

PART 1 - GENERAL

1.1.. GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Section 03 30 00: Cast-in-Place Concrete.
- .2 Section 06 40 00: Architectural Woodwork.
- .3 Section 09 91 00: Painting.
- .4 Section 12 35 53.13: Steel Laboratory Casework.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16-09, Design of Steel Structures.
 - .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
 - .5 CSA W47.1-09(R2014), Certification for Companies for Fusion Welding of Steel.
 - .6 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A325M-13, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric)
 - .2 ASTM A563-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .3 ASTM F436-11, Standard Specification for Hardened Steel Washers.
- .3 Canadian General Standards Board (CAN/CGSB)
 - .1 CAN/CGSB-1.40, Anti-Corrosive Structural Steel, Alkyd Primer.
 - .2 CAN/CGSB-1.108, Bituminous Solvent Type Paint.
 - .3 CAN/CGSB-1.181, Ready-Mixed, Organic Zinc-Rich Coating.
- .4 Canadian Institute of Steel Construction (CISC)/ Canadian Paint Manufacturer's Association (CPMA)
 - .1 CISC/CPMA-2-75,1975, Quick Drying Primer for Use of Structural Steel.
- .5 CCD – 0472, Paints, Surface Coatings. The Environmental Choice Program.

1.4 QUALITY ASSURANCE

- .1 Qualifications of Welders: Welding of any stair, ladder, railing component and other steel assemblies shall be performed by fabricator certified under CSA W47.1.

1.5 SUBMITTALS

- .1 Submit shop drawings of all metal fabrications required in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate construction details, sizes of steel sections, thickness of materials, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.
- .3 Shop drawings for structural assemblies, stairs, handrails, guardrails and railings, ladders and other items listed in this Section shall bear stamp and signature of a professional engineer registered or licensed to practice in the province of Nova Scotia.
- .4 Reports:
 - .1 Mill test reports: submit three certified copies of mill test reports covering chemical and physical properties of steel used in this work. Mill test reports to be certified by qualified metallurgists confirming that tests conform to requirements of CAN/CSA-G40.20 and CAN/CSA G40.21.
 - .2 Weld inspection report: as described in Sentence 3.5 of this Section.

1.6 WORK SUPPLIED BUT NOT INSTALLED

- .1 Supply following items for installation under other Sections of work: Anchor bolts, bearing plates, sleeves and other inserts to be built into concrete and masonry elements and required for anchorage and support of metal fabrications.
- .2 Supply other Sections with instructions, and if required, templates, necessary for accurate setting of insets and components.

1.7 DELIVERY STORAGE AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Deliver, store, handle and protect components to prevent damage, warping, corrosion, permanent distortion of members or chipping and scraping of the paint coat.
- .3 Storage and Protection:
 - .1 Store materials off ground, indoors in dry location and in clean, well-ventilated area.
 - .2 Store and protect stairs and ladders from nicks, scratches and blemishes.
 - .3 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .4 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Comply with CAN/CSA-S16. Provide new materials free from defects impairing strength or durability.
- .2 Steel shapes, channels, plates and angles shall conform to CSA-G40.21 - 300W unless otherwise directed. HSS Sections shall be CSA-G40.21 - 350W, Class C or ASTM A500 Grade C.
- .3 Sheet steel: hot dip galvanized, cold rolled, with stretcher level degree of flatness to ASTM A526, zinc coating designation Z275.
- .4 Steel pipe: to ASTM A53/A53M ($F_y = 241$ MPa), standard weight, prime painted finish.
- .5 Steel tubing: to CAN/CSA-G40.21 or ASTM A500 shapes, sizes and dimensions, as indicated.
- .6 Floor plate: CSA G40.20/G40.21, Grade 300W, pattern: checkered, to sizes as indicated.
- .7 Steel pipe: to ASTM A53/A53M, standard weight, schedule 40 seamless black.
- .8 Bolts and anchor bolts: to ASTM A307.
- .9 Structural bolts: High strength to ASTM A325M. Bolts shall be identifiable by their head markings. Provide galvanized bolts, nuts and washers for steel in unheated locations.
- .10 Welding Materials: to CSA-W59.
- .11 Shop paint primer: to CISC/CPMA 2-75.
- .12 Welding electrodes: E49XX.

2.1 MATERIAL (continued)

- .13 Threaded rods for embedment into concrete with epoxy adhesive: CAN/CSA-G40.21, 300W, sized as shown on drawings complete with nuts and circular washers.

2.2 FABRICATION

- .1 Fabricate structural steel as indicated to CSA S16 and in accordance with reviewed shop drawings.
- .2 Do welding to CSA W59.
- .3 Fabricate components in the shop in largest size practicable to minimize field jointing.
- .4 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Accurately cut, machine file and fit joints, corners, copes and mitres.
- .5 Where possible, fit and shop assemble work, ready for erection.
- .6 Reinforce fabricated components to safely withstand expected loads.
- .7 Make joints in built-up sections with hairline joints in least conspicuous locations and manner.
- .8 Make allowance for thermal expansion and contraction when fabricating exterior work.
- .9 Joints shall be welded unless otherwise indicated and unless details of construction do not permit welding. Exposed welds shall be continuous and shall be ground smooth.
- .10 Close exposed open ends of tubular members with welded on steel plugs.
- .11 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes, as required to facilitate installation of such other work.
- .12 Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation by: drilling, countersinking and tapping holes, forming shapes and cutting to required sizes.
- .13 Grind off mill stampings and fill recessed markings on steel components left exposed to view.
- .14 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .15 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush. Seal exterior steel fabrications to provide corrosion protection to CAN/CSA-S16.1.

2.3 CONNECTIONS

- .1 Design connections to conform to CAN/CSA-S16.
- .2 In general, make shop and field connections with high tensile structural bolts (A325) or by welding.

2.4 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: to CISC/CPMA 2-75.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181, in accordance with chemical component limits and requirements and VOC limits of GS-11.
- .4 Bituminous paint: to CAN/CGSB-1.108, in accordance with chemical component limits and requirements and VOC limits of GS-11.

2.5 SHOP PAINTING

- .1 Primer: VOC limit g/L maximum to GS-11.
- .2 Thoroughly clean steel of loose scale, rust, oil, dirt and other foreign matter. Suitably prepare steel surfaces by shot blasting and shop prime to CSA S16 in preparation to receive specified finishes. Grind smooth sharp projections.
- .3 Remove oil and grease by solvent cleaning.
- .4 Clean surfaces to be field welded; do not paint.
- .5 Visual review of shop welding shall be carried out prior to shop painting.
- .6 Shop apply one coat of primer to components after fabrication except where galvanized, encased in concrete or zinc rich paint finish is required.
- .7 Use primer unadulterated, as prepared by manufacturer. Paint on dry, clean surfaces. Do not paint when temperature is lower than 7°C.
- .8 Apply coat of bituminous enamel to contact surfaces of metal components in contact with cementitious materials and dissimilar metals.
- .9 Apply coatings in the shop and before assembly. Where size permits, galvanize components after assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Before commencing work, make a thorough examination of other work upon which the miscellaneous metal work is dependent.

3.1 EXAMINATION (continued)

- .2 Field verify and coordinate all dimensions and elevations in the field at time of construction. Contractor to verify all dimensions and report any discrepancies to the Departmental Representative before proceeding with the work.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Companies to be certified to Division 1 or 2 of CSA W47.1 for fusion welding, CSA W55.3 for resistance welding for structural assemblies. Provide certification that all welded joints are certified by Canadian Welding Bureau.
- .3 Erect and install components square, plumb, straight, and true, accurately fitted, with tight joints and intersections. Drill, cut and fit as necessary to attach this work to adjoining work.
- .4 Provide temporary supports and bracing required to position components until they are permanently anchored in place.
- .5 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles. Securely anchor components in place; unless otherwise indicated, anchor components as follows:
 - .1 To concrete and solid masonry with expansion type anchor bolts.
 - .2 To hollow construction with toggle bolts.
 - .3 To thin metal with screws or bolts.
 - .4 To thick metal with bolts or by welding.
 - .5 To wood with bolts or lag screws.
 - .6 Fill space between railing members and sleeves with non-shrink grout.
- .6 Provide all components required for anchoring. Make anchoring in concealed manner wherever possible. Make exposed fastenings, where approved by Departmental Representative, neatly and of same material, colour, texture and finish as base metal on which they occur. Keep exposed fastenings evenly spaced. Exposed fastening devices to match finish and be compatible with material through which they pass.
- .7 Make field connections with bolts to CAN/CSA-S16, or weld.
- .8 Provide components for building-in by other sections in accordance with shop drawings and schedule.
- .9 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .10 Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or be isolated by other means as approved by Departmental Representative.

3.2 ERECTION (continued)

- .11 After installation, clean and refinish damaged finishes, welds, bolt heads and nuts. Touch-up field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .12 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.3 STEEL PLATE COUNTERTOP

- .1 Steel plate countertop: 10 mm. bent steel plate countertop and integral backsplash as shown on drawings and details.
- .2 Finish: Prime and paint underside of countertop and backsplash only.
- .3 Install steel plate countertop and back splash on heavy-duty welded table frame as shown on drawings and details. Heavy-duty welded table frame provided by Section 12 53 35.13 – Steel Laboratory Casework.
 - .1 Provide all miscellaneous steel angles and shapes shown on drawings and details for securing steel plate countertop to heavy duty welded table frame.
- .4 Install steel plate countertop and back splash in a single plane, true and level to 1 mm. in 3 m., end abutting adjacent countertop at a hairline joint with no raised edges.

3.4 INSTALLATION OF REINFORCING STEEL/ANCHOR RODS USING ADHESIVE ANCHOR SYSTEM

- .1 Install reinforcing steel/anchor rods using adhesive anchor system in concrete at locations noted or shown on structural drawings and/or as required to complete the work. Installations shall be in strict accordance with the manufacturer's written instructions.

3.5 INSPECTION AND TESTING

- .1 Conduct visual inspection on all welding as outlined in Clauses 7 and 11 of CSA W59. Submit written inspection report to Departmental Representative as described in Article 1.5 of this Section.

3.6 SCHEDULE OF COMPONENTS

- .1 The work described in this Section consists of the supply and installation for miscellaneous metal fabrication, assembling, erection, prime painting and touch-up painting of the following items:
 - .1 Provide components made of steel unless otherwise indicated.
 - .2 Provide reinforcing steel/anchor rods with adhesive anchor system in concrete where shown on structural drawings.
 - .3 Provide and install bent steel plate countertop in Maintenance Workshop (A124).
 - .4 Provide bollards where shown on drawings.
 - .5 Miscellaneous steel angles, channels, plates, lintels indicated on drawings. But not included on structural drawings or not specifically covered in other sections.
 - .6 All other metal fabrications shown on drawings and not specifically covered in other Sections.

3.7 PAINTING

- .1 Prepare surfaces and finish paint after installation of miscellaneous steel items in accordance with Section 09 91 00 - Painting.

3.8 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.

3.9 PROTECTION

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

END OF SECTION