

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 06 40 00 – Architectural Woodwork
- .2 Section 09 01 90.63 – Interior Repainting
- .3 Section 09 91 23 – Interior Painting
- .4 Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment
- .5 Section 26 05 29 - Hangers and Supports for Electrical Systems and Seismic Restraint Systems

1.2 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A53/A53M-18, 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 A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - .4 ASTM F3125/F3125M-18 - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .2 CSA Group (CSA)
 - .1 CAN/CSA B651-18, Accessible Design for the Built Environment
 - .2 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
 - .3 CAN/CSA G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA S16-14, Design of Steel Structures.
 - .5 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .6 CSA W59-18, Welded Steel Construction (Metal Arc Welding).
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, bolts, tubing pipe, and handrails and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS SDS 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 stamped and signed by professional engineer registered or licensed in the Province of Ontario, Canada.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .3 Submit drawings for the following items.
 - .1 Huddle canopy assembly. Coordinate with Section 06 40 00 for sizing and spacing of hardwood slats.
 - .2 Smart Board Stand.
 - .3 Supports for mechanical and electrical equipment
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Construction Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating 75% of construction wastes recycled or salvaged.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages of recycled content materials and products, showing their costs and percentages of post-industrial post-consumer content, and total cost of materials for project.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restrictions requirements.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Site review and Post-Installation Certification: Professional Engineer who stamped shop drawings shall provide periodic site review and reports and signed and stamped certification that the work of this Section has been performed in conformance with shop drawings.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 19 – Waste Management and Disposal.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of crates, padding, pallets, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 – Waste Management and Disposal.

Part 2 Products**2.1 MATERIALS**

- .1 Steel sections and plates:
 - .1 HSS (Tube) Sections: to CSA G40.21, Grade 350W.
 - .2 Angles: to CSA G40.21, Grade 300W.
 - .3 Plates: to CSA G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, double extra strong or extra strong, black finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48.
- .5 Bolts and anchor bolts: to ASTM A325.
- .6 Stainless steel tubing: to ASTM A269/A269M.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- .8 Post installed concrete anchors:
 - .1 12.7mm Ø expansion anchors to have minimum factored resistance of 15.6kN in tension and 34kN in shear.
 - .2 9.5mm Ø expansion anchors to have minimum factored resistance of 10.0kN in tension and 26.4kN in shear.
 - .3 Submit product information with technical data for expansion anchors for approval by departmental representative.

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, round, flat, and oval headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA G164.
- .2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
- .3 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of MPI 107, E3 or E2.
- .4 Zinc primer: zinc rich, ready mix to MPI 18, E3, in accordance with chemical component limits and restrictions requirements and VOC limits.

2.4 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.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer, as prepared by manufacturer (un-modified/undiluted). Paint on dry surfaces, free from rust, scale, grease. Paint when temperature minimum 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

2.6 PIPE RAILINGS

- .1 Steel pipe, prefinished matte black (622). Sized to comply with CAN/CSA B651.
- .2 Design railings to resist concentrated load not less than 0.9 kN applied at any point and in any direction and a uniform load not less than 0.7 kN/m applied in any direction, as per NBC 2015

2.7 CORNER GUARDS

- .1 Steel corner guards: 2 mm thick, 50 x 50 mm by 2135 mm, type prefinished 622 black matte, with removable protective paper cover, surface mounted with adhesive, and mechanically fastened.

- .2 Fasteners: self-tapping stainless steel, concealed mounting.
- .3 Adhesive: water resistant type as recommended by manufacturer for substrate.

2.8 SQUARE SECTIONS AND ANGLE FRAMES FOR SMART BOARD MONITOR STAND

- .1 Fabricate frames from steel, sizes of square sections and angles as indicated in structural drawings.
- .2 Weld sections together to form continuous frame for Monitor support framework, sizes as indicated.

Finish: prime coat. Finish paint to Section 09 91 23 – Interior Painting

2.9 SQUARE SECTIONS AND ANGLE FRAMES FOR HUDDLE CANOPY FRAMING

- .1 Fabricate frames from steel, sizes of square sections and rounded square sections as indicated in structural drawings.
- .2 Weld sections together to form continuous framework, sizes as indicated. Coordinate sizes and spacings with hardwood slats and architectural drawing dimensions.
- .3 Finish: prime coat. Finish paint to Section 09 91 23 – Interior Painting

2.10 TOILET COMPARTMENT SUPPORT

- .1 Attachment angle: L100 x 100 x 8 steel angle x overall length of toilet partitions with pre-drilled holes to receive partition bolts:
 - .1 Weld or bolt to partition brace.
 - .2 Secure to structure above.
 - .3 Provide expansion bolts as required to complete bracing installation
- .2 Provide bracing as required to resist lateral loads in accordance with the 2015 NBC

2.11 ADULT CHANGE TABLE SUPPORT

- .1 Provide attachment angles and profiles to support required design loads provided by adult change table manufacturer for wall mounted folding adult change table. See section 10 28 00 Toilet and Bath Accessories.

2.12 WALL REINFORCEMENT FOR STONE COUNTERS

- .1 Provide base mounted steel frame structural support within metal stud wall assembly to support stone counters to resist design concentrated loads of 120 kilos applied anywhere along the counter.

2.13 MISCELLANEOUS ROUGH HARDWARE AND FABRICATIONS

- .1 Supply anchor bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeves, brackets and other similar items where required or called for on drawings, for work in this Section

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for metal fabrications 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 remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 ERECTION - GENERAL

- .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 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 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16, Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
 - .1 Primer: maximum VOC limit 100 g/L (MPI 107 E3 or E2 primers). Request permission from Departmental Representative / Consultant to use primer with higher VOC content in case of high corrosion possibility.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 300 g/L (MPI 18 or 19: E3 or E2 Zinc-rich Primers).
- .10 Refer to Section 09 91 23 – Interior Painting and Section 09 01 90.63 – Interior Repainting for surfaces to receive full-primer coats.

3.4 PIPE RAILINGS

- .1 Install pipe railings to walls and stairs with brackets and support as indicated. Conceal fasteners with matching finished flanges.
- .2 Set railing standards in cementitious floor topping at landings and mechanically fasten to landing and slab. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.

3.5 CORNER GUARDS

- .1 Install corner guards in locations as indicated.
- .2 Install units on solid backing and erect with materials and components straight, tight and in alignment.
- .3 Mechanically fasten at 200 mm on centre corner guards as indicated. Provide additional anchorage at corner guards with continuous adhesive application.

3.6 FRAMES FOR SMART BOARD STAND

- .1 Install steel sections and frames for Smart Board Stand as indicated.

3.7 FRAMES FOR SMART BOARD STAND

- .1 Install steel sections and frames for Smart Board Stand as indicated in engineered shop drawings.

3.8 SQUARE SECTIONS AND ANGLE FRAMES FOR HUDDLE CANOPY FRAMING

- .1 Install steel square sections and frames for Huddle Canopy Framing as indicated in engineered shop drawings.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Instructions, “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 00 10 – General Instructions, “Cleaning”.
- .3 Waste Management: separate waste materials for recycling reuse in accordance with Section 01 74 19 – Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.10 PROTECTION

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

3.11 POST INSTALLED CONCRETE ANCHORS

- .1 Install anchors in strict accordance with manufacturer's instructions.
- .2 Install anchors in accordance with edge distances and spacings listed on drawings.
- .3 Install anchors perpendicular to concrete face. anchors installed at angle larger than manufacturer's allowable tolerance will be rejected and remedial work will be done at contractors' cost.

END OF SECTION