

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 05 50 00 - Metal Fabrications.

1.2 **REFERENCES**

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-S16, Limit States Design of Steel Structures.
 - .3 CAN/CSA-S136, Cold Formed Steel Structural Members.
 - .4 CSA-S136.1, Commentary on CSA Standard S136.
 - .5 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
 - .6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding of Structural Steel.
 - .7 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .8 CSA W59, Welded Steel Construction (Metal Arc Welding) Metric.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-85.10, Protective Coatings for Metals.
- .3 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A36/A36M, Specification for Structural Steel.
 - .2 ASTM A325M, Specification for High-Strength Bolts for Structural Steel Joints Metric.
- .4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
 - .1 CISC/CPMA 1, Quick-Drying, One Coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA 2, Quick-Drying, Primer for use on Structural Steel.
- .5 The Society for Protective Coatings (SSPC)
 - .1 SSPC SP 1, Solvent Cleaning.
 - .2 SSPC SP 7, Brush-Off Blast Cleaning.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including fabrication and erection documents and materials list.
- .2 On erection drawings: indicate details and information necessary for assembly and erection purposes such as, description of methods, sequence of erection, type of equipment used in erection and temporary bracings. Show detail of all non-standard connections such as bracing connections, truss connections, moment connections and hanger assemblies and other non-standard connections as requested by the Departmental Representative.
- .3 Erection drawings to be stamped by a qualified professional Engineer licensed to practice in the Province of Newfoundland and Labrador. The erection drawings are to contain a clause stating that the professional Engineer who stamped the erection drawings is responsible for all fabricator designed assemblies, components and connections required for this project.
- .4 Drawings for all fabricator designed assemblies, components and connections are to be stamped and signed by the professional Engineer who stamped the erection drawings.

1.4 SAMPLES

- .1 Prepare sample of typical exposed structural connections in accordance with approval of Departmental Representative. Samples to be judged upon alignment of surfaces, uniform contact between surfaces, smoothness and uniformity of finished welds. When approved, sample units will serve as a standard for workmanship, appearance and material acceptable for entire project.

1.5 DESIGN REQUIREMENTS

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 with CSA-S136.1 to resist forces, moments, shears and allow for movements indicated.
- .2 Unless noted otherwise on the drawings or in the specifications connection design is the responsibility of the structural steel fabricator. Fully detailed connections shown on the contract drawings including bolt and welded sizes are deemed to have been designed by the Departmental Representative.
- .3 If connection for shear only (standard connection is required):
 - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction".
 - .2 If shears are not indicated, select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam.

- .4 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional Engineer licensed in the Province of Newfoundland and Labrador.

1.6 SOURCE QUALITY CONTROL

- .1 If requested submit on certified copy of mill reports covering chemical and physical properties of steel used in this work.

1.7 QUALITY ASSURANCE

- .1 At least 2 weeks prior to fabrication of structural steel submit to Departmental Representative a letter from the fabricators Welding engineer stating the Welding engineer is responsible for welding procedures and practices for this project as outlined in CSA S47.1
- .2 Provide certificate of Quality Compliance from steel fabricator upon completion of structural steel fabrication stating that the work has been designed and fabricated in accordance with the requirements of the contract documents.
- .3 If requested, submit to the Departmental Representative one copy of all approved welding procedures for this project.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade as indicated, 350W and/or CAN/CSA-S136.
- .2 Cold formed structural members: to CAN/CSA S-136.
- .3 Anchor bolts: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .4 Bolts, nuts and washers: to ASTM A325M
- .5 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .6 Shop paint primer:
 - .1 To CISC/CPMA 1 for interior steel.
 - .2 To CISC/CPMA 2 for exterior steel.

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with approved reviewed shop drawings.

- .2 Install shear studs in accordance with CSA W59.
- .3 Continuously seal members by continuous welds where indicated.

2.3 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 except where members to be encased in concrete. Colour of shop primer to match the colour of the existing structural steel.
- .2 Shop primer to match the colour of the shop primer on the existing steel.
- .3 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface by solvent cleaning to SSPC SP 1, followed by brush-off blast cleaning to SSPC SP 7.
- .4 Apply one coat of primer in shop to steel surfaces except:
 - .1 Surfaces and edges to be field welded.
- .5 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5° C.
- .6 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.
- .7 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

PART 3 EXECUTION

3.1 GENERAL

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Welding: in accordance with CSA W59.
- .3 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.

3.2 CONNECTION TO EXISTING WORK

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative for direction before commencing fabrication.

3.3 MARKING

- .1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.4 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and in accordance with approved reviewed erection drawings.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.5 FIELD PRIMING

- .1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC SP 7 except as specified otherwise. Apply in accordance with CAN/CGSB 85.10. Colour of primer to match colour of existing structural steel.

3.6 FIELD QUALITY CONTROL

- .1 The structural steel erection contractor will carry out an inspection of the work and make the inspection results available to the Departmental Representative. The inspection report will identify the areas of work inspected, deficiencies identified and measures taken to correct the deficiencies.
 - .1 Inspection to include: Vertical and horizontal alignment checks, torque testing and inspection of representative connection welds.
 - .2 Submit test reports to Departmental Representative within 2 weeks of completion of inspection.
 - .3 Copies of test reports and inspections to be included in Commissioning Manual.
- .2 The Owner may opt to designate a third party Inspection and Testing Company to complete additional inspection and testing of materials and workmanship.
 - .1 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.

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.2 The Department will pay costs of initial inspection and testing by third party Inspection and Testing Company. Costs for any re-inspection and/or re-testing as a result of deficient work will be paid for by the contractor.

END OF SECTION

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1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 – Common Product requirements.
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .4 Section 05 12 23 - Structural Steel for Buildings.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials, (ASTM)
 - .1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.153, High-Build, Gloss Epoxy Coating.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16, Design of Steel Structures.
 - .4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .4 The Environmental Choice Program
 - .1 CCD-047, Architectural Surface Coatings.
 - .2 CCD-048, Surface Coatings - Recycled Water-borne.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11, Paints and Coatings.
- .6 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
 - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 QUALITY ASSURANCE

- .1 Test Reports: Submit Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Submit Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Bolts and anchor bolts: to ASTM A307.

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 round oval 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.

2.3 FINISHES

- .1 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.
- .2 Zinc primer: zinc rich, ready mix: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.

2.4 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items. The colour of shop primer is to match the colour of the shop primer on the existing steel.
- .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.

PART 3 EXECUTION

3.1 ERECTION

- .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 Owner's 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.

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- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16, or weld.
- .7 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .8 Touch-up high build epoxy coated finishes.

3.2 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.

3.3 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