

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 05 51 29 - Metal Stairs and Ladders.
- .2 Section 09 91 23 - Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A53/A53M-12. Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .2 ASTM A167-99(2009). Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .3 ASTM A307-12. Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 - .4 ASTM A336/A336M-10a. Standard Specification for Alloy Steel Forgings for Pressure and High-Temperature Parts.
- .2 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.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA-G40.20-04/G40.21-04 (R2009). General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003). Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S16-09. Design of steel structures.
 - .4 CSA-W48-06 (R2011). Filler Metals and Allied Materials for Metal Arc Welding.
 - .5 CSA-W59-03 (R2008). Welded Steel Construction (Metal Arc Welding).

1.3 SUBMITTALS

- .1 Provide Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data. Submit manufacturer's printed product literature, specifications and data sheet.
- .3 Submit Shop Drawings:
 - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories. On installation drawings, indicate all information necessary for assembly, including member size, base plate elevation, anchor bolt size and location.

METAL FABRICATIONS

- .2 Indicate cuts, copes, holes, threaded fasteners, rivets and welds. Indicate welds by AWS welding symbols.
- .3 Ensure Fabricator designed assemblies, components and connections, and drawings are stamped and signed by qualified Professional Engineer licensed in the province Ontario.

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 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products**2.1 MATERIALS**

- .1 Steel sections and plates: to CSA-G40.20/G40.21, Grade 350W.
- .2 Hollow Structural Sections (HSS): to CSA-G40.20/G40.21, Grade 350W, Class "C".
- .3 Secure room wall plates: Matte finish 1.52mm thick commercial quality to ASTM A336.
- .4 Steel pipe: to ASTM A53/A53M standard weight, black finish.
- .5 Stainless steel sheet: to ASTM A167-99. Type 309, 310 or 316. Brushed finish.
- .6 Welding materials: to CSA W59.
- .7 Welding electrodes: to CSA W48 Series.
- .8 Bolts and anchor bolts: steel bolts to ASTM A307. Provide stainless steel bolts, screws and anchors for stainless steel fabrications. Provide hot dip galvanized bolts, screws and anchors for hot dip galvanized fabrications.
- .9 Grout: non-shrink, non-metallic, flowable. 15 MPa at 24 hours.

2.2 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600g/m² 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 Paint: finish paint as specified in Section 09 91 23 - Painting.

2.3 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .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. Use self-tapping shake-proof screws on items requiring assembly by screws or as indicated. Provide wall and floor anchors as indicated or required for attachment.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Accurately form connections with exposed faces flush; mitres and joints tight. Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Fabricate items to receive galvanized finish in largest practical sizes. Provide bolted connections for pipe railings that are hot-dip galvanized after fabrication. Do not field weld hot-dip galvanized components.

2.4 SHOP PAINTING

- .1 Clean, prepare surfaces and apply primer to CSA-S16. Apply one shop coat of primer to metal items, with exception of galvanized 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 degrees C.
- .3 Clean surfaces to be field welded. Do not paint.
- .4 Interior components: apply one coat of shop coat primer. Minimum 0.4 mm, Maximum 0.75 mm dry thickness.
- .5 Exterior components (non-galvanized): apply one coat of zinc primer. Minimum 0.4 mm, Maximum 0.75 mm dry thickness.

2.5 PIPE RAILINGS AND HANDRAILS

- .1 Steel pipe: 40 mm nominal outside diameter. Fabricate to shapes and sizes as indicated. Fabricate in maximum sizes to allow for hot dip galvanized treatment after fabrication. Fabricate with bolted connections between sections.
- .2 Pickets: 13 mm diameter solid steel bar. Spacing maximum 100 m OC horizontally.
- .3 Anchor plates: plate steel of sizes and shapes as indicated.
- .4 Anchors: provide appropriate anchors to suit wall structure.
- .5 Finish: hot dip galvanize interior and exterior pipe railings and handrails after fabrication.

METAL FABRICATIONS**2.6 SUPPORT BRACKETS FOR MILLWORK**

- .1 Fabricate support brackets from angle iron and plate steel sections as per details.
- .2 Finish: shop coat primer. Field apply finish paint system as specified in Section 09 91 23 - Painting.

2.7 SUPPORT FRAMING

- .1 Fabricate custom support frames from angle iron and plate steel sections as per details.
- .2 Brackets: sizes and shapes as per details. Weld to support frame. Provide anchor plates for attachment to wall surfaces as detailed including solid wood blocking. Complete with anchors as per details.
- .3 Finish: shop coat primer. Field apply finish paint system as specified in Section 09 91 23 - Painting.

2.8 EXTERIOR BOLLARDS

- .1 Fabricate from hollow structural sections, minimum 150 mm diameter. Fabricate to length as per details to allow minimum 750 mm below grade.
- .2 Finish: hot dip galvanized after fabrication. Do not field paint.

2.9 SECURE ROOM WALL PLATING

- .1 Fabricate from matte finish 1.52mm thick commercial quality plate to ASTM A336. Fasten to steel studs with 4.75 mm rivets at 305 mm on centres maximum. Install wall to RCMP security wall construction SR2, details and location as indicated on drawings. Coordinate with Section 09 22 16 - Non-Structural Metal Framing.

2.10 STAINLESS STEEL WALL COVERINGS

- .1 Fabricate wall coverings from 1.52mm stainless steel plate. Provide in single length per wall. Radius edges to remove sharp exposed edges. Round over outside corners 15 mm diameter radius.

2.11 BRACE FRAME FOR HVAC

- .1 Fabricate miscellaneous components from structural steel sections, plates, bars and tubing as indicated in the drawings. Coordinate size and configuration to suit wall mounted HVAC and insulated ductwork.
- .2 Finish: hot dip galvanized after fabrication for all exterior components.

2.12 MISCELLANEOUS FABRICATIONS

- .1 Fabricate miscellaneous components from structural steel sections, plates, bars and tubing as indicated in the drawings.
- .2 Fabricate support plates and anchors as indicated in the drawings.

METAL FABRICATIONS

- .3 Finish: hot dip galvanized after fabrication for all exterior components. Do not paint galvanized finishes. Provide shop coat primer for interior components. Field apply finish paint system as specified in Section 09 91 23 – Painting

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 Departmental Representative's approval 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 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.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 PIPE RAILINGS AND HANDRAILS

- .1 Install pipe railings to exterior stairs, landing and access ramp as indicated.
- .2 Set railing uprights in concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.
- .3 Supply exterior railings in sections with bolted connections. Do not field weld.
- .4 Touch up galvanized finish where damaged during installation. Do not paint galvanized finishes.

3.3 VANITY SUPPORT BRACKETS

- .1 Install support brackets in locations as indicated.
- .2 Secure to wall framing as per details.

METAL FABRICATIONS

- .3 Touch up shop primer and prepare for application of finish paint as specified in section 09 91 23 - Painting.

3.4 SUPPORT FRAMING

- .1 Install support framing brackets in locations as indicated.
- .2 Fasten to wall framing as per details.
- .3 Touch up shop primer and prepare for application of finish paint as specified in section 09 91 23 - Painting.

3.5 EXTERIOR BOLLARDS

- .1 Install exterior bollards in locations as indicated.
- .2 Install bollard into drilled hole, minimum 450 mm in diameter x 2400 mm deep. Install bollard and fill hole with concrete. Secure bollard plumb and upright. Fill bollard with concrete and create uniform dome top.
- .3 At base of bollard, slope top of concrete at grade to shed water. Remove and reinstate asphalt paving to match existing grades as specified in Section 32 12 16.01 - Asphalt Paving - Short Form.
- .4 Touch up galvanized finish where damaged during installation. Do not paint galvanized finishes.

3.6 SECURE ROOM WALL PLATING

- .1 Install at locations indicated on drawings. Fasten to steel studs with 4.75 mm rivets at 305 mm on centres maximum. Install wall to RCMP security wall construction SR2, details and location as indicated on drawings.
- .2 Coordinate installation with Section 09 22 16 - Non-Structural Metal Framing.

3.7 STAINLESS STEEL WALL COVERINGS

- .1 Install at locations indicated in drawings.
- .2 Secure to wall fully imbedded in adhesive.

3.8 MISCELLANEOUS FABRICATIONS

- .1 Install miscellaneous fabrications to locations as indicated.
- .2 Provide anchors and provide solid fastening to substrate as indicated.
- .3 For interior components, touch up shop primer and prepare for application of finish paint as specified in section 09 91 23 - Painting.
- .4 For exterior components, touch up galvanized finish where damaged during installation. Do not paint galvanized finishes.

METAL FABRICATIONS**3.9 BRACE FRAMES FOR HVAC**

- .1 Install fabrications to locations as indicated. Provide anchors and provide solid fastening to substrate as indicated. Touch up galvanized finish where damaged during installation. Do not paint galvanized finishes.

3.10 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

METAL STAIRS AND LADDERS**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 05 50 00 - Metal Fabrications.

1.2 REFERENCES

- .1 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM).
 - .1 ANSI/NAAMM MBG531-09. Metal Bar Grating Manual.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A53/A53M-12. Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .2 ASTM A307-12. Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 - .3 ASTM A325-10e1. Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.181-99. Ready-Mixed Organic Zinc-Rich Coating.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA-G40.20-04/G40.21-04 (R2009). General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003). Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA W59-03(R2008). Welded Steel Construction (Metal Arc Welding).
- .5 National Association of Architectural Metal Manufactures (NAAMM).
 - .1 AMP 510-92. Metal Stair Manual.

1.3 SYSTEM DESCRIPTION

- .1 Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.
- .2 Design stairs and landings per architectural details.
- .3 Detail and fabricate stairs to NAAMM AMP 510, Metal Stairs Manual.
- .4 Design stairs and landings from open bar grating treads and landings.

1.4 SUBMITTALS

- .1 Provide all submittals in accordance with Section 01 33 00 - Submittal Procedures.

METAL STAIRS AND LADDERS

- .2 Submit manufacturer's printed product literature, specifications and data sheet.
- .3 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for finishes, coatings, primers and paints.
- .4 Submit Shop Drawings. Indicate construction details, sizes of steel sections and thickness of steel sheet. Submit shop drawing bearing stamp of a qualified Professional Engineer registered in Province of Ontario.
- .5 Design stairs and landings. Refer to architectural drawings for general layout and intent.

1.5 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.

Part 2 Products**2.1 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 Metal bar grating: to ANSI/NAAMM MBG531, steel, Type W-19-4. Hot dip galvanized finish.
- .4 Nosings: hot dip galvanized steel checker plate with anti slip abrasive coating.
- .5 Steel pipe: to ASTM A53/A53M, standard weight, schedule 40 seamless black.
- .6 Welding materials: to CSA-W59.
- .7 Bolts: to ASTM A307.
- .8 High strength bolts: to ASTM A325M.

2.2 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600g/m² to CAN/CSA-G164.

2.3 FABRICATION

- .1 Fabricate to NAAMM AMP 510 - 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.

METAL STAIRS AND LADDERS

- .3 Accurately form connections with exposed faces flush and with mitres and joints tight. Make risers of equal height.
- .4 Grind or file exposed welds and steel sections smooth.
- .5 Shop fabricate stairs, landings and railings in sections as large and complete as practicable to allow for hot dip galvanized finish. Provide bolted connections to allow for site assembly without welding.

2.4 PLATE/GRATING STAIRS

- .1 Fabricate stairs with open riser, open grating treads and landings construction.
- .2 Form outer stringers from steel sections as indicated in the drawings.
- .3 Form wall stringers from steel sections as indicated in the drawings.
- .4 Extend stringers around mid landings to form steel base.
- .5 Close ends of stringers where exposed.
- .6 Form treads from metal bar grating to size and profile as indicated. Secure to stringers with steel angle supports. Provide nosings from steel checker plate with abrasive coating.
- .7 Form landings from metal bar grating to size and profile as indicated. Reinforce landings with steel angles spaced as indicated.
- .8 Fabricate in sections to allow for hot dip galvanized finish. Fabricate for bolted connections and attachments.

2.5 PIPE/TUBING BALUSTRADES

- .1 Construct balusters and handrails from steel pipe.
- .2 Cap and weld exposed ends of balusters and handrails.
- .3 Terminate at abutting wall with end flange.
- .4 Fabricate in sections to allow for hot dip galvanized finish. Fabricate for bolted connections and attachment to stairs and landings.

2.6 PIPE HANDRAILS

- .1 Construct handrails from 40 mm OD steel pipe.
- .2 Cap and weld exposed ends of handrails. Terminate at abutting wall with end flange. Fabricate handrails to return to walls with gentle radius.
- .3 Fabricate in sections to allow for hot dip galvanized finish. Fabricate for bolted connections and attachments to stairs / landings.

METAL STAIRS AND LADDERS**2.7 FINISHES**

- .1 Hot dip Galvanize all assembled components in accordance with CAN/CSA G164.
- .2 Touch up primer: to CAN/CGSB-1.181. Ready-Mixed Organic Zinc-Rich Coating.

Part 3 Execution**3.1 INSTALLATION OF STAIRS**

- .1 Install in accordance with NAAMM, Metal Stair Manual.
- .2 Install galvanized steel stair assembly complete with hand rails and guards as required by code and per detailed.
- .3 Do not field weld hot dip galvanized components. Assemble with bolted connections only.
- .4 Install plumb and true in exact locations, using bolted connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.
- .5 Hand items over for casting into concrete to Contractor together with setting templates.
- .6 Touch up bolts and damaged or scratched surfaces with zinc rich coating at completion of erection.

3.2 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 Clean handrails immediately prior to final inspection.
- .3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION