

**Part 1            General**

**1.1            REFERENCE STANDARDS**

- .1    ASTM International (ASTM)
  - .1    ASTM A36/A36M-19, Standard Specification for Carbon Structural Steel.
  - .2    ASTM A193/A193M-19, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
  - .3    ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .4    ASTM F3125/F3125M-18, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- .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 Manufacturers Association (CPMA).
  - .1    Handbook of the Canadian Institute of Steel Construction.
  - .2    CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4    CSA Group (CSA)
  - .1    CSA G40.20/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2    CAN/CSA-S16-19, Design of Steel Structures.
  - .3    CAN/CSA-S136-16, North American Specifications for the Design of Cold Formed Steel Structural Members.
  - .4    CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.
  - .5    CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
  - .6    CSA W55.3-08 (R2018), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - .7    CSA W59-18, Welded Steel Construction (Metal Arc Welding).
- .5    Master Painters Institute
  - .1    MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
  - .2    MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.
- .6    The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
  - .1    NACE No. 3/SSPC SP-6-06, Commercial Blast Cleaning.

## **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 10 10 – General Instructions.
- .2 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.
- .3 Erection drawings:
  - .1 Submit erection drawings indicating 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.
- .4 Fabrication drawings:
  - .1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Ontario, Canada.
- .5 Samples:
  - .1 Prepare sample of typical exposed structural connections in accordance with AISC Specifications of Architecturally exposed structural steel for approval of Departmental Representative. Samples to be judged upon alignment of surfaces, uniform contact between surfaces, smoothness and uniformity of finished welds. When approved, sample units will serve as a standard for workmanship, appearance and material acceptable for entire project.
- .6 Source Quality Control Submittals:
  - .1 Submit 4 weeks prior to fabrication of structural steel.
    - .1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
    - .2 Provide mill test reports certified by metallurgists qualified to practise in Province of Ontario
- .7 Fabricator Reports:
  - .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.

## **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 10 10 – General Instructions.
- .2 Deliver materials in manufacturer s original, undamaged containers with identification labels intact.

- .3 Packaging Waste Management: remove for reuse by manufacturer in accordance with Section 01 10 10 – General Instructions.

## **Part 2 Products**

### **2.1 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of with CSA-S136.1 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 For composite construction select or design minimum end connection to resist reaction resulting from factored movement resistance as tabulated in the Handbook of the Canadian Institute of Steel Construction assuming 100% shear connection with depth of steel deck and/or slab shown on drawings.
- .4 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Ontario, Canada for non-standard connections.

### **2.2 MATERIALS**

- .1 Structural steel: to CSA-G40.20/G40.21.
- .2 Anchor bolts: to ASTM A36/A36M or CSA-G40.20/G40.21, Grade 300W.
- .3 Bolts, nuts and washers: to ASTM F3125.
- .4 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .5 Shop paint primer: to CISC/CPMA2-75 solvent reducible alkyd, grey

### **2.3 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with approved shop drawings.
- .2 Continuously seal members by continuous welds. Grind smooth.

### **2.4 SHOP PAINTING**

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.

- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of
  - .1 Surfaces to be encased in concrete.
  - .2 Surfaces and edges to be field welded.
- .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 APPLICATION**

- .1 Manufacturers Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

#### **3.2 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.

#### **3.3 CONNECTION TO EXISTING WORK**

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

#### **3.4 MARKING**

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When 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.

#### **3.5 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 Departmental Representative.
- .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.

**3.6 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.
- .3 Submit test reports to Departmental Representative within 10 days
- .4 Departmental Representative will pay costs of tests as specified in Section 01 10 10 – General Instructions.
- .5 Test shear studs in accordance with CSA W59.

**3.7 FIELD PAINTING**

- .1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

**3.8 CLEANING**

- .1 Clean in accordance with Section 01 10 10 – General Instructions.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 10 10 – General Instructions.

**END OF SECTION**