

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 61 00 – Common product requirements.

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM A 36/A36M-08, Specification for Structural Steel.
 - .2 ASTM A 307-07, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 325-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .4 ASTM A 325M-09, Specification for High-Strength Bolts for Structural Steel Joints.
 - .5 ASTM A 490M-08, Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).
- .2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
 - .1 CISC/CPMA Standard 1-73b, Quick-Drying One-Coat for use on Structural Steel.
 - .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA G40.20/G40.21-04, 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/CSA-S16-09, Limit States Design of Steel Structures.
 - .4 CAN/CSA-S136-F07, North American Specifications for the Design of Cold Formed Steel Structural Members.
 - .5 CSA-S136.1-04, Commentary on CSA Standard S136.
 - .6 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
 - .7 CSA W48-F09, Filler Metals and Allied Materials for Metal Arc Welding.

- .8 CSA W55.3-1965(R2008), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .9 CSA W59-F05, Welded Steel Construction (Metal Arc Welding) (Metric).
- .10 CSA-S826 series 01 Ferry Boarding Facilities.
- .11 CSA S269.1-1975(R2003), Falsework for Construction Purpose.

1.3 SUBMITTALS

- .1 Submit required shop drawings, including shaping and assembly documents, equipment and material list in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings shall specify all shaping details such as the material used, nominal thicknesses before coating, related to coatings ,assembly details, including joints made in shop, cuts, assemblies, holes, screw spacing, threaded anchors, rivets and welds. Welds shall be indicated as specified in standard CSA W59.
- .3 The documents outlining the welding procedures must be approved by the Canadian Welding Bureau or be certified and stamped by an engineer in metallurgy.
- .4 Erection drawings: Submit erection drawings indicating details and information necessary for assembly and erection purposes including:
 - .1 Description of methods.
 - .2 Sequence of erection.
 - .3 Type of equipment used in erection.
 - .4 Temporary shoring devices, signed and sealed by an engineer from the Association of Engineer of New Brunswick.
- .5 Verify that the drawings submitted for assemblies, components and connections conceived by a steel fabricator are stamped and signed by qualified professional engineer licensed in the Province of New Brunswick, Canada.

1.4 QUALITY ASSURANCE

- .1 Submit a copy of mill test reports 4 weeks prior to fabrication of structural steel.

1.5 DELIVERY, STORAGE
AND HANDLING

- .1 Mill test reports must show chemical and physical properties and other details of steel to be incorporated in project.
- .2 Provide mill test reports certified by metallurgists qualified to practice in Canada.
- .2 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication comply with standards related to specified material and products.
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide and install protective cushions for transportation, lifting and storage of elements.
- .1 During shaping, transportation and assembly, necessary precautions shall be taken so that beams, columns and other member do not get damaged.
- .2 Do not cut edges of the elements.
- .3 Do not submit elements to excessive stress
- .3 Identify weight on elements that exceed 3 metric tons.
- .4 At least 7 days before shipment of items, submit to the Department's Designated Representative the delivery calendar.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Structural steel:
 - W shapes: in accordance with standard CSA-G40.20/G40.21, Grade 350W.
 - Angles and plates: in accordance with standard CSA-G40.20/G40.21, Grade 300W.
 - Hollow structural section (HSS): ASTM A500, Grade C.
- .2 Anchor bolts: to CAN/CSA G40.20/G40.21, Grade A300.
- .3 Bolts, nuts and washers: to CAN/CSA-G40.20/G40.21, Grade 300W or ASTM A 325M Or ASTM A490M as indicated.

- .4 Welding materials: to CSA W48 Series and CSA W59 and certified by Canadian Welding Bureau.
- .5 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².
- .6 Paint applied in workshop: as specified in Section 05 12 23 – Structural Steel for Building.
- .7 Shear studs shall be installed in accordance with CSA W59.

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16-10 and in accordance with shop drawings.
- .2 Install shear studs in accordance with CSA W59

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 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 the Department's Designated Representative for direction before commencing fabrication.

3.3 MARKING

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When 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 erection drawings.

- .2 Clean out dirt and unwanted debris from steel surfaces to the satisfaction of the Department's Designated Representative.
- .3 Verify the position of the infrastructure's components, the location of anchor bolts before the erection of the steel construction; in all cases, report any discrepancies to the Department's Designated Representative.
- .4 During assembly, minimize effort to bring pieces in position without enlarging nor deforming holes and without causing torsion, strain or a pronounced bending of metal components.
 - .1 If needed, ream holes to enlarge them only if the Department's Designated Representative has given prior permission.
 - .2 The diameter of reamed holes shall not exceed the bolts used by more than 2 mm. When a bore is needed, use hardened steel washers.
- .5 During erection, the structure must be assembled securely to withstand dead loads, construction, wind and ice loads, earthquakes and erection constraints.
- .6 Field cutting or altering of structural members: must be previously approved by the Department's Designated Representative.
- .7 Place anchor bolts to elevations and locations as specified.
 - .1 Prevent the infiltration of water and unknown substances in holes.
 - .2 Ensure heating and protection as directed by the Department's Designated Representative and grout completely the space around the anchor bolts.
 - .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.

3.5 FINISHING

- .1 Finish: the elements shall comply with prescribed alignments and free of torsion, bends, open joints and sharp edges and angles.
- .2 Galvanizing: Hot dip galvanizing, to CAN/CSA-G164, with minimum zinc coating of 600 g/m².

- .1 Galvanizing shall be completely removed beforehand on all surfaces needing welds.
- .2 These welds will then be galvanized using a product of type "Galvicon" according to the manufacturer's instructions.
- .3 Paint applied in workshops according to following particularities and requirements:

.1 Bollards

.1 Surface preparation

- .1 Eliminate all traces of oil and grease by complying with SSPC-SP1-solvent cleaning.
- .2 Shotblasting in accordance with SA2½ (ISO 8501-1:1988) or SSPC-SP10. If oxidation has occurred between shotblasting and paint application, scouring must be performed again to restore the visual level specified originally. Surface defects by shotblasting shall be ground, filled or treated appropriately.

.2 Product

Product	Binder	Type of Layer	Method of Application	Sol. Per Vol. (%)	Thick. wet Sheet (mil.)	Thick dry sheet. (mil.)	Theor. Cov. (ft2/gal)	Thinner
Inter-zone 954	Epoxy hardening by addition of polyamine	Solid Layer	Pulverization airless, brush, roller, pneumatic spray	85	18,8	16,0	85,3	GTA 415
Inter-thane 870	Acrylic Aliphatic polyurethane	Solid Layer	Pulverization airless, brush, roller, pneumatic spray	56	7,2	4,0	223,7	GTA 056

Finish: red

.2 Ladder bars

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Finish: Yellow

3.6 TOLERANCES

.1 Allowable tolerances for bolt and rivets holes

.1 Unless otherwise specified by the Department's Designated Representative, the finished hole diameter shall not exceed the diameter of bolts or rivets to be received of more than 2 mm.

.2 The spacing between two finished holes of the same group shall not vary more than 1 mm compared to the spacing prescribed for these two holes.

- .3 The distance between two groups of holes shall comply with the following requirements:

Distance center-to-center (m)	Divergence + or – (mm)
Less than 10	1
From 10 to 20	2
From 20 to 30	3

- .4 Correct elements wrongly punched or drilled at the request and as directed by the Department's Designated Representative only. The use of the torch is prohibited.

- .2 Bearing tolerances

- .1 Beams and trusses: 6 mm plus or minus.

- .3 Workshop assembly

- .1 Support each beam to its support points; then measure the beam deflection at points where the curve was measured and keep this value in a record.

- .2 Measure the deflection in beam web plan.

- .3 Submit to the Department's Designated Representative a diagram showing the deflection of each beam before their delivery.

- .4 Metal poles

- .1 Vertical deviation: maximum 1/500 of the length of the frame element

- .2 Curve: maximum 1/1000 of the length of the frame element.