

Part 1 General

1.1 SECTION INCLUDES

- .1 Shop fabricated ferrous metal items.
- .2 Shop fabricated aluminum items.
- .3 Steel pipe handrails balusters, and fitting.

RELATED SECTIONS

- .4 Structural Specifications.
- .5 Section 01 61 00 – Common Product Requirements.
- .6 Section 06 10 13 - Wood Blocking and Curbing.
- .7 Section 09 91 99 – Painting for Minor Works.

1.2 REFERENCES

- .1 ASTM A53/A53M-07 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- .2 ASTM A153/A153-09 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A307-07b - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A500/A500M-09 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .5 ASTM A501-07 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- .6 ASTM B177- 01(2006)e1 - Engineering Chromium Electroplating.
- .7 ASTM B209M-07 - Aluminum and Aluminum-Alloy Sheet and Plate.
- .8 ASTM B210M-05 - Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
- .9 ASTM B211M-03 - Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
- .10 ASTM B221M-07 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .11 CAN/CGSB-1.40-97 - Anti-corrosive Structural Steel Alkyd Primer.
- .12 CAN/CGSB-1.181-99 - Ready-Mixed, Organic Zinc-Rich Coating.
- .13 CAN/CSA-G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .14 CSA S16-09 - Design of steel structures.
- .15 CSA-W47.1-09 - Certification of Companies for Fusion Welding of Steel Structures.
- .16 CSA-W47.2-M1987 (R2009) - Certification of Companies for Fusion Welding of Aluminum.
- .17 CSA-W48-06 - Filler Metals and Allied Materials for Metal Arc Welding
- .18 CSA-W55.3-08 - Certification of Companies for Resistance Welding of Steel and Aluminum.

- .19 CSA-W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).
- .20 CSA-W59.2-1991(R2008) - Welded Aluminum Construction.
- .21 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.

1.3 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings:
 - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.

1.5 CLOSEOUT SUBMITTALS

- .1 Section 01 78 00: Closeout Submittals.

1.6 QUALITY ASSURANCE

- .1 Welders' Certificates: Submit to Section 01 33 00 requirements, certifying welders employed on the Work, verifying qualification within the previous twelve (12) months to CSA-W47.1 (steel), CSA-W47.2 (aluminum).
- .2 Welded Steel Construction: CSA-W59.
- .3 Welded Aluminum Construction: CSA-W59.2.
- .4 Design of steel structures: CSA S16.
- .5 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- .6 Comply with requirements of the Building Code in place of work, and local authority having jurisdiction. It is the responsibility of this subcontractor to design and fabricate handrails in accordance with barrier free requirements.

Part 2 Products

2.1 MATERIALS - STEEL

- .1 Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 300W. 350W for wide flange and HSS Sections.
- .2 Steel Pipe: ASTM A53/A53M, Standard weight, galvanized finish
- .3 Stainless steel: to ASTM A269, Type 302 Commercial grade seamless welded with AISI No. 4 finish.
- .4 Bolts, Nuts, and Washers: ASTM A307.
- .5 Wire: cold drawn steel.
- .6 Sheet steel: to ASTM A526, commercial quality, thicknesses indicated, ZF075 zinc coating to ASTM A525 M.
- .7 Exposed fastenings: same material, colour, finish as fastened metal, as indicated.

- .8 Isolation coating: to CGSB 1 GP 108c, alkali resistant, bituminous paint.
- .9 Welding Materials: Type required for materials being welded.
- .10 Welding Filler Material: CSA-W48.
- .11 Shop and Touch-Up Primer: CAN/CGSB-1.40, colour grey.
- .12 Galvanizing: to CSA G164 M92, hot dipped galvanizing, minimum zinc coating 600g/m² (2 oz/sq.ft).
- .13 Aluminum extrusion: Aluminum Association Alloy AA 6063 T6.
- .14 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 MATERIALS

- .1 Stainless Steel corner guards:
 - .1 50mm x 50 mm size, 16 Ga, Full height long, with 13 mm corner radius
 - .2 Stainless Steel Grade 316.
 - .3 Surface adhesive mounted.

2.3 FABRICATION

- .1 Fit and shop assemble items in largest practical sections, for delivery to Site.
- .2 Fabricate items with joints tightly fitted and secured.
- .3 Continuously seal joined members by continuous welds.
- .4 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- .5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- .6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- .7 Use self-tapping shake-proof screws on items required to be assembled by screws or as indicated. Use screws for interior metal work, except where noted otherwise. Use welded connections for exterior metal work, unless otherwise approved by Contract Administrator.
- .8 Where possible, work to be fitted and shop assembled, ready for erection.
- .9 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .10 All exposed fastenings shall be of the same material, colour, and finish as the metal to which applied unless specifically shown or listed otherwise.
- .11 All items supplied by this section shall be complete with all fastenings.
- .12 Drill for countersunk screws and anchor bolts. Prime paint.
- .13 Galvanize all exterior work except for materials scheduled for painting.
- .14 All metal fabrications accessible to the public shall have burrs, sharp filings, or dangerous protrusions removed and ground smooth. Contractor shall correct any dangerous installation as direct by the Contract Administrator.

- .15 Site confirm field dimensions prior to fabrication.

2.4 FABRICATION TOLERANCES

- .1 Squareness: 3 mm (1/8 inch) maximum difference in diagonal measurements.
- .2 Maximum Offset Between Faces: 1.6 mm (1/16 inch).
- .3 Maximum Misalignment of Adjacent Members: 1.6 mm (1/16 inch).
- .4 Maximum Bow: 3 mm in 1.2 m (1/8 inch in 4 ft).
- .5 Maximum Deviation From Plane: 1.6 mm in 1.2 m (1/16 inch in 4 ft).

2.5 FINISHES - STEEL

- .1 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with two (2) coats.
- .4 Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M. Provide minimum 600 g/sq m (2.0 oz/sq ft) galvanized coating.
- .5 Non-structural Items: Galvanized after fabrication to ASTM A123/A123M. Provide minimum 380 g/sq m (1.25 oz/sq ft) galvanized coating.
- .6 Shop Painting:
 - .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items. Apply two coats of primer to areas inaccessible after final installation.
 - .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, and grease. Do not paint when temperature is lower than 7°C.
 - .3 Clean surfaces to be field welded. Do not paint.
 - .4 Non-ferrous metals shall be finished as specified by item.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that field conditions are acceptable and are ready to receive work.
- .3 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- .1 Clean and strip primed steel items to bare metal where Site welding is required.
- .2 Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.

- .2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- .3 Field weld components indicated on Drawings.
- .4 Perform field welding to CSA requirements.
- .5 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .6 Touch-up rivets, field welds, bolts, and burnt or scratched surfaces after completion of erection with primer.
- .7 Obtain approval prior to Site cutting or making adjustments not scheduled.
- .8 After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

- .1 Section 01 73 00: Tolerances.
- .2 Maximum Variation From Plumb: 6 mm (1/4 inch), non-cumulative.
- .3 Maximum Offset From True Alignment: 6 mm (1/4 inch).
- .4 Maximum Out-of-Position: 6 mm (1/4 inch).

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 74 11 - Cleaning.

3.6 PROTECTION

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

3.7 SCHEDULES

END OF SECTION