Part 1 General

1.1 SECTION INCLUDES

1. Shop fabricated miscellaneous metal items.

1.2 RELATED REQUIREMENTS

1. Section 03 30 00 - Cast-in-place Concrete: Placement of metal fabrications in concrete.
2. Section 05 12 00 - Structural Steel: Structural steel column anchor bolts.

1.3 REFERENCE STANDARDS

1. STD G40.20/G40.21-13 General requirements for rolled or welded structural quality steel/structural quality steel
2. CSA W47.1:19 Certification of companies for fusion welding of steel
3. STD W55.3-08 Certification of companies for resistance welding of steel and aluminum
4. STD W59-18 Welded steel construction
5. Maintenance repainting specification manual
6. SSPC 16-01 Steel structures painting manual. Volume 1: good painting practice
7. CSA S16:19 Design of steel structures

1.4 ACTION SUBMITTALS

1. Section 01 33 00: Submission procedures.
2. Shop Drawings:
    1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
    2. Indicate welded connections using standard welding symbols. Indicate net weld lengths.
    3. Miscellaneous metals shop drawings are to be stamped by a structural engineer practicing in the province of Ontario.
    4. Design of steel connections to the maximum UDL loads in steel handbook beam tables, provided no point loads act on the beam and when shears are not indicated
    5. Connections shall be concentric and shall not introduce eccentricity into any elements.

1.5 INFORMATIONAL SUBMITTALS

1. Section 01 33 00: Submission procedures.

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).

2. Welded Steel Construction: CSA-W59.
3. 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.

Part 2 Products

2.1 MATERIALS - STEEL

1. Structural Steel Beam and Columns: ASTM A992/992M, Grade 50 (Fy = 345 MPa) unless otherwise noted.
2. Structural Channels and Angles: CSA-G40.20/G40.21, Grade 300W unless otherwise noted.
3. H.S.S.: CSA-G40.20/G40.21, Grade 350W (Class C) unless otherwise noted.
4. Steel plate.: A36, Grade 250W minimum unless otherwise noted.
5. Bolts, Nuts, and Washers: ASTM A325 bolts, galvanized to A153/A153M for galvanized structural members.
6. Anchor Bolts: ASTM F1554 (formerly ASTM A307). Material shall be a minimum of Grade 36 (Fu = 414MPa) or CSA G40.21 300W (Fu=450MPa).
7. Welding shall conform to CSA W47.1 and CSA W59, by the Canadian Welding Bureau. All welding shall be completed by CWB Certified Welders. Third party welding inspection shall be performed by firms certified to CSA W178.1 and W178.2.
8. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, with a compressive strength of 35 MPa (minimum). Grout shall be installed at a maximum of 38mm (1 1/2").
9. Primer: As specified in Section 09 91 00.

2.2 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.

2.3 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.

2.4 FINISHES - STEEL

1. Prepare surfaces to be primed in accordance with SPCC SP 2.
2. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
3. Do not prime surfaces in direct contact with concrete or where field welding is required.
4. Prime paint items with one (1) coat.
5. Structural Steel Members: Galvanize after fabrication appropriate grade for type and size of steel material indicated, with zinc coating thickness ASTM A123/A123M.
6. Non-structural Items: Galvanized after fabrication to appropriate grade for type and size of steel material indicated, with zinc coating thickness ASTM A123/A123M.

2.5 ISOLATION COATING

1. Isolate aluminum from following components, by means of bituminous paint:
    1. Dissimilar metals except stainless steel, zinc or white bronze of small area.
    2. Concrete, mortar and masonry.
    3. Wood.

2.6 ANGLE LINTELS

1. Steel angles: sizes indicated for openings. Provide 200mm (8") minimum bearing at ends or as indicated on structural drawings.
2. Weld or bolt back-to-back angles to profiles as indicated.
3. Finish: prime painted for interior, galvanized for exterior.

2.7 PIPE RAILINGS

1. Steel pipe: 42.2 mm (1.66") nominal outside diameter, formed to shapes and sizes as indicated or as indicated on drawings.
2. Galvanize exterior pipe railings after fabrication. Shop coat prime interior railings after fabrication.

2.8 ACCESS LADDERS

1. Stringers: 76 x 10 mm (3" x 3/8") thick steel flat bar.
2. Steel Rungs: 20 mm (3/4") diameter rod, welded to stringers at 300 mm (12") on centre.
3. Brackets: sizes and shapes as indicated complete with fixing anchors.
4. Galvanize finish for exterior, prime paint for interior.
    1. Galvanize exterior ladders after fabrication.

2.9 EXTERIOR STAIRS

1. As indicated on drawings.
2. Finish: refer to architectural drawings.

2.10 CHANNEL FRAMES

1. Fabricate frames from steel, sizes of channel and opening as indicated.
2. Weld channels together to form continuous frame for jambs and head of openings, sizes as indicated.
3. Finish: painted.

Part 3 Execution

3.1 EXAMINATION

1. 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 or Shop Drawings.
4. Perform field welding to CSA requirements.
5. Obtain approval prior to site cutting or making adjustments not scheduled.
6. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

1. Conform to CSA S16.
2. Maximum Variation From Plumb: 6 mm / 1/4 inch per story, 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. Perform cleaning after installation to remove construction and accumulated environmental dirt.
2. Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section