

Part 1 General**1.1 RELATED SECTIONS**

- .1 Division 01 - General Requirements.
- .2 Section 04 05 00 - Common Work Results for Masonry.
- .3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .5 Section 09 91 13 - Exterior Painting.
- .6 Section 09 91 23 - Interior Painting.

1.2 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
 - .1 ANSI/NAAMM MBG 531-09, Metal Bar Grating Manual.
 - .2 NAAM AMP-510- Metal Stairs Manual.
- .3 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A123M-12, Standard Specification for Zinc Hot Dip Galvanized Coatings on Iron and Steel Products.
 - .3 ASTM A269-10, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .4 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .5 ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength.
 - .6 ASTM B209M-10, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .7 ASTM B210M-12, Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
 - .8 ASTM B211M-12e1, Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod and Wire.
 - .9 ASTM F593-02(2008)e1, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

- .4 American Welding Society, (AWS)
 - .1 AWS – A5.10/A5,10M-2012 (ISO 18273), Wire Electrodes, Wires and Rods for Welding of Aluminum and Aluminum Alloys.
- .5 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-S157/S157.1-05(R2010), Strength Design in Aluminum/Commentary on CAN/CSA-S157, Strength Design in Aluminum
 - .3 CAN/CSA-S16-09, Design of Steel Structures.
 - .4 CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum.
 - .5 CSA W48-06(R2011), Filler Metals and Allied Materials for Metal Arc Welding.
 - .6 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding).
 - .7 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
- .6 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
 - .1 CISC/CPMA 1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA 2-75, Quick-Drying, Primer for Use on Structural Steel.
- .7 The Environmental Choice Program
 - .1 CCD-047a-98, Paints, Surface Coatings.
 - .2 CCD-048-98, Surface Coatings - Recycled Water-borne.
- .8 Master Painters Institute (MPI)
 - .1 MPI – EXT 5.5D, Bituminous Finish.
- .9 National Association of Architectural Metal Manufactures (NAAMM)
 - .1 AMP 510-92, Metal Stair Manual.
- .10 Steel Structures Painting Council (SSPC),
 - .1 Systems and Specifications Manual, Volume 2.

1.3 METAL STAIRS SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design metal stair, balustrade and landing construction and connections to NBC 2010 vertical and horizontal live load requirements. Provide shop drawings that have been prepared, signed, and sealed by Structural Engineer, registered in the Province of Ontario.
 - .2 Detail and fabricate stairs to NAAMM Metal Stairs Manual.
 - .3 Design such that no field welding is required; bolted connections in field permitted only.

- .4 Design such that stairs, balustrade and landings be demountable for easy removal and re-installation.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 00 10 – General Instructions and include characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets - Safety Requirements. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.
 - .2 Submit shop drawings stamped and signed by a qualified professional engineer registered or licensed in Ontario, Canada.
 - .3 Submit shop drawings to include fabrication and erection drawings consisting of connection and design details, erection diagrams, erection procedures and material lists.
 - .4 Indicate cuts, copes, materials, core thicknesses, finishes, connections, holes, threaded fasteners, rivets, welds, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories. Indicate welds using welding symbols as shown in Appendix A of CSA W59.2.

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.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading: Deliver, store, handle and protect materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 00 10 – General Instructions.

- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum bar, rod, wire: to ASTM B211M.
- .2 Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Shapes and Tubes: to ASTM B221M.
- .3 Aluminum sheet or plate: to ASTM B209M.
- .4 Aluminum sheet: plain, 0.9 mm (20ga) minimum thickness, factory paint finish to match enclosure.
- .5 Aluminum drawn tubes: to ASTM B210M.
- .6 Aluminum bolts and rivets: to ASTM B316M.
- .7 Aluminum welding wire: to ASTM B316M.
- .8 Aluminum welding wire: to AWS – A5.10/A5.10M.
- .9 Stainless Steel bolts: to ASTM F593.
- .10 Metal bar grating: to ANSI/NAAMM MBG 531, Slip Resistant Aluminum, Type 19-SI-4, with checkered plate nosings.
- .11 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .12 Steel pipe: to ASTM A53/A53M Schedule 40.
- .13 Steel Welding materials: to CSA W59.
- .14 Welding electrodes: to CSA W48 Series.
- .15 High Strength Bolts: to ASTM A325M.
- .16 Bolts and anchor bolts: to ASTM A307-00.
- .17 Stainless steel tubing: to ASTM A269, Type 304 No. 4 finish Interior use only.
- .18 Grout: non-shrink, non-metallic, flowable, 15MPa at 24 hours.
- .19 Bituminous paint: MPI-EXT 5.5D, without thinner.
- .20 Galvanizing: hot dip galvanize steel bolts to CAN/CSA-G164, minimum zinc coating of 600 g/m².

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Ensure anodizing layer is maintained if fabrication method erodes anodizing layer, area affected is to be re-anodized.
- .6 Fabricate aluminum fabrications to CAN/CSA-S157 and in accordance with reviewed shop drawings.
- .7 Dull all exposed metal edges, no sharp edges will be deemed acceptable.

2.3 FABRICATION OF METAL STAIRS

- .1 Fabricate to NAAMM, Metal Stair Manual.
- .2 Refer to drawings for Stair construction and details.
- .3 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.
- .4 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.
- .5 Close ends of stringers where exposed.
- .6 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.
- .7 Grind or file exposed welds and aluminum sections smooth.
- .8 Shop fabricate stairs in sections as large and complete as practicable.
- .9 Dull all exposed metal edges, no sharp edges will be deemed acceptable.

2.4 STAIR NOSINGS

- .1 Metal stair nosing: provide stair nosing with anti-slip surface of aluminum checkered plate. Provide integrally to top of stair nosing.
- .2 Nosing to be full width of stairs less 6mm from either end of edge of tread.
- .3 Nosing shall be furnished with wing anchors, bolts and nuts or concealed cast anchors.
- .4 Finishes: All purpose usage stair nosing shall be provided with one coat shop applied yellow coat.

2.5 PIPE/TUBING BALUSTRADES

- .1 Refer to drawings for pipe/tubing balustrades and details.
- .2 Construct balusters and handrails from aluminum tubing as indicated.

- .3 Cap and weld exposed ends of balusters and handrails.
- .4 Terminate balustrade a minimum of 50mm from abutting walls and cap hollow end sections.

2.6 FINISHES

- .1 Reference: Section 09 91 13-Exterior Painting for finish coat to landings, stair treads, balustrade, pipe rails, stringers etc.
- .2 Galvanizing: hot dipped galvanizing with zinc coating 600g/m^2 to CAN/CSA-G164.
- .3 Shop coat primer: to CAN/CGSB-1.40.
- .4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .5 Finish exposed surfaces of aluminum components to Aluminum Association (AA) Designation System for Aluminum Finishes.
 - .1 Clear Anodic finish: designation A A31.
 - .2 Coloured Anodic finish: designation A A33.

2.7 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 Isolation coatings:
 - .1 Alkali resistant bituminous paint or zinc chromate prime coating

2.8 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized, concrete encased or anodized aluminium 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.

2.9 PIPE RAILINGS

- .1 Pipe: sized as indicated nominal outside diameter, formed to shapes and sizes as indicated.
- .2 Finish of exterior pipe railings to be clear anodized aluminium, brush finish.

2.10 ADDITIONAL METAL FABRICATION

- .1 Additional Metal Fabrication to be coordinated with Departmental Representative for locations, material and finishes. Items to be considered, but not limited to:
 - .1 Flashing with 'V' groove: Finish: shop paint to match enclosure.
 - .2 -Exterior Corner guards- Finish: Hot Dipped Galvanized after fabrication.
 - .3 -Exterior Handrails and Guardrails- Finish: Clear Anodized Aluminum, brushed finish
 - .4 -Grating for Exterior Landings- Finish: Clear Anodized Aluminum, brushed finish.
 - .5 -Stair Nosing and Exterior Landing area as indicated on drawings- Finish: Colour Yellow, Anodized Aluminum, brushed finish.
 - .6 -Exterior Aluminum Supports, for Exterior Landings, and Exterior Stairs- Finish: Clear Anodized Aluminum, Brushed Finish.
 - .7 -Exterior gutters and downspouts- Finish: Shop paint to match enclosure.

Part 3 Execution**3.1 ERECTION**

- .1 Do steel welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect structural aluminum as indicated and to CAN/CSA-S157 and reviewed erection drawings.
- .3 Field cutting or altering structural members: to approval of Departmental Representative.
- .4 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .5 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .6 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .7 Provide components for building by other sections in accordance with shop drawings and schedule.
- .8 Make field connections with bolts.
- .9 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .10 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .11 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

- .12 Touch-up damaged aluminum surfaces with one coat of zinc chromate primer followed by one coat of compatible paint

3.2 PIPE RAILINGS

- .1 Install pipe railings to stairs as indicated on drawings.
- .2 Railing standards to be fastened to concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.
- .3 Exterior work: Anodized Aluminium Finish

3.3 METAL STAIRS

- .1 Install stairs in accordance with NAAMM, Metal Stair Manual.
- .2 Do structural aluminum work: to CAN/CSA-S157.
- .3 Do aluminum welding in accordance with CSA W59.2.
- .4 Companies to be certified under Division 1 or 2.1 of CSA W47.2 for fusion welding of aluminum and or CSA W55.3 for resistance welding of structural components.
- .5 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure; do not field weld. Provide anchor bolts, bolts and plates for connecting stairs to structure.
- .6 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

3.4 JOINT SEALING AND PAINTING

- .1 Surface preparation of aluminum in contact with or embedded in dissimilar materials: to CAN/CSA-S157. Treat locations as there is moisture present.
- .2 Paint to CAN/CSA-S157

3.5 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