERANCES**

- .1 Squareness: 1/8" maximum difference in diagonal measurements.

- .2 Maximum Offset Between Faces: 1/16"mm.
- .3 Maximum Misalignment of Adjacent Members: 1/16" mm.
- .4 Maximum Bow: 1/8" in 4'.
- .5 Maximum Deviation from Plane: 1/16" in 4'.

## **2.4 FINISHES – STEEL**

- .1 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with one coat.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verify that field conditions are acceptable and are ready to receive Work.

### **3.2 PREPARATION**

- .1 Clean and strip primed steel items to bare metal where site welding is required.
- .2 Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

### **3.3 INSTALLATION**

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of installation of permanent attachments.
- .3 Field weld components indicated on shop drawings.
- .4 Perform field welding in accordance with AWS DI.1.
- .5 Obtain approval from Contract Administrator, prior to site cutting or making adjustments not scheduled.
- .6 After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.



**3.3 ERECTION TOLERANCES**

- .1 Maximum Variation From Plumb: 6 mm per story, non-cumulative.
- .2 Maximum Offset From True Alignment: 6 mm.
- .3 Maximum Out-of-Position: 6 mm.

**3.4 SCHEDULE**

- .1 The following Schedule is a list of principal items only. Refer to Drawing details.
  - .1 Steel hand/guard railings
  - .2 Steel Stairs
  - .3 Steel Access Ladder

**END OF SECTION**