

**SECTION 05500
METAL FABRICATIONS**

PART 1 - GENERAL

1.1 SUMMARY

- .1 Retain a structural engineer registered in the Province of British Columbia to prepare signed and sealed shop drawings for guardrails and handrails and other miscellaneous metal fabrications.
- .2 Fabrication and supply miscellaneous metal items complete with fasteners and accessories.
- .3 Refer to Schedule of Items in Part 3.
- .4 Where requirements noted on Structural Drawings are more stringent than those specified herein, they will take precedence over these Specifications.

1.2 RELATED SECTIONS

- .1 Structural Steel: As noted on Structural Drawings.
- .2 08810 Glass and Glazing.

1.3 REFERENCES

- .1 ASTM B221-02 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .2 ASTM B632/B632M-02 Standard Specification for Aluminum-Alloy Rolled Tread Plate.
- .3 CSA-S16.1-01, Limit States Design of Steel Structures.
- .4 CSA-W47.1-92(R2001), Certification of Companies for Fusion Welding of Steel Structures.
- .5 CSA-W59-1989(R2001) Welded Steel Construction (Metal Arc Welding).
- .6 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
- .8 Vancouver Building By-Law 2007.

1.4 SUBMITTALS

- .1 Submit in accordance with Division 1 Submittal Procedures.
- .2 Shop Drawings: Submit shop drawings of each item. Completely detail indicating dimensions and methods of fixing.
- .3 Design handrails, guardrails and other items as applicable to meet or exceed requirements of Vancouver Building By-Law 2007.
 - .1 Shop drawings for metal fabrications shall be signed and sealed by a Professional Engineer registered in the Province of British Columbia. The Engineer shall also submit with shop drawings a signed and sealed Letter of Assurance in accordance with the B.C. Building Code. (Schedule B-1 and B-2).
 - .2 At the completion of the work, provide a Letter of Assurance in accordance with the B.C. Building Code signed and sealed by the Engineer confirming that the applicable metal fabrications have been designed and installed to meet or exceed requirements of B.C. Building Code. (Schedule C-B).

1.5 QUALITY ASSURANCE

- .1 Materials and execution of work shall conform to standards listed in REFERENCES above.

PART 2 - PRODUCTS

2.1 STEEL

- .1 Rolled Shapes and Structural Steel and Plates: CSA G40.20/G40.21 Grade 300 W.
- .2 Bolts, Nuts and Fasteners: CSA G40-20/G40-21.

- .3 Fastenings: Conform to approved good local practice. Make sufficiently strong and compatible with work. Expose fasteners only where pre-approved by Consultant. Use self-tapping shake proof headed screws on items requiring assembly by screws or as indicated. Use screws for interior metal work. Use welded connections for exterior metal work unless otherwise approved by Consultant.
- .4 Bar Mill Products: Mild steel, with low carbon content, for cold bending and hot forming.
- .5 Miscellaneous Framing (Clips, Brackets, Plates, Backing, Trim): Merchant bar quality of CSA G40-20/G40.21 Grade 300 W. Sizes and weights as detailed or as required to suit fabrication requirements as presented on the shop drawings.
- .6 Steel Pipe: Standard or extra heavy as per item description meeting A53, Grade B, continuous or electrical resistance welded, 35 k.s.i. unless otherwise noted. Sizes shown on the Architectural Drawings are nominal. Wherever CSA standards are written, ASTM standards where applicable may be used.
- .7 Checker Plate: ASTM A36/A36M-97 steel checker plate.
- .8 Other steel items as noted on Structural Drawings.
- .9 Stair nosing inserts: Type 121, 1 7/8" x 1/4" thick complete w/ strap anchors imbedded in the concrete, black grit, as manufactured by Wooster Products Inc., or approved equivalent.

2.2 STEEL FINISHES

- .1 Galvanizing: Irregularly shaped items to CSA G164.
- .2 Galvanize exterior items. Galvanize after fabrication.
- .3 Galvanized Metal Primer: Cement oil base type, Pittsburg Ironhide, or Retardo Rust Inhibitive Paint.
- .4 Standard Shop Priming: Shop prime exposed metal surfaces (not embedded in concrete) meeting CAN/CGSB 1.40-97 with approved primer. Touch up or field-prime damage or welds immediately after erection.
- .5 Touch-up: Touch up or field-prime damage, cuts or welds immediately after erection with galvicron paint, or special primer as required.

2.3 ACCESSORIES

- .1 Grout: Premixed non-metallic sand/cement/expanding grout, normal grey colour.
- .2 Sand: Specially graded and processed to suit epoxy grout mix design.
- .3 Glass: Provide clear tempered glass as specified in Section 08810 Glazing.

2.4 SHOP FABRICATION - GENERAL

- .1 Materials Cutting: Shear materials cut from stock or cleanly part, trim, grind and sand to remove burrs. Where cuts are burred, grind smooth and cut true to line. Grind smooth or fill exposed welding, or welding in fitted surfaces. Ensure work is accurate, neatly fitted, and executed in a workmanlike manner.
- .2 Welding: Welding shall conform to CSA W59 and be executed by fabricators approved in conformance with CSA W47.1. Work shall conform to B.C. Building Code, CGSB, or ASTM standards of workmanship and fabrication. Use only metallic arc process. Electrodes shall conform to CSA W48.
- .3 Joints exposed to weather are to be watertight.

2.5 SHOP FABRICATION OF RAILINGS

- .1 Fabricate handrails or guardrails in accordance with details and reviewed shop drawings; square, true, straight and accurate to required size, mitre tube rail comers and reinforce with concealed attachments.
- .2 Install closure pieces into ends of tube handrails.
- .3 Where possible, work to be fitted and shop assembled, ready for site erection.
- .4 Exposed welds to be continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Overlapping sleeves used to fasten separate tube handrail sections together are not accepted.

2.6 FINISHES

- .1 Exterior Guardrails/Handrails: Aluminum or steel, powder coat finish.

- .2 Interior Guardrails/Handrails: Aluminum or steel, powder coat finish.
- .3 Finishes: Standard color as selected by the Consultant.
- .4 Generally interior items to be shop prime painted, exterior items to galvanized.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine surfaces to which work of this section is to be applied with Installer present and ensure that conditions are suitable to provide a complete and satisfactory installation. Correct unsatisfactory conditions.
- .2 Examine surfaces and conditions prior to installation. Commencement of installation implies acceptance of surfaces and conditions.

3.2 INSTALLATION - GENERAL

- .1 Vertically Mount Anchoring System: Aluminum or steel base plates, with stainless steel anchor bolts and neoprene gaskets.
- .2 Inject bolt holes and penetrations through fascia and walls with sealant to prevent water penetration.

3.3 HOLE DRILLING

- .1 Holes: 1.5 mm to 3 mm greater than pipe or dowel diameter. Depth as indicated on detail drawings. By percussive or rotary machine, diamond coring for holes greater than 50 mm in diameter. First test holes and grouting to be approved on site by Consultant.

3.4 DOWEL SHANK

- .1 Deformed for full grout depth. Threaded or rebar type deformation. Remove mill scale, galvanized or other protective coatings by sandblasting, acid etching, or chemical stripping.

3.5 GROUTING

- .1 Purpose-made expanding type for sand/cement/grout installation of steel into drilled or cored grout pockets.
- .2 Aggregate: Bagged, well rounded, or spherical shaped sand.

3.6 INSTALLATION

- .1 Set in place, level and correctly aligned, miscellaneous metal items described.

3.7 PROTECTION AND CLEAN-UP

- .1 Protect work of other sections from damage resulting from work of this section, especially welding and cutting sparks. As work proceeds, and at completion, remove surplus materials and deposit debris in containers provided or remove from site as directed.

3.8 SCHEDULE OF ITEMS

- .1 General: Quantities and sizes, when listed, are given as general information only. Determine requirements of sizes, quantities, and locations for specific items listed and confirm same on shop drawings submitted in accordance with contract conditions
- .2 Anchors, Bolts, and Screws: Fixing and anchorage for miscellaneous metalwork items shall be supplied as and where required to suit installation and erection.
- .3 Shelf Angles, Clips, and Channels: Provide general angles, anchors, clips, plates, channels and similar items required to support or fix items of work installed by other Sections, save where specifically excepted, and supply and fix other miscellaneous ironwork items required in the work.
- .4 Steel or Aluminum Handrails: As detailed, steel handrails to be standard pipe or extra heavy duty as required. Open ends fitted with bullet nose end clips. Form bends with tight radii complete with plate connections, brackets or for drilled-in installation.
- .5 Sump Pit and Water Meter Covers and Frames: Checker plate covers with angle iron frames for casting into concrete. Fabricate with necessary connections, anchor lugs, and cut-outs. Co-ordinate with Mechanical and Electrical sections.

- .6 Millwork Supports: As indicated. Coordinate with Section 12350. Prime painted.
- .7 Bench Brackets: As indicated.
- .8 Stair nosing inserts for exterior concrete stairs, as required and noted on drawings.

END OF SECTION