Part 1 General

1.1 RELATED SECTIONS

.1 Section 05 31 00 - Steel Decking

.2 Section 05 50 00 - Metal fabrications

.3 Section 05 51 29 - Metal Stairs

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM A36/A 36M, Specification for Structural Steel.
- .2 ASTM A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
- .3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .4 ASTM A325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .5 ASTM A325M, Specification for High-Strength Bolts for Structural Steel Joints Metric.
- .6 ASTM A490, Specification for Heat Treated, Steel Structural Bolts, 150 ksi (1035 MPa) Tensile Strength.
- .7 ASTM A490M, Specification for High-Strength Steel Bolts, Classes 10.9 and, for Structural Steel Joints Metric.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.40, Primer Structural Steel, Oil Alkyd Type.
- .2 CGSB 85-GP-14M, Painting Steel Surfaces Exposed to Normally Dry Weather.
- .3 CAN/CGSB-85.100, Painting.

.3 Canadian Institute of Steel Construction/Canadian Paint Manufacturer's Association (CISC/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.

.4 Canadian Standards Association (CSA)
- .1 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- .2 CAN/CSA-G40.21, Structural Quality Steels.
- .3 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- .5 CAN/CSA-S136, Cold Formed Steel Structural Members.
- .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .7 CSA W48 Series, Electrodes.
- .8 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .9 CSA W59, Welded Steel Construction (Metal Arc Welding) Metric.

.5 The Society for Protective Coatings (SSPC)
- .1 SSPC SP-6/NACE No. 3, Commercial Blast Cleaning

1.3 SHOP DRAWINGS

.1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section E4.

.2 On erection drawings, indicate all 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.

.3 Ensure Fabricator designed assemblies, components and connections, and drawings are stamped and signed by qualified professional engineer licensed in the province of Manitoba, Canada.

1.4 SAMPLES

.1 Submit samples as instructed by Contract Administrator.

.2 Prepare sample of typical exposed structural connections in accordance with AISC Specifications of Architecturally exposed structural steel for approval of Contract Administrator. 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 OF DETAILS AND CONNECTIONS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16.1 and CAN/CSA-S136 with CSA S136.1 to resist forces, moments, shears and allow for movements indicated.

.2 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.

.3 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Manitoba, Canada.

1.6 QUALITY ASSURANCE

.1 Submit 4 copies of mill test reports showing chemical and physical properties and other details of steel to be incorporated into work at least 4 weeks prior to fabrication of structural steel. Mill test reports shall be certified by metallurgists qualified to practice in province of Manitoba, Canada.

.2 Ensure Fabricator of structural steel, in addition, provides an affidavit stating that materials and products used in fabrication conform to applicable material and products standards called for by design drawings and specifications.

Part 2 Products

2.1 MATERIALS

.1 Structural steel: to CAN/CSA-G40.21 Grade 350W and as indicated on structural drawings and CAN/CSA-S136.

.2 Anchor bolts: to CAN/CSA-G40.21, Grade 300W.

.3 Bolts, nuts and washers: to ASTM A325M.

.4 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.

.5 Shop paint primer:
- .1 Where steel is not to be field painted: CISC/CPMA 1.
- .2 Where steel is to be field painted: CISC/CPMA 2. Use same primer specified in Section 099100 – Painting for finishing formulae for steel surfaces.

.6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².

.7 Shear studs: to CSA W59, Appendix H.

2.2 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16.1, CAN/CSA S136 and in accordance with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

.3 Continuously seal members by continuous welds. Grind smooth.

.4 Provide holes in top and bottom flanges or weld threaded studs to top and bottom flanges for attachment of wood nailers as required.

2.3 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.1, CAN/CSA-S136, and CAN/CGSB-85.100 except where members are to be encased in concrete.

.2 Clean all members. Remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC No SP6.

.3 Apply one coat of primer in shop to all steel surfaces to achieve minimum dry film thickness of 0.04 to0.065 mils, except:
- .1 Surfaces to be encased in concrete.
- .2 Surfaces to receive field installed stud shear connections.
- .3 Surfaces and edges to be field welded.
- .4 Facing surfaces of friction-type connections.
- .5 Below grade surfaces in contact with soil.
- .6 Hot dipped galvanized finishes.

.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5°C.

.5 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.

.6 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-S16.1 and CAN/CSA-S136.

.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 MARKING

.1 Mark materials in accordance with CAN/CSA-G40.20. 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.

3.3 ERECTION

.1 Erect structural steel, as indicated and in accordance with CAN/CSA S16.1, CAN/CSA-S136 and in accordance with reviewed erection drawings.

.2 Field cutting or altering structural members: to approval of Contract Administrator.

.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.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by the Contract Administrator.

.2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Contract Administrator.

.3 Submit test reports to Contract Administrator within 1 week of completion of inspection.

.4 Test shear studs in accordance with CSA W59.

3.5 FIELD PAINTING

.1 Paint in accordance with Section 099100 - Painting.

.2 Touch up all damaged surfaces and surfaces without shop coat with primer to CAN/CGSB-1.40 except as specified otherwise. Apply in accordance with CGSB 85-GP-14M.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 05 12 23 - Structural steel

.2 Section 05 50 00 - Metal fabrications

1.2 REFERENCES

.1 Canadian Standards Association (CSA).
- .1 CSA C22.2 No.79 - Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
- .2 CAN/CSA-S16.1 - Limit States Design of Steel Structures.
- .3 CAN/CSA-S136 - Cold Formed Steel Structural Members.
- .4 CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures.
- .5 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .6 CSA W59 - Welded Steel Construction, (Metal Arc Welding) Metric.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-1.181 - Ready-Mixed Organic Zinc-Rich Coating.

.3 American Society for Testing and Materials (ASTM)
- .1 ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A792/A792M, Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.4 Canadian Sheet Steel Building Institute (CSSBI).
- .1 CSSBI 10M - Standard for Steel Roof Deck.
- .2 CSSBI 12M - Standard for Composite Steel Deck.

1.3 SHOP DRAWINGS

.1 Submit shop drawings, erection and shoring drawings in accordance with Section E4.

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in the Province of Manitoba, Canada.

.3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, and reinforcement details and accessories.

.4 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete filled decks.

Part 2 Products

2.1 MATERIALS

.1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A635/A635M structural quality Grade 230, with ZF075 coating (wipe coat) for roof decking and Z275 (G90) for floor decking, 0.76 mm (22 gauge) minimum base steel thickness.

.2 All deck undersides to be painted.

.3 Acoustic insulation: sound absorbing insulation for acoustic deck, fibrous glass, 17.5 kg/cubic metre, 1.1 lbs/cubic foot density, profiled to suit deck flutes.

.4 Acoustic closures: fibrous glass 17.5 kg/m^3 , 1.10 lbs/ft^3 density profiled to suit deck flutes.

.5 Closures: as recommended by manufacturer. Closures to exterior walls neoprene.

.6 Cover plates, cell closures and flashings: steel sheet with minimum steel core thickness of 0.76 mm (22 gauge). Metallic coating same as deck material.

.7 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

.8 Shear studs: to CSA W59.

2.2 TYPES OF DECKING

.1 Steel roof deck: 0.76 mm minimum base steel thickness, 38 mm maximum deep profile, non-cellular, interlocking side laps.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA S136 and CSSBI 10M and CSSBI 12M.

.2 Welding: in accordance with CSA W59, except where indicated otherwise.

.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.

3.2 ERECTION

.1 Erect steel deck as indicated and in accordance with CAN/CSA-S136 , CSSBI 10, CSSBI 12, and reviewed shop drawings.

.2 Lap ends: to 50 mm minimum, and formed over supports.

.3 Fasten steel deck to steel framework at ends and intermediate supports with 19 mm fusion welds at minimum 4 transverse welds per deck unit or 300 mm on centre for members parallel to ribs.

.4 Allow minimum 38 mm bearing for roof deck and full top flange bearing for floor deck, when supported by structural steel.

.5 Mechanically fasten male/female side laps at 450 mm on centre maximum.

.6 Immediately after decking is permanently secured in place touch up metallic coated top surface with primer where burned by welding.

.7 Place and support reinforcing steel as indicated.

.8 Deck fastening screws not allowed.

3.3 CLOSURES

.1 Install closures to ensure effective closures against weather, thermal and acoustic effects.

.2 Install closures to details indicated, to manufacturer's recommendations and as specified herein.

.3 Where steel deck rests on exterior masonry walls:
- .1 Fill web spaces with neoprene closures as recommended by manufacturer.
- .2 Make weather tight seal.

.4 Where flutes are at right angles to exterior walls, and deck extends beyond these walls:
- .1 Caulk interlocking side laps of decking for 400 mm immediately over walls. Install interior and exterior closures.
- .2 Caulk exterior closures to prevent air infiltration. Caulk interior closures to prevent water vapour exfiltration.
- .3 In addition, provide a glass fibre pads to close off topside flutes directly over face of wall or use closures as recommended by manufacturer.

.5 Where flutes run at right angles to interior partitions:
- .1 Fill web spaces with double run of steel closures or as recommended by manufacturer.

.6 Where flutes are parallel to interior partitions:
- .1 Install steel closure flashing to provide neat juncture between two materials or as recommended by manufacturer.

.7 Attach metal cell closures at locations required to contain poured concrete as recommended by manufacturer.

3.4 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck that are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer.

.3 For deck openings over with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details.

.4 Refer to and frame openings as indicated on mechanical and electrical drawings.

3.5 CONNECTIONS

.1 Install connections in accordance with CSSBI recommendations as indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete: setting inserts and anchors in concrete.

.2 Section 09 91 00 - Painting: field painting.

1.2 REFERENCES

.1 American Iron and Steel Institute (AISI)

.2 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 A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB-1.108, Bituminous Solvent Type Paint.
- .3 CAN/CGSB-1.181, Ready-Mixed, Organic Zinc-Rich Coating.

.4 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 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- .4 CSA W59, Welded Steel Construction (Metal Arc Welding).

.5 The Society for Protective Coatings (SSPC)
- .1 SSPC Painting Manual, Volume 2, Systems and Specifications.

.6 National Building Code of Canada (NBC)

1.3 DESIGN CRITERIA

.1 Details and specifications are intended to indicate the general character and extent of metal fabrications and do not attempt to indicate all methods of construction.

.2 Fabricate and install metal fabrications to withstand all stresses encountered in normal use. Unless specified or noted otherwise, all imposed live loads shall be in accordance with NBC.

1.4 SUBMITTALS

.1 Submit drawings in accordance with Section E4.

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in the Province of Manitoba, Canada.

.3 Shop drawings: indicate materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories. Indicate field measurements on shop drawings.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 350W.

.2 Steel pipe: to ASTM A 53/A53M, Type S, Grade B, weight class specified by item, galvanized finish, of sizes indicated.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Exposed fasteners: of same material, color and finish as the metal to which applied, unless indicated otherwise.

.7 Epoxy grout: multi-component epoxy grout with high bond strength for anchoring bolts, pipes, base plates in concrete and masonry.

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 headed screws on items requiring assembly by screws or as indicated.

.3 Where possible fit work and shop assemble ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

.5 Remove and grind smooth burrs, filings, sharp protrusions, and other projections from metal fabrications to prevent possible injury. Correct dangerous or potentially harmful installations.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with minimum zinc coating of 600 g/m² (2.0 oz/ft²) to CAN/CSA-G164.

.2 No welding after galvanize finishing

.3 Shop coat primer: to CAN/CGSB-1.40.

.4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.4 PIPE RAILINGS

.1 Aluminum: standard weight, galvanized, diameters indicated.

.2 Formed to shapes and sizes indicated. Return pipe railing to walls at terminations.

.3 Box open ends of railings with flat welded plate.

Part 3 Execution

3.1 ERECTION

.1 Perform welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Exposed fastening devices to match finish and be compatible with material through which they pass.

.4 Provide components for building by other sections in accordance with shop drawings and schedule.

.5 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.6 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

.7 Provide items required for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

END OF SECTION