
1.0 GENERAL

1.1 References

- .1 Comply with all standards mentioned in this specification, unless more stringent requirements are given herein.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 123/A 123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A 653/A 653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A 792/A 792M-10(2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 Canadian Standards Association (CSA)
 - .1 CSA S16-09, Design of Steel Structures
 - .2 CSA S136-07 (R2012), North American Specification for the Design of Cold-Formed Steel Structural Members
 - .3 CSA W47.1-09, (R2014), Certification of Companies for Fusion Welding of Steel
 - .4 CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum
 - .5 CSA W55.3-08, (R2013), Certification of Companies for Resistance Welding of Steel and Aluminum
 - .6 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 51-06, Lightweight Steel Framing Design Manual.
 - .2 CSSBI Fact Sheet #3 (2006), Care and Maintenance of Prefinished Sheet Steel Building Products.
 - .3 CSSBI Technical Bulletin Vol. 7, No. 2 (2011), Changing Standard Thicknesses for Canadian Lightweight Steel Framing Applications.
 - .4 CSSBI S5-11, Guide Specification for Wind Bearing Steel Studs.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-7.1-98, Lightweight Steel Wall Framing Components

1.2 Design Criteria

- .1 The calculations for the wind-load bearing stud system shall be performed by a professional engineer, who is a member in good standing of the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG).
- .2 The calculations shall be based on the principles of limit states design, using weighted loads and resistances.
- .3 Exterior walls shall resist a factored positive and negative wind pressures of min. 2.35 kPa with a deflection of less than 1/180th of the span, and be designed in accordance with NBC requirements and local by-laws. The wall cladding and its fixation shall resist a minimum factored wind suction

load of 1.62 kPa.

- .4 Roof elements must be designed in accordance with the requirements of the NBC and the relevant local regulations. The maximum allowable deflection is 1/180 of the span. Gravity loads are provided on the **structure drawings**. The roof cladding and its fixations shall resist a minimum factored uplift wind loads of 2.2 kPa.
- .5 Calculate adequate bracing to prevent rotation and translation of the elements when the stud system is subjected to wind loads.
- .6 Calculate elements and assemblies so that tolerances for the installation of the structure are respected.
- .7 Design stud system assemblies subject to wind loads to accommodate deflections of slabs or roofs and avoid axial loading of studs.
- .8 Fasteners shall include bolts, metal screws and welding. CSA S136 prescriptions shall be respected in calculating resistance of metal screws.
- .9 Comply with NBC Section 4.1.10.3 (Loads on walls acting as guards) for all wall areas adjacent to a floor level above ground level.

1.3 Action and Informational Submittals

- .1 Provide submittals in accordance with **Section 01 33 00** and the following requirements:
 - .1 **Shop drawings:**
 - .1 Shop drawings shall be stamped and signed by professional engineer, who is a member in good standing of the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG).
 - .2 **Proof of qualifications:** provide proof of qualification for the following:
 - .1 Welders: to be accredited from the Canadian Welding Bureau, in accordance to CSA W47.1 requirements.
 - .2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

1.4 Delivery, Handling and Storage

- .1 Deliver materials to job site in perfect condition, uniform shape and size, and free of chips, cracks or broken corners.
- .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids, protected from the sun and contamination due to corrosion or other damage from work on site, and in such a manner as to avoid deflection.
- .3 Handle with care, avoiding chipping of edges or any damage to the surface of adjacent materials or surfaces, such as gypsum boards.

- .4 Remove damaged material from site.

1.5 Waste Management

- .1 Separate waste materials for disposal, re-use and recycling in accordance with **Section 01 74 19**.

2.0 PRODUCTS

2.1 Exterior Structural Steel Stud System, Galvanized

- .1 **Steel studs:** as per CSA S136, hot dipped galvanized steel with 152 mm, 102 mm or 92 mm width and 41 mm depth, or as indicated on plans. Minimum bare steel thickness as per drawings and as per structural calculations. Stud spacing as per structural calculations, max. 406 mm, o.c.
- .2 **Colour code steel studs:** in accordance with CSSBI 50M.
- .3 **Stud tracks, top and bottom:** fabricated from same material and finish as steel studs, width to suit, minimum depth 63.5 mm or as noted, cold rolled, hot dipped galvanized steel sheet, same sheet thickness as studs.
- .4 **Slotted top tracks for deflection:** similar to standard top track, with perforated flanges, 63.5 mm height, allowing 30 mm vertical movement, width as required.
- .5 **Gasket strip:** See below.
- .6 **Sub-Girt Systems:** fabricated from same material and finish as steel studs. Minimum bare steel thickness as per drawings and as per structural calculations. Single, double, triple systems, profiles "Z" or adjustable "L", and "U" profiles, dimensions as per **drawings**, continuous or discontinuous, installed horizontally or vertically, at maximum 1220 mm c.c. or as indicated on drawings. Exterior and interior surfaces of each layer of sub-girts isolated with a clip with thermal isolator, see **below**.
- .7 **Clip with thermal isolator:** Z-275 galvanized steel, over-molded with a plastic isolator (horizontal and vertical assembly), thermal bridging as per ASHRAE 90.1, NECB or SB-10, evaluated for NFPA 285, North American made.
- .8 **Metal furring:** cold formed galvanized steel sheet, 22 mm depth, minimum bare steel thickness 1.2 mm (18 ga.) and as per structural calculations. Compliant to CAN/CGSB-7.1 and ASTM C645.
- .9 **Angle clips:** fabricated from same material and finish as studs, 38 mm x 38 mm x depth of steel studs or as indicated, 1.2 mm (18 ga) mm minimum thickness.
- .10 **Nailer (anchor backing):** steel sheet, width 75 mm or as indicated, 1.2 (18 ga) mm minimum bare metal thickness, galvanized.
- .11 **Stiffeners and accessories:** as recommended by the manufacturer.
- .12 **Insulating strip for metal work (thermal break), self-adhesive:** See **Section 07 40 00**.

.13 **Air / vapour barrier:** see Section 07 10 00.

.14 **Insulation:** see Section 07 20 00.

2.2 Exterior gypsum sheathing board

.1 Glass fibre mat faced, silicone core gypsum exterior wall sheathing board, fire-resistive, exterior face also covered with an alkali-resistant coating, as per ASTM C1177/C1177M and C1396/C1396M, 12.7 mm thick, as indicated on the drawings; 1220 mm wide by maximum practical length, ends square cut.

2.3 Fasteners for Exterior Stud System

.1 **Screws:** pan head, self-drilling, self-tapping sheet metal screws, corrosion protected to minimum requirements of CSSBI, (hot dipped galvanized) with length 5 mm longer than twice the thickness of steel.

.2 **Anchors:** concrete expansion anchors or other suitable drilled type fasteners, hot dipped galvanized or stainless steel.

.3 **Bolts, nuts, washers:** hot dipped galvanized finish or stainless steel.

.4 **Nails, screws and staples for gypsum sheathing:** as per ASTM C954; flat head counter-sunk self-tapping screws, length 32 mm or more, as required, with hot dipped galvanized finish or stainless steel and as recommended by the manufacturer.

3.0 EXECUTION

3.1 General

.1 Do work in accordance with CSSBI 50M and CSA standards.

.2 See Section 07 10 00 and Section 07 20 00 for installation of membranes and insulation.

3.2 Erection of Stud System

.1 Erect components as per requirements of reviewed shop drawings, with adequate spacing to resist the wind loads specified or calculated.

.2 Anchor tracks securely to the structure or support, at max. 600 mm o.c. spacing, or as indicated on the shop drawings.

.3 Erect studs plumb, aligned and securely attached with not less than 2 No. 8 screws or welded at each side of flange of top and bottom tracks.

.4 Seat studs into bottom and top tracks.

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- .5 Where indicated, Install 50 mm minimum top track and double it, or install deflection track to accommodate vertical deflection. Do not fasten studs to track; leave 20 mm space for deflection or as indicated on reviewed shop drawings.
 - .6 Install a backer plate at 150 mm lower than the top of the studs, for the upper limit to fasten the gypsum boards.
 - .7 Where indicated, install joint deflection trim and/or deflection clip, to accommodate vertical deflections. Use only deflection screws recommended by manufacturer, installed as per manufacturer's instructions.
 - .8 Install studs at not more than 50 mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.
 - .9 Brace steel studs with horizontal internal bridging as required. Fasten bridging to 1.2 mm (18 ga.) steel clips fastened to steel studs with 4 No. 8 screws or by welding.
 - .10 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.
 - .11 Touch up welds with coat of zinc rich primer.
 - .12 Attach the anchors to the studs after the installation of the air/vapour barrier membrane, seal around screw penetrations (See **Section 07 10 00**).

3.3 Erection Tolerances

- .1 **Plumb:** not to exceed 1/500th of member length.
- .2 **Camber:** not to exceed 1/1000th of member length.
- .3 **Spacing:** no more than 3 mm from design spacing.
- .4 **Gap between end of stud and track web:** not more than 4 mm.

3.4 Cutouts

- .1 Provide cutouts for services as recommended by manufacturer, to maximum dimensions of 65 mm across member depth and 115 mm along member depth, and at not less than 200 mm c.c. spacing.
- .2 Limit distance from centerline of last unreinforced cutout to end of member to less than 300 mm.

3.5 Installation of Exterior gypsum sheathing board

- .1 Install sheathing according to details on drawings and as per the manufacturer's instructions.

.2 Install sheathing boards horizontally and fix at 200 mm spacing on studs and tracks, at 12.7 mm from boards edges and extremities.

.3 Adjust and abut boards against each other.

3.6 Cleaning

.1 Perform cleaning as per **Section 01 74 11**.

End of Section

1.0 GENERAL

1.1 References

- .1 This Section is to be referred to by all Architectural Sections incorporating metal items, unless otherwise indicated, for the description of basic metal materials, related products and finishes.
- .2 Materials specified below are for reference only, and do not constitute any work. They are to be referred to in case they are specified in various Sections for specific work items.
- .3 Comply with all standards in this specification, unless more stringent requirements are given herein.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 53/A 53M-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 A711 / A711M-07 Standard Specification for Steel Forging Stock
 - .4 ASTM A 269M-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .5 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .6 ASTM A 240/01A, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .5 Canadian Standards Association (CSA)
 - .1 CSA G40.20-3 G40.21-13, 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 S16-14, Design of Steel Structures
 - .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding) [Metric].
 - .6 CSA S136-07 (R2012), Commentary on North American specification for the design of cold-formed steel structural members
 - .7 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel
 - .8 CSA B651-12 - Accessible Design for the Built Environment
- .6 Green Seal Environmental Standards (GS)
 - .1 GS-11-2011, Paints and Coatings.
- .7 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.
- .8 ULC Standards
 - .1 UL 2768-(2011), Architectural Surface Coatings.

- .2 UL 2760-(2011), Surface Coatings - Recycled Water-borne.

1.2 Design Criteria

- .1 Pre-Implementation Meeting: Hold meeting to review work requirements, manufacturer's installation instructions.
- .2 Factory and site work shall be performed by qualified personnel. Any required correction work must be performed to the satisfaction of the Departmental Representative.
- .3 The equipment must fit perfectly on the site. At no time will the material be deformed to fit the materials on the site.
- .4 Test Reports: submit test reports certifying that products, materials and equipment meet the requirements for physical characteristics and performance criteria.
- .5 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the requirements for physical characteristics and performance criteria.

1.3 Action and Informational Submittals

- .1 Provide submittals in accordance with **Section 01 33 00** and the following requirements:
 - .1 **Shop drawings:** all shop drawings must indicate materials, dimensions, core thickness, finishes, joints, joints, anchoring method and number of anchors, supports, reinforcement elements, details and accessories.
 - .2 **Proof of qualifications:**
 - .1 Provide proof of qualification for the following:
 - .1 Welders: to be accredited from the Canadian Welding Bureau, in accordance to CSA W47.1 requirements.
 - .2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.
 - .3 **Product Data:**
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 33 00

1.4 Delivery and storage

- .1 Materials must be transported, stored, handled and protected in accordance with **Section 01 61 00**
- .2 Storage and protection:

- .1 The exposed surfaces of stainless steel elements must be covered with a strong self-adhesive paper or peel able plastic film prior to the shipment to the site of the elements in question.
- .2 Surfaces must be cleared of protective coating only at the time of final cleaning of the building. Provide the instructions necessary to remove these protections.

1.5 Waste Management

- .1 Separate waste materials for disposal, re-use and recycling in accordance with **Section 01 74 19**.

2.0 PRODUCTS

2.1 General

- .1 Materials shall be new, of the highest grade for purpose, clean and free from traces of machining, mill scale, flaking, rust, pitting, twists, kinks, buckles, defective edges and other defects impairing strength, durability and appearance. No material containing plugged or filled holes permitted.
- .2 Work shall be true to detail, clean, straight, with sharp profile and smooth finish surfaces.

2.2 Materials

- .1 Aluminum mouldings, profiles and plates: to CAN / CSA HA M Series, ASTM B 209M.
- .2 Steel sections and plates: to CAN / CSA-G40.21, grade 300W.
- .3 Steel Pipe: ASTM A53-/A 53M Standard Weight, Galvanized Finish.
- .4 Welding materials: to CSA W59.
- .5 Bolts and anchor bolts: in accordance with ASTM A307.
- .6 Galvanization: hot-dip galvanizing, 600 g / m² zinc layer to CAN / CSA G164.
- .7 Shop coat primer: to CAN/CGSB-1.40, latest revision, grey colour, except do not prime miscellaneous steel fabrications installed in exterior locations where an epoxy primer is required; coordinate work with **Section 09 91 00**.
- .8 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181. Use for touch-ups to galvanized items.
- .9 Striated aluminum plate (Diamond type) under the threshold of exterior pedestrian doors, meeting the composition of exterior walls with adjacent landings:
 - .1 Dimensions as indicated on the drawings by the width of the outer frame or by the longest length of the manufacturer, thickness as per drawings.
- .10 For stairs, balustrades, landings, decks, platforms, and canopy structure refer to **Section 05 51 29 - Metal stairs**.

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- .11 Stainless Steel Elements: Stainless Steel, Series 304 Finished No.4, 16 Gauge, with Removable Paper Protective Film, to Profiles Specified for Surface-Resistant Adhesive Mounting, Manufacturer Recommended Type for Each type of surface considered. Dimensions, height and location: as shown on the plans.
 - .12 Stainless steel flat head screws, nuts and bolts.
 - .13 Stainless steel wiring systems at building entrances, see **drawings** for location:
 - .1 Cable: 5mm wire rope, stainless steel grade 316
 - .2 Turnbuckle: wall mount and hand swage stud turnbuckle, closed body, for 5mm cable, stainless steel grade 316.
 - .3 Hand swage: wall mount hand swag, for 5mm cable, stainless steel, grade 316.
 - .14 Metal studs for interior partitions, refer to **Section 09 20 00 – Drywall work**.
 - .15 Exterior metal studs, refer to **Section 05 41 00 – Structural metal stud framing**.
 - .16 Metal corner protectors **CP**: 1.6 mm thick, 304 grade stainless steel, satin finished, with removable protective film made of paper, conforming to the specified profiles, for surface mounting with water-repellent adhesive, of the recommended type by the manufacturer for each type of surface considered.
 - .1 Dimensions 50X50mm
 - .2 Height : 1220mm
 - .3 Location : as shown on the plans.
 - .17 Bird screen for beneath the hood vents: Consisting of a frame of galvanized steel angles as per dimensions indicated on the **drawings** and a galvanized steel wire welded mesh with 25x25 mm openings.
 - .18 Fence underneath building and its double door: All galvanized steel, dimensions as per **drawings** and to be coordinated on site prior to fabrication. Provide robust stainless steel key lock.
 - .19 Aluminium angle for cove light, dimensions and profile as per **drawings**. Factory pre-painted, color to be confirmed by Departmental Representative
 - .20 Site fence: Layout as per **drawings**. See Civil. Provide robust stainless steel key lock.

2.3 Assemblies

- .1 Refer to **Drawings** for metal fabrication assemblies.

2.4 Fasteners

- .1 Fabricate work square, true, straight and accurate required size, with joints closely fitted and properly secured.
- .2 Screw Assemblies: Use self-tapping, screws or as indicated. Use screws for interior metal works.

Unless otherwise approved by the Departmental Representative, assemble the elements by welding in the case of external metal works.

- .3 Adjusted and assembled in shop, ready to assemble, where possible.
- .4 Exposed welds run continuously along entire length of joint, filed or ground to a smooth, even surface. Seal exterior steel structures to protect against corrosion in accordance with CAN3-S16.1-01.
- .5 All steel at outdoor installation to be galvanized after forming.

2.5 Finishes

- .1 Unless otherwise indicated, all exterior metal work will be hot-dip galvanized, 600 g / m² zinc-coated to CAN / CSA G164 and left as such.
- .2 Interior wrought metals, except stainless steel, shall be painted in accordance with **Section 09 91 00 – Painting**.
- .3 Execute preparation and anodization of aluminium elements after assembling and welding processes.

2.6 Painting applied in the workshop

- .1 Clean surfaces in accordance with Steel Structures Painting Council SSPC-SP1 and SP2. Clean surfaces to be field welded; do not paint.
- .2 Apply a coat of primer paint to all metal parts, except galvanized parts, which will be embedded in the concrete.
- .3 Apply primer paint as prepared by manufacturer, without modification. Apply to dry surfaces without rust, grease or scales. Do not apply primer paint at temperatures below 7 ° C.
- .4 Clean surfaces to be welded on site; do not paint them.

2.7 Fabrication – General

- .1 Fabricate work square, plumb, straight, accurate to required size, true to detail, clean with smooth finish surfaces, joints closely fitted and properly secured.
- .2 Fabricate items from steel unless otherwise noted, with structural qualities to withstand strain and stresses to which the items will be normally subjected, as per CSA S16.1-01.
- .3 Deburr, smooth and round off raw edges of plates and sheet material prior to forming during fabrication.
- .4 Unless otherwise directed, fit, assemble and shop-weld elements, prior to site erection.

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- .5 Custom made items must be shop-assembled, in sections as long and as complete as possible.
 - .6 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated. Countersink exposed fastenings, cut off bolts flush with nuts.
 - .7 Use hot dipped galvanized fasteners and anchors for galvanized items.
 - .8 Use stainless steel fasteners and anchors for stainless steel and aluminum items.
 - .9 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush, fill with metallic paste and sand to uniform smooth finish.

3.0 EXECUTION

3.1 General

- .1 Do work in accordance with CSSBI 50M and CSA standards.
- .2 For fabrication and installation of structural elements, see **Structural Sections of Divisions 03 and 05**.
- .3 See **Mechanical** and **Electrical** for penetrations and other interferences.
- .4 See relevant Sections for the fabrication of supporting elements for the products of these Sections.
- .5 For installation of access doors and panels see **Section 08 31 00**.

3.2 Preparation

- .1 Ensure that all measurements on shop drawings correspond to dimensions on plans and details, including tolerances. Report any discrepancies to the Departmental Representative, and make sure that all inconsistencies are resolved prior to fabrication.
- .2 Take accurate field measurements prior to installation and immediately report any discrepancies to the Departmental Representative.
- .3 When taking field measurements, allow for trimming and fitting for site adjustment.

3.3 Erection

- .1 Erect metalwork as indicated, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .2 All welding as per CSA W47.1 and W47.2.
- .3 Clean surfaces to be welded in place; prime and paint only after welding work complete.
- .4 Assemble elements with precision, using welded connections wherever possible to provide rigidity.

Weld on clean, dry, unpainted surfaces. Make joints tight, with flush faces. All exposed welds to be cleanly ground, sanded and smoothed down to adjoining surfaces. Comply with CWB and AWS requirements.

- .5 Make welds continuous for entire length of joint in stainless steel assemblies. Ensure welded joints are clean, without stains, and of the same appearance as the adjoining surfaces.
- .6 Provide the proper anchor bolts, bolts and plates acceptable to Departmental Representative, and as per CSA S16 to anchor items to substrates or structure.
- .7 Exposed fasteners must match finish and be compatible with elements attached.
- .8 Provide miscellaneous metal items required to properly build and secure the work of this or other Sections.
- .9 Do not weld or torch cut items in the field without the Departmental Representative's approval.
- .10 Hand items over for casting into concrete to appropriate trades together with setting templates.
- .11 Provide adequate separation with bituminous paint or otherwise between incompatible materials to avoid electrolytic reaction.
- .12 Install manufactured items according to the manufacturers' instructions.
- .13 Make sure exposed raw edges of plates and sheet material are deburred, smoothed and rounded off prior to installation.
- .14 After completion of installation, touch up primed surfaces, rivets, bolts, burned or scratched surfaces and field welds with spot primer. Touch up galvanized surfaces with zinc-rich spot primer.
- .15 Install panels and other elements in stainless steel or aluminum by means of countersunk, self-tapping stainless steel fasteners and/or adhesive, as indicated.
- .16 Seal joints around stainless steel or other items as indicated.
- .17 Remove fabrication lubricants from galvanized surfaces prior to installation.

3.4 Cleaning

- .1 Perform cleaning as per **Section 01 74 11**.
- .2 Clean work areas of debris, traces of metals and welding materials.
- .3 Leave surfaces clean and free of grease and foreign matter.

End of Section

1.0 GENERAL

1.1 References

- .1 See **Section 05 50 00** for basic metal materials.
- .2 Comply with all standards in this specification, unless more stringent requirements are given herein.
- .3 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
 - .1 ANSI/NAAMM MBG531-15, Metal Bar Grating Manual.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 53/A 53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .3 ASTM F 3125/F 3125M-[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.
- .5 Canadian Standards Association (CSA)
 - .1 CSA G40.20-3 G40.21-13, 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 CAN/CGSB-1.181, Zinc primer: zinc rich, ready mix to.
 - .4 CAN/CGSB-1.40, Shop coat primer: to
 - .5 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .6 csa w59-13, welded steel construction (metal arc welding) [metric].
 - .7 csa b651-12 - accessible design for the built environment
- .6 National Association of Architectural Metal Manufactures (NAAMM)
 - .1 AMP 510-92, Metal stair manual.
- .7 Green Seal Environmental Standards (GS)
 - .1 GS-11-2011, Paints and Coatings.
- .8 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.
- .9 The Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications Manual, Volume 2, 2014 Edition.

- .10 ULC Standards
 - .1 UL 2768-(2011), Architectural Surface Coatings.
 - .2 UL 2760-(2011), Surface Coatings - Recycled Water-borne.

1.2 Design Criteria

- .1 Design stairs, balustrades and connections to NBC and CSA-B651-12 vertical and horizontal live loads requirements.
- .2 Also meet other requirements of NBC and CSA-B651-12 regarding railings or balustrades.
- .3 Detail and fabricate stairs and balustrades as per NAAMM Metal Stairs Manual, latest edition.
- .4 Design to sanitary conditions with no surfaces or areas where debris and bacteria can accumulate.

1.3 Action and Informational Submittals

- .1 Provide submittals in accordance with **Section 01 33 00**, the table of submittals and the following requirements:
 - .1 **Shop drawings:** all shop drawings for stairs, balustrades, landings, decks, platforms, and canopy structure, supporting elements or reinforcements for openings and other supporting systems shall be signed and stamped by a professional engineer responsible for structural engineering calculations and technical studies, and who must be a member in good standing of the Northwest Territories and Nunavut Association of professional Engineers and Geoscientists (NAPEG); include such calculations.
 - .2 **Proof of qualifications:**
 - .1 Provide proof of qualification for the following:
 - .1 Welders: to be accredited from the Canadian Welding Bureau, in accordance to CSA W47.1 requirements.
 - .2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

1.4 Waste Management

- .1 Separate waste materials for disposal, re-use and recycling in accordance with **Section 01 74 19**.

2.0 PRODUCTS

2.1 General

- .1 Materials shall be new, of the highest grade for purpose, clean and free from traces of machining, mill scale, flaking, rust, pitting, twists, kinks, buckles, defective edges and other defects impairing strength, durability and appearance. No material containing plugged or filled holes permitted.
- .2 Work shall be true to detail, clean, straight, with sharp profile and smooth finish surfaces.

2.2 Materials

- .1 Steel sections: to CAN / CSA-G40.21, grade 300W.
- .2 Steel plates: to CAN / CSA-G40.21, grade 260W.
- .3 Steel tubing: to CSA G40.20/G40.21, grade 260W, square, rectangular, round, mm wall thickness, sizes and dimensions as indicated.
- .4 Welding materials: to CSA W59.
- .5 Bolts and anchor bolts: in accordance with ASTM A307.
- .6 High strength bolts: to ASTM A F3125/F3125M.
- .7 Galvanization: hot-dip galvanizing, 600 g / m² zinc layer to CAN / CSA G164.
- .8 Shop coat primer: to CAN/CGSB-1.40, latest revision, grey colour, except do not prime miscellaneous steel fabrications installed in exterior locations where an epoxy primer is required; coordinate work with **Section 09 91 00 - Painting**.
- .9 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181. Use for touch-ups to galvanized items.
- .10 Interior stairs: All interior metal stairs components, including stringers, stair tread, risers, landings, plates, angles, channels, columns, handrails and guardrails as per **Architecture drawings**.
- .11 Interior stair nosing: cast aluminium anti-slip stair nosing for metal pan as per **Architecture drawings**.
- .12 Exterior stairs, ramps, platforms and terraces: Stair treads, handrails and guardrails as per **Architecture drawings**. All other elements as per **Structure Drawings** (including stringers, platforms, terraces, ramps, gratings and landings). All exterior steel is galvanized.
- .13 Exterior anti-skid grating stair threads: prefabricated step made of welded galvanized steel grating 19 mm thick with non-slip checker plate step nosing. Dimensions as per **Architecture drawings**. See **09 91 00 Painting** for painted contrasting color strip at stair nosing.
- .14 For access doors, panels, hatches and ladders, refer to **Section 08 31 00 – Access doors and panels**.
- .15 For concrete refer to **Structure Division 03**.

2.3 Assemblies

- .1 Refer to **Drawings** for metal fabrication assemblies.

2.4 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 Galvanized steel exterior stairs, ramps, platforms and terraces: Bolt assemblies for all connections made on site. Plan for no or minimum welding on site.
- .4 Accurately form connections with exposed faces flush:
 - .1 Make mitres and joints tight.
 - .2 Make risers of equal height.
- .5 Grind or file exposed welds and steel sections smooth.
- .6 Shop fabricate stairs in sections as large and complete as practicable.

2.5 Stairs and steps made of steel pans and plates

- .1 The treads and bearings shall be made of strong steel plate, of the thickness and profile shown in the drawings and shall be attached to the stringers and supports as indicated. The bearings must be reinforced as needed.

2.6 Handrails

- .1 Construct handrails from diameter steel tubing as indicated on drawings, 3.25 mm minimum wall thickness.
- .2 Fabricate handrails according to details. The handrails shall withstand the highest of the following loads: a uniform load of 0.7 kN applied in any direction or a concentrated load of not less than 0.9 kN applied to any point and in any direction any direction.
- .3 Close ends of steel tubes forming handrails.
- .4 Cap and weld exposed ends of balusters, guardrails and handrails.

2.7 Finishes

- .1 **Basic metal finishes:** see Section 05 50 00.
- .2 **Painting and coatings:** see Sections 09 91 00
- .3 Execute preparation and anodization of aluminium elements after assembling and welding processes.

2.8 Painting applied in the workshop

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- .1 Clean surfaces in accordance with Steel Structures Painting Council SSPC-SP1 and SP2. Clean surfaces to be field welded; do not paint.
 - .2 Apply a coat of primer paint to all metal parts, except galvanized parts, which will be embedded in the concrete.
 - .3 Apply primer paint as prepared by manufacturer, without modification. Apply to dry surfaces without rust, grease or scales. Do not apply primer paint at temperatures below 7 ° C.
 - .4 Clean surfaces to be welded on site; do not paint them.

3.0 EXECUTION

3.1 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 to appropriate trades together with setting templates.
- .4 Plan and install continuous nailing bases for handrails and wall fixed guardrails.
- .5 Coordinate the work of the handrails with those of the manufacture of interior stairs.
- .6 Ensure that the parts match and fit perfectly to the support.
- .7 Do welding work in accordance with CSA W59 unless specified otherwise.
- .8 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

3.2 Cleaning

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

3.3 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