

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section D13.
- .2 Section E3.
- .3 Section E4.
- .4 Section E12
- .5 Section 09 91 00 – Painting and Protective Coatings.

**1.2 REFERENCES**

- .1 National Building Code of Canada (NBC).
- .2 Manitoba Building Code (MBC).
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A325-09, Specification for Structural Bolts, Steel, Heat Treated, 60,000 PSI Tensile Strength, galvanized.
- .4 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
- .5 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16.1-09, Limit States Design of Steel Structures.
  - .4 CAN/CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
  - .5 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .6 CSA W59-03(R2008), 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 E3.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section E3. Indicate VOC's:
    - .1 For finishes, coatings, primers and paints.

- .2 Shop Drawings.
  - .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section E3.
  - .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.
    - .5 All information necessary for fabrication of component parts, including extent of shop paint coverage.
    - .6 Wall Plate and Anchor Bolt Details and Setting Out Plan.
    - .7 Location and size of all members and details of field connections.
  - .3 Ensure each drawing submitted bears stamp and signature of qualified Contract Administrator registered or licensed to practice in Manitoba, Canada.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section E4.

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section D13.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material and pallets in appropriate on-site containers for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to an approved metal recycling facility.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Steel sections: to CAN/CSA-G40.20/G40.21, Grade 350W.
- .2 Hollow structural sections: to CAN/CSA G40.20/G40.21, Grade 350W, Class C.

- .3 Angles, channels and plates (L, C): to CAN/CSA G40.20/G40.21, Grade 300W.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A325.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- .8 Structural aluminum: to 6063-T6 or 6351-T6 alloy, mill finish, unless otherwise noted.
- .9 Stainless steel: grade 304, mill finish.

## **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 round 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.
- .5 Detailing of connections for members framing into concrete walls shall allow horizontal adjustment of connection angles.

## **2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181. suitable for final finish as specified in Section 09 91 00 Painting and Protective Coatings.

## **2.4 SHOP PAINTING**

- .1 Apply one shop coat of primer to metal items, with exception of galvanized, stainless steel 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°C.
- .3 Clean surfaces to be field welded; do not paint.

## **2.5 VEHICLE BUMPER POSTS (VBP)**

- .1 Supply and install vehicle bumper posts where shown on the Drawings.

- .2 Posts shall be fabricated from 250 mm diameter (Schedule 80) steel pipe, hot dip galvanized.
- .3 Posts shall be supplied in 2400 mm lengths installed in 600 mm diameter, 25 MPa mass concrete foundations.
- .4 Posts, when in place, shall extend 1200 mm above finished floor or grade level.
- .5 Posts shall be filled solid with 25 MPa concrete, domed at the top to shed water.
- .6 Grind and buff welds to a smooth finish.

## **2.6 STEEL PLATFORM FRAMING**

- .1 Design platform framing to support minimum live load of 4.8 kPa in addition to dead load of assembly.
- .2 Fabricate platform framing of galvanized steel sections and to landing sizes indicated on approved shop drawings.
- .3 Provide full fillet welds ground smooth.
- .4 Include steel pipe guards as indicated on the drawings.
- .5 Fabricate posts of standard weight ANSI Schedule 40 aluminum pipe, 48.3 mm od, mill finish, to height indicated.
- .6 Cap top and bottom of posts with welded aluminum plate of same od as posts, and securely weld posts to face of platform framing.
- .7 Fabricate aluminum safety chains of properly sized links with aluminum or stainless steel snap hooks at one end, and fixed eyes on posts at opposite ends.
- .8 Anchor chains at top of posts and at mid-height above grating level with minimum sag.
- .9 Remove all burrs and sharp edges, grind welds and buff smooth.
- .10 Secure platform rigidly in place using stainless steel anchors in concrete as required to safely accommodate design loadings.

## **2.7 STEEL STAIRS – GRATING TREADS**

- .1 Supply and install grating type steel stairs as indicated on the Drawings.
- .2 Stairs to be open riser type with grating treads, and connections designed to support a minimum uniform live load of 4.8 kPa in addition to dead load of the work.
- .3 Fabricate stringers from structural steel channels. Stringers at landings to form base 100 mm high above finished landing surface. Cap exposed ends of stringers with welded steel plate closures. Bolt stringer in place through clip angles.

- .4 Gratings for stair treads and landings: Borden metal Type B, Fisher and Ludlow Series GAL, or Approved equal in accordance with B7, of pressure locked steel construction with serrated bearing bars, galvanized finish.
- .5 Treads to include grating manufacturer's standard cast abrasive safety nosings and welded lugs for bolting to stringers. Include safety nosing on landing edges overlooking stairs.
- .6 Nosing to overlap preceding treads by 25 mm.
- .7 All members to be welded or bolted into a rigid, structurally sound unit, all welds ground and buffed smooth.
- .8 Railings to be as specified under "Steel Piperails".

## **2.8 STEEL PIPE RAILS**

- .1 Supply and install all pipe rails to locations shown on the Drawings. Design pipe rails and anchorage of system to accommodate loadings required by code.
- .2 Fabricate pipe rail of standard weight ANSI Schedule 40 steel pipe, 48.3 mm od, mill finish, with intermediate horizontal rails and vertical posts at not more than 1500 mm centres.
- .3 Height of top rail to be 1070 mm above floor or landing level with intermediate rail at midpoint or as detailed.
- .4 At stairs, height of pipe handrails shall be as indicated. Include intermediate rail along open sides of stairs. Provide at least 50 mm clearance between every handrail and any wall to which it is fastened.
- .5 Pipe rails shall be fabricated with all joints neatly and accurately fitted, welded and buffed smooth.
- .6 Provide anchor plates welded to posts for side anchored railing sections, predrilled for fasteners.
- .7 Pipe rails to be installed on steel stairs shall have posts welded to stringers or as detailed on the Drawings.

## **2.9 STEEL GRATING**

- .1 Supply and install grating where indicated on the Drawings.
- .2 Grating: Borden Metal Type B, Fisher and Ludlow Series, or Approved equal in accordance with B7, of pressure locked steel construction with serrated bearing bars, mill finish.
- .3 Design gratings to support minimum live load of 7.2 kPa, with maximum deflection  $1/240^{\text{th}}$  of the span.
- .4 Fabricate grating sections to required configurations. Weld continuous steel banding to ends of bearing bars, and buff all welds smooth.

- .5 Secure grating sections on supporting frames with stainless steel saddle clips and bolts.
- .6 Install gratings true and level with full bearing on supporting frames, and all grating sections flush and level.

**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.

**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**