

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 05 51 00 - Metal Railings.
- .2 Section 06 10 00 - Rough Carpentry.
- .3 Section 06 12 10 - Structural Insulated Panels.
- .4 Section 06 17 00 - Shop Fabricated Timber Framing.
- .5 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- .6 Section 09 21 16 - Gypsum Board Assemblies.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269/A269M-15a Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA International
 - .1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-14, Design of Steel Structures.
 - .4 CSA W47.1-09 (R2014), Certification of companies for fusion welding of steel.
 - .5 CSA W48-14, Filler metals and allied materials for metal arc welding.
 - .6 CSA W59-13, Welded Steel Construction (Metal Arc Welding), Includes Update No. 1 (2014), Update No. 3 (2015), Update No. 4 (2015).
- .3 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - September 2012.

- .4 National Association of Architectural Metal Manufactures (NAAMM)
 - .1 NAAMM AMP 555-92, Code of Standard Practice for the Architectural Metal Industry
- .5 National Ornamental & Miscellaneous Metals Association (NOMMA)
 - .1 NOMMA Guideline 1: Joint Finishes, 1994.

1.03 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 sections, plates, pipe, tubing and bolts, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3 Shop Drawings:
 - .1 Submit drawings prepared and stamped by professional engineer licensed to practice in the Province of Prince Edward Island, and indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .2 Submit shop drawing for condenser unit stand in accordance with Section 01 33 00 - Submittal Procedures and indicate materials, material thicknesses, finishes, connections, joints, anchorage, number of anchors and details.

1.04 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.

- .3 Detail and fabricate metal fabrications in accordance with NAAMM AMP 555.
- .4 Fabricator for structural welded steel connections shall be certified in accordance with CSA W47.1

1.05 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, protected from weather, and in accordance with manufacturer's recommendations.
 - .2 Replace defective or damaged materials with new.

1.06 JOB CONDITIONS AND COORDINATION

- .1 Coordinate with other trades and exercise the necessary scheduling to ensure that work is carried out and items incorporated during the appropriate construction phase.
- .2 Provide instructions and drawings to other trades for setting bearing plates, anchors bolts, and other members that are built into work of other trades.

2 PRODUCTS

2.01 MATERIALS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.
- .2 Hollow structural sections: to CAN/CSA G40.20/G40.21, Grade 350W, Class C.
- .3 Steel pipe: to ASTM A53/A53M standard weight (Schedule 40), galvanized finish.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.

- .6 Fasteners: bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws, and machine bolts.
 - .1 Unfinished fasteners: In areas not exposed to the public, use unfinished bolts conforming to ASTM A307, Grade A, with hexagon heads and nuts. Supply bolts of lengths required to suit the thickness of the material being joined, but not projecting more than 6 mm beyond nut, without the use of washers.
 - .2 Finished fasteners:
 - .1 In areas exposed to public use, bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws and machine bolts to be hot dip galvanized in accordance with ASTM A153/A153M or CAN/CSA G164.
 - .2 For joining stainless steel components use stainless steel fasteners of same type.
 - .3 Structural bolts: to ASTM A325.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- .8 Aluminum: Aluminum for the condenser unit stand to CSA A257

2.02 FABRICATION

- .1 Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night sky heat loss. Temperature change (Range): 100 deg F (38 deg C).
- .4 Shear and punch metals cleanly and accurately. Remove burrs.

- .5 Ease exposed edges to a radius of approximately 0.794 mm (1/32 inch), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- .6 Remove sharp or rough areas on exposed traffic surfaces.
- .7 Weld corners and seams continuously to comply with American Welding Society (AWS) recommendations, and the following:
 - .1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - .2 Obtain fusion without undercut or overlap.
 - .3 Remove welding flux immediately.
 - .4 At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- .8 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- .9 Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- .10 Shop Assembly: preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- .11 Cut, reinforce, drill and tap miscellaneous metalwork as indicated to receive finish hardware, screws, and similar items.
- .12 Ensure exposed welds are continuous for length of each joint.
- .13 Grind or file exposed welds and steel sections smooth and flush with adjacent surfaces. Weld locations not to be visible after application of paint finishes.

- .14 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.
- .15 Accurately form connections with exposed faces flush; mitres and joints tight.
- .16 Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- .17 All welding is to be performed by CWB Certified Welders.
- .18 Welded joints: Finish #1, to NOMMA Guideline 1: Joint Finishes.

2.03 MISCELLANEOUS FABRICATIONS

- .1 Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required. Fabricate items to sizes, shapes, and dimensions required.
- .2 Miscellaneous Framing and Supports: Provide steel framing and supports for applications indicated that are not a part of structural steel framework, as required to complete work.
- .3 Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitred joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- .4 Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
- .5 Miscellaneous Steel Trim: Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination for assembly and installation with other work.

- .6 Fabricate connections to foundation for heavy timber framing as required. Coordinate with Section 06 10 00, and provide connectors to concrete trades for embedment in foundation concrete.

2.04 FINISHES

- .1 Primers and paints: to 09 91 00 - Painting.

2.05 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.06 SHOP PAINTING

- .1 Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2.
- .2 Apply one coat of shop primer.
- .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.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for 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. Commencing with Work means acceptance of conditions.

3.02 ERECTION

- .1 Erect and install work in accordance with manufacturer's or fabricator's (as applicable) written instructions and Drawings.
- .2 Do welding work in accordance with CSA W59 unless specified otherwise.
- .3 Supply finished items to be built in to effected trades, along with instructions for proper installation.
- .4 Apply architectural metalwork using hidden mechanical fasteners. Installation shall be by skilled architectural metalworkers experienced in highest quality work.
- .5 Fasteners to draw adjoining sections together in proper, true alignment, and are capable of field adjustment.
- .6 All fasteners, mountings to be non-loosening and installed so that they will be hidden at completion.
- .7 Install all Work to true, straight lines, accurate to profile, all properly aligned.
- .8 Isolate dissimilar metals in a manner approved by the Departmental Representative to prevent electrolytic action or corrosion.
- .9 Install finish hardware supplied under other Sections required for completion of components of this Section.
- .10 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .11 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .12 Make field connections with high tensile bolts to CSA S16 and weld to prevent loosening.
- .13 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

- .14 Touch up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .15 Install miscellaneous metal fabrications and rough hardware as required.

3.03 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 and 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.

3.04 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 31 29.10 - Wood Shingles and Shakes.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .4 ASTM F3125M-15a Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .2 CSA International
 - .1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).
 - .2 CSA S16-14, Design of Steel Structures.
 - .3 CSA W48-14, Filler metals and allied materials for metal arc welding.
 - .4 CSA W59-13, Welded Steel Construction (Metal Arc Welding), Includes Update No. 1 (2014), Update No. 3 (2015), Update No. 4 (2015).
- .3 National Association of Architectural Metal Manufacturers (NAAMM)
 - .1 AMP 510-92, Metal Stair Manual.
 - .2 AMP 521-01(R2012), Pipe Railing Systems Manual.
- .4 National Research Council Canada (NRC)
 - .1 National Building Code of Canada (NBC), edition adopted and currently enforced by the Province of Prince Edward Island.
- .5 National Ornamental & Miscellaneous Metals Association (NOMMA)
 - .1 NOMMA Guideline 1: Joint Finishes, 1994.

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

1.03 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 products incorporated into the Work and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer licensed in Province of Prince Edward Island, Canada.
 - .2 Indicate construction details, sizes of steel sections and thickness of steel sheet.

1.04 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.

1.05 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, protected from the weather, and in accordance with manufacturer's recommendations; store and protect fabrications from nicks, scratches, and blemishes; replace defective or damaged materials with new.

2 PRODUCTS

2.01 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design metal railings and connections to National Building Code of Canada (NBC) vertical and horizontal live load requirements.

2.02 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.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series
- .6 Bolts: to ASTM A307.
- .7 High strength bolts: to ASTM F3125M.

2.03 FABRICATION

- .1 Fabricate railings 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 railings in sections as large and complete as practicable.

2.04 PIPE/TUBING BALUSTRADES

- .1 Construct railings from galvanized steel pipe; cap and weld exposed ends; terminate at abutting wall with end flange.

2.05 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to ASTM A123.
- .2 Touch up galvanized surfaces with zinc rich coating, to ASTM A780: DOD P 21035 zinc rich paint, minimum DFT 8 mils.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for 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. Commencing with Work means acceptance of conditions.

3.02 PREPARATION

- .1 Install railings 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.

3.03 INSTALLATION OF RAILINGS

- .1 Install railings as indicated, including all sleeves, anchors and connections. Prepare steel, touch-up galvanized finish on site as required to maintain cover of exposed steel.
- .2 Install railings in accordance with NAAMM Metal Stair Manual.
- .3 Install railings to structural support.
- .4 Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
 - .1 Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's directions.
 - .2 Anchor posts and rail ends to steel with welded connections, unless otherwise indicated.
 - .3 Anchor posts and rail ends into concrete and masonry with steel round flanges welded to post and rail ends, and anchored into wall construction with expansion shields and bolts.
 - .4 Install removable railing sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.
- .5 Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 40 mm clearance from inside face of handrail and finished wall surface. Locate brackets at spacing not less than 1.5 m o.c., unless otherwise indicated. Secure wall brackets and wall return fittings to building construction as follows:
 - .1 Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - .2 For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 - .3 For hollow masonry anchorage, fasten brackets directly on masonry wall using toggle bolts.

- .4 For steel framed gypsum board assemblies, fasten brackets to wood blocking using lag bolts or to metal blocking using self-tapping screws, of size and type required to support structural loads.
- .6 Hand items over for casting into concrete or building into masonry to appropriate trades, together with setting templates.
- .7 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. 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 and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.05 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