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**Partie 1      General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 03 30 00 - Cast-in Place Concrete.
- .2      Section 05 50 00 – Metalwork.
- .3      Section 06 10 00 – Rough Carpentry.
- .4      Section 09 30 13 – Ceramic Tiles.
- .5      Section 09 91 13 – Painting – Exterior.
- .6      Section 09 91 23 – Painting – Interior.

**1.2            REFERENCES**

- .1      American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
  - .1      ANSI/NAAMM MBG 531-2009, Metal Bar Grating Manual.
- .2      ASTM International
  - .1      ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2      ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .3      ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength Metric.
- .3      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
  - .2      CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .4      CSA International
  - .1      CSA G40.20/G40.21-F04 (C2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2      CAN/CSA G164-FM92 (C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3      CSA W59-F03 (C2008), Welded Steel Construction (Metal Arc Welding).
- .5      Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1      Material Safety Data Sheets (MSDS).
- .6      National Association of Architectural Metal Manufacturers (NAAMM)
  - .1      AMP 510-92, Metal Stair Manual.

- .7 The Society for Protective Coatings (SSPC)
  - .1 Systems and Specifications Manual, Volume 2, 2008 Edition.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for stairs, ladders and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
  - .2 Indicate construction details, sizes of steel sections and thickness of steel sheet.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect stairs, ladders from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **1.6 ACCEPTABLE PRODUCTS AND MATERIALS**

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products

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**Partie 2      Products**

**2.1            DESCRIPTION**

- .1      Design Requirements:
- .2      Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.
- .3      Detail and fabricate stairs to NAAMM Metal Stairs Manual.

**2.2            MATERIALS**

- .1      Steel sections: to CSA G40.20/G40.21 Grade 300 W.
- .2      Steel plate: to CSA G40.20/G40.21, Grade 260 W.
- .3      Steel pipe: to ASTM A53/A53M, standard weight, schedule 40 seamless black.
- .4      Steel tubing: to CSA G40.20/G40.21, Grade 300 W, square and round, 3.6 mm wall thickness, sizes and dimensions as indicated.
- .5      Steel rods: to CSA G40.20/G40.21, Grade 300W, square and round, 3.6 mm wall thickness, sizes and dimensions as indicated.
- .6      Steel plate: to CSA G40.20/G40.21, Grade 300W, 3mm thickness, 6mm or 13mm as indicated.
- .7      Metal bar grating: to ANSI/NAAMM MBG 531, steel, Type W-25-102, 25 x 3 mm bars.
- .8      Welding materials: to CSA W59.
- .9      Bolts: to ASTM A307.
- .10     High tensile bolt: to ASTM A325M.
- .11     Galvanized mesh: welded mesh, 50 x 50 mm, 1.6 mm diameter wire, hot-dipped. Use for stairs and landings.

**2.3            FABRICATION**

- .1      Fabricate in accordance with NAAMM, Metal Stair Manual.
- .2      Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.
- .3      Accurately form connections with exposed faces flush:
  - .1          Make mitres and joints tight.
  - .2          Make risers of equal height.
- .4      Grind or file exposed welds and steel sections smooth.
- .5      Shop fabricate stairs in sections as large and complete as practicable.

**2.4 STEEL PAN STAIRS (stair nos. 3, 10, 12, 13, 14A)**

- .1 Fabricate stairs with closed riser steel pan construction.
- .2 Form treads and risers from 4.5 mm thick steel plate. Secure treads and risers to L 35 x 35 x 5 horizontal and vertical welded to stringers.
- .3 Form wall stringers from MC 310 x 15.8.
- .4 Form landings from 4.5 mm thick steel plate, reinforced by L 55 x 55 x 6 mm spaced at 400 mm on centre.
- .5 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.
- .6 Extend stringers around mid landings to form steel base.
- .7 Stair details are provided on drawings. Follow thicknesses and gauges indicated except where a thicker element is required to meet calculation criteria.
- .8 Close ends of stringers where exposed.

**2.5 PLATE/GRATING STAIRS (Stair nos. 15, 16, 17, 24, 26)**

- .1 Form treads from 6 mm thick steel plate to profile indicated, and secure to stringers with L 35 x 35 x 5 supports. Form landings from 6 mm thick steel plate, reinforced by L 55 x 55 x 6, spaced at 600 mm on centre.
- .2 Form steel grating treads and landings from metal bar grating to profile indicated and secure to stringers and supports as indicated. Form landings of steel grating and reinforce as required.
- .3 Form stringers from MC 310 x 15.8.

**2.6 PIPE/TUBING BALUSTRADES**

- .1 Construct balusters from 32 mm x 32 mm steel tube and handrails from 38 mm x 38 mm tube.
- .2 Cap and weld exposed ends of balusters and handrails.
- .3 Terminate at abutting wall with end flange.

**2.7 BAR BALUSTRADES**

- .1 Construct bar balustrades as follows:
  - .1 Baluster: 12 mm diameter bar.
  - .2 Top rail: 38 mm x 13 mm bar.
  - .3 Pickets: 38 mm x 13 mm posts 1200 mm on centre.
  - .4 Handrail: 38 mm diameter tube.
- .2 Weld balustrades to stringers as indicated.

**2.8 STAINLESS STEEL GUARD RAIL AND HAND RAIL (stair nos. 4, 5A, 5B, 5C, 6A, 6B, 11)**

- .1 Stainless steel plates and posts, 38mm x 13mm.
- .2 Stainless steel bolts and anchors.
- .3 Anchor handrail with 38mm x 3mm plates, to the wall and slab as indicated on drawings.

**2.9 LADDERS**

- .1 Fabricate ladders as indicated on drawings, including caged ladders and anchors.
- .2 Hot dip galvanize completed ladders.
- .3 Provide ladders at the following locations:
  - .1 Replace existing ladder between stage and crawlspace (Room 203-03).
  - .2 Ladders and caged ladders between stage walkways and crawlspace in multifunctional room (central building).
  - .3 Mechanical rooms and access to tunnels.

**2.10 EXISTING STAIRS TO BE REPAIRED**

- .1 Stair repair work as indicated.

**2.11 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m<sup>2</sup> 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.
- .4 Stainless steel: to ASTM A269, 304, commercial grade, to be welded seam-free.

**2.12 SHOP PAINTING**

- .1 Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2.
- .2 Apply one coat of shop primer except interior surfaces of pans.
- .3 Apply two coats of primer of different colours to parts inaccessible after final assembly.
- .4 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7 degrees C.
- .5 Do not paint surfaces to be field welded.

**Partie 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal stairs and ladders installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 INSTALLATION OF STAIRS**

- .1 Install in accordance with NAAMM, Metal Stair Manual.
- .2 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.
- .3 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .4 Do welding work in accordance with CSA W59 unless specified otherwise.
- .5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal stairs and ladders installation.

**END OF SECTION**