

**PART 1 - GENERAL**

1.1 Work included:

- .1 All labour, materials and equipment necessary for the fabrication, supply and installation of all miscellaneous metalwork items inclusive of but not limited to signage, railings, handrails, fences, galvanized steel roofing, running rails, embed and other metal skatepark features as indicated on the drawings and as specified herein.

1.2 Related Work:

- .1 Cast-in-Place Concrete Section 03300
- .2 Pre-Cast Architectural Concrete Section 03400

1.3 Standards:

- .1 Welding work to conform to CSA Standard W59 and shall only be performed by organizations and operations qualified under CSA Welding Qualifications Code CSA W47.
- .2 Electrodes to conform to CSA Standard W48.
- .3 Conform to CAN3-S16.1-M for design of steel, unit stresses and workmanship.

1.4 Shop Drawings and Measurements:

- .1 Submit shop drawings in accordance with Section CW1110-R1 / NMS 01300 – Submittals, see Division 1 – General Requirements in Tender Documents, of all miscellaneous metal work. Complete detail items indicating all dimensions and methods of fixing. Confirm all dimensions on site prior to preparation of shop drawings.
- .2 Shop drawings for fencing, railings and guard rails shall be sealed by a professional engineer registered in Manitoba.
- .3 Do not commence fabrication of miscellaneous metalwork until shop drawings and samples have been reviewed and approved by the *Contract Administrator*.

1.5 Samples and Prototypes:

- .1 Following review of shop drawings, prepare and submit a full size sample of a railing module, i.e. full height by approximately 0.5m.
- .2 Samples shall be reviewed and approved by the *Contract Administrator* prior to commencing fabrication work of the railing.
- .3 All details of the approved sample will serve as standards for the work prepared for installation.

1.6 Delivery:

- .1 All miscellaneous metalwork items delivered to the site or to another sub-trade shall be tagged and supplied with sufficient information for identification and fixing.
- .2 Arrange delivery in such sequence and manner to permit the most efficient and economical performance of this section of the work.

1.7 Protection:

- .1 Use all means necessary to protect miscellaneous metal work before, during and after installation and to protect the installed work and materials of all other items.
- .2 In the event of damage, immediately make all repairs and replacements necessary to the approval of the *Contract Administrator* at no extra cost to the City.

**PART 2 - MATERIALS**

2.1 Materials:

- .1 Steel: Shall be one of the following types as designated on the drawings or specified herein.
  - .1 Miscellaneous steel shapes, conforming to CAN3-G40.21, Grade 300W.
  - .2 Seamless hollow structural sections, conforming to CAN3-G40.21, Grade 350W, Type H.
  - .3 Pipe, standard weight, conforming to ASTM Specification A53, Grade B.
  - .4 Bolts, nuts and washers to be hot dip galvanized to CSA G164, minimum zinc coating of 600g/m<sup>2</sup>.
  - .5 Hot Dip Galvanizing: all steel including fastenings, clips, etc. to be hot dip galvanized to CSA G164 minimum zinc coating of 600g/m<sup>2</sup>.
  - .6 All field installed anchors to concrete will be the epoxy (chemical) type anchor, installed per manufacturer's specifications.

2.2 Fabrication:

- .1 Verify all dimensions on site prior to proceeding with shop fabrication.
- .2 Fit and shop assemble in largest practical sections for delivery to the site.
- .3 Fabricate and assemble miscellaneous metal items true, straight, square and free from warpage and other defects.
- .4 Grind smooth sharp edges, angles and corners.

- .5 Design, fabrication and workmanship shall conform to CAN3-S16.1-M.
  - .6 Welding shall conform to CSA W-59-1979.
  - .7 Fabricate all work in accordance with details shown on drawings and reviewed shop drawings.
  - .8 Fabricate items from steel unless otherwise noted.
  - .9 Where possible, fit and shop assemble work, ready for installation.
  - .10 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush. Stitch welds will not be accepted.
  - .11 Bolted work shall be carefully tightened with threads of bolts nicked to prevent subsequent loosening, unless work indicated is noted as demountable.
  - .12 Drill or punch all holes required for the attachment of work of other trades and bolted connections prior to galvanizing.
- 2.3 Anchors, Bolts and Screws:
- .1 All fixing and anchorage for miscellaneous metal work shall be supplied as detailed and as required to suit installations and erection.
- 2.4 Angles and Clips:
- .1 Provide all the angles, clips, plates etc. required to support or fix items of work installed by other sections save where specifically excepted and supply and fix any other miscellaneous metalwork required in the work.

### **PART 3 - EXECUTION**

- 3.1 Examination:
- .1 Examine all details of the work as related to this section and other sections. Ensure that all conditions are suitable to provide a complete and satisfactory installation or be responsible for any additional costs involved.
  - .2 Carefully inspect all surfaces and the work of other trades as it relates to the work of this section for defects and discrepancies and report same to the *Contract Administrator*.
  - .3 Clean-up all metal pieces, bits of steel and drillings laying on concrete surfaces to avoid rust staining.
- 3.2 Erection:
- .1 Erect metalwork square, plumb, straight and true, accurately fitted, with tight joints and intersections.

- .2 Execute all metalwork in a thorough and workmanlike manner according to best shop practices. Material cut from stock to be sheared or parted straight and all deburred. Where cuts are burned, grind off clean and true to line. Exposed welding or welding in fitted surfaces to be ground smooth or filleted as required. Fabricate all items accurately, true to line and dimension.
- .3 Make field connections with bolts to CAN3-S16.1-M and CSA S1653-1981, or weld, if specified on drawings. (Otherwise, field welding is not permitted. Bleeding rust stains to concrete is to be avoided. If this occurs, Contractor will repair at no cost to the City).
  - .1 If field welding (sealed) is called for, such as: at the base of handrail posts to concrete embeds then power wire brush and clean weld affected area to paint supplier's specifications and apply ClovaZinc 1, zinc rich paint, to 15 mil thickness in two coats.
- .4 Field drilling holes for screws (which leaves an unprotected hole) is not permitted.