

1 General

1.1 RELATED WORK

- .1 Section 07 46 13 - Wall Cladding Assembly.

1.1 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA_S136_07, North American Specification for the design of Cold Formed Steel Structural Members.
 - .2 CSA W47.1_03(R2009), Certification of Companies for Fusion Welding of Steel Structures.
 - .3 CSA W55.3-08, Certification of companies for resistance welding of steel and aluminum.
 - .4 CSA W59_03(R2008), Welded Steel Construction (Metal Arc Welding).
- .2 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 10M_08, Standard for Steel Roof Deck.
- .3 American Society for Testing and Materials International, (ASTM)
ASTM A 653/A653M_08, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.2 WELDING QUALIFICATIONS

- .1 Erection companies must be certified by the Canadian Welding Bureau (CWB) under CAN/CSA-W47.1 Certification of Companies for Fusion Welding of Steel Structures, and welding operators must be qualified by CWB for deck welding.

1.3 DESIGN REQUIREMENTS

- .1 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action and uplift as indicated.
- .2 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

1.4 SUBMITTALS

- .1 Welders must present proof of their certification to the Departmental Representative before welding commences.

- .2 Submit shop drawings in accordance with Section 01 01 50 - General Instructions.
- .3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
- .4 Submit shop drawings for gravity load only to be stamped and signed by qualified professional engineer registered or licensed in Provinces of British Columbia, Canada.
- .5 The Professional Engineer responsible for the shop drawings shall inspect the installation of the work for conformance with the design and the shop drawings, and shall upon completion of the work, provide to the Departmental Representative a completed Schedules S-B: Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional, and Schedules S-C: Assurance of Professional Field Review and Compliance by Supporting Registered Professional.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions.
- .2 Divert unused metal from landfill to metal recycling facility approved by Departmental Representative.
- .3 Dispose of unused paint material at official hazardous material collections site approved by Departmental Representative.
- .4 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .5 Dispose of unused caulking material at official hazardous material collections site approved by Departmental Representative.

2 Products

2.1 MATERIALS

- .1 Zinc coated steel sheet: to ASTM A 653/A653M structural quality Grade A, with Z275 coating.

- .2 Closures to external walls: closed cell neoprene as recommended by manufacturer.
- .3 Cover plates, deck flute closures and flashings: steel sheet with minimum base steel thickness of 0.91 mm. Metallic coating same as deck material.
- .4 Primer: zinc rich, ready mix to MPI Manual, MPI #200.
- .5 Caulking: to Section 07 92 10 - Joint Sealing.
- .6 Fire stopping: to Section 07 46 13 – Roof and Wall Cladding Assembly.

2.2 TYPES OF DECKING

- .1 Roof deck: 0.91 mm minimum base steel thickness, 38 mm deep profile, non-cellular interlocking side laps.

3.0 Execution

3.1 General

- .1 Structural steel work: in accordance with CAN/CSA_S136 and CSSBI 10M.
- .2 Welding: in accordance with CSA W59, except where specified otherwise.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 ERECTION

- .1 Erect steel deck as indicated and in accordance with CSSBI 10M and with reviewed erection drawings.
- .2 Where possible, supply and install decking in length that will permit continuity over a minimum of three spans.
- .3 Lap ends: to 50 mm minimum.
- .4 Provide minimum 20mm Dia. puddle weld spaced at 150mm with side laps button punched @ maximum 450mm for steel deck to steel beams and inserts or as indicated on structural drawings.
- .5 OWSJ Size Limits: minimum flat width of the top chord surface, where welding contact will be made, shall be 38 mm. Top chord minimum thickness, at point of welding, is 2.5 times the aggregate thickness of the steel deck material to be welded.

- .6 Arc Spot Weld Size Limits: the visible surface diameter of an arc spot weld size is 15mm nominal top diameter.
- .7 Fit Up: install the steel deck generally in full contact with the beam flange at point of welding, with no gap greater than 1.5 mm and no deleterious material interposed between deck and beam flange. Primer on beam flange is acceptable.
- .8 Immediately after deck is permanently secured in place, touch up metallic coated top surface with primer where burned by welding.
- .9 Deck edge:
All edges of steel decking shall be supported by edge angles fastened to main structural members, unless noted otherwise, use L75x75x6 at roofs.
- .10 Unless noted otherwise, all members designated as diaphragm chord members and all perimeter edge angles shall be connected by full strength groove welds or by full strength splice plates on each leg to form continuous compression and tension members. Weld edge angles and chords to Beams, joists and shear connectors and weld deck to angles chords and structural members as shown on drawings or as detailed by decking contractor.

3.3 FIELD QUALITY CONTROL

- .1 The Departmental Representative will not be responsible for inspection of the Contractor's work as described in Clause 7.12 of the CISC Code of Standard Practice for Structural Steel. The Contractor is responsible for the accuracy and completeness of his own work and shall verify that the structural steel has been fabricated, erected and finished in accordance with the contract specifications.

Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.

SCHEDULES OF INSPECTION AND TESTING OF MATERIALS

- .1 Non destructive Testing of puddle welds:
 - i) 100% of all pins & screws to be visually inspected (Field).
- .2 Verify the certification and conformance of the erector and welder to any relevant CSA Standards.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.
- .3 Submit test reports to Departmental Representative within 1 week of completion of inspection.
- .4 The costs of tests shall be borne by the Contractor.

3.4 OPENINGS AND AREAS OF CONCENTRATED LOADS

- .1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.
- .2 For larger openings, detail framing as follows:

Location	Opening Size (In any direction)	Reinforcing
Roof	<150mm but < 500mm	L51x51x6.4 running perpendicular to flutes and welded to minimum two flutes each side of opening
Roof	>500mm	L76x76x6.4 all around and extending to supporting structural steel members

3.5 CONNECTIONS

- .1 Install connections in accordance with CSSB1 Steel Roof Deck, 10M.

END OF SECTION 05 31 00

PART 1 GENERAL

1.1 Related Sections

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Sections 08 11 00 - Metal Doors and Frames
- .5 Sections 08 11 16 - Aluminum Doors and Frames
- .6 Section 08 71 00 – Door Hardware.
- .7 Section 08 80 00 – Installation of Plastic Glazing in Acoustical Screens.
- .8 Section 09 91 23 - Interior Painting.
- .9 Section 09 91 13 - Exterior Painting.

1.2 References

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-12, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269/A269M-14, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-12, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92 (R2013), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-09, Limit States Design of Steel Structures.
 - .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .4 The Environmental Choice Program
 - .1 CCD-047a-98, Paints, Surface Coatings.

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- 1.6 Waste Management and Disposal
- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated and cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.
 - .4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

PART 2 PRODUCTS

- 2.1 Materials
- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W, 350W.
 - .2 Steel pipe: to ASTM A53/A53M standard weight and extra strong, double extra strong, black, galvanized finish.
 - .3 Welding materials: to CSA W59.
 - .4 Welding electrodes: to CSA W48 Series.
 - .5 Bolts and anchor bolts: to ASTM A307; corrosion resistant types to ASTM A325M, Type 3. Provide all required anchoring devices including anchor clips, bar and strap anchors, expansion bolts and shields, and other devices designed to support and secure work.
 - .6 Aluminum sheet: proprietary utility sheet, plain, embossed pattern, mm minimum thickness, black, colour.
 - .7 Stainless steel tubing: to ASTM A269, Type 302, Commercial grade, Seamless welded with AISI No. 4 finish.
 - .8 Grout: non-shrink, non-metallic, flowable, 15 MPa pull out strength 7.9 MPa at 24 hours.
 - .9 Security Mesh: Sheets of carbon steel sheet expanded security mesh to requirements of ASTM A569M and to ASTM F1 267, Style: 20 mm, SWD-25 mm x LWD-54 mm, designed for penetration resistance, in sizes x 3 mm thick, 68% open area and 8.5 kg/m².
 - .10 Security fasteners: screws and bolts with spanner type heads to prevent removal except with special tools; non-corrosive type.
 - .11 Shop coat primer: to CAN/CGSB-1.40.

- .12 Touch-up primer: to CAN/CGSB-1.40.
- 2.2 Fabrication
- .1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
 - .2 Fabricate items from steel unless indicated otherwise; use galvanized steel for exterior items, unless indicated otherwise.
 - .3 Use self-tapping shake-proof countersunk flat headed screws on items requiring assembly by screws or as indicated. Use screws for interior work. Use welded connections for exterior work, unless approved otherwise by Departmental Representative.
 - .4 Where possible, fit and shop assemble work, match mark, ready for erection.
 - .5 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush with sharp edges and corners rounded to 3 mm radius. Where continuous welds may cause distortion of fabrication use stitch welds and plastic filler, grind and sand smooth.
 - .6 Seal exterior steel fabrications to provide corrosion protection in accordance with CAN/CSA-S16.1.
- 2.3 Finishes
- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
 - .2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
 - .3 Shop coat primer: to CAN/CGSB-1.40.
 - .4 Touch-up primer: to CAN/CGSB-1.40.
- 2.4 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.
- 2.5 Shop Painting
- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

PART 3 EXECUTION

- 3.1 Erection
 - .1 Do welding work in accordance with CSA W59 unless specified otherwise.
 - .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
 - .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
 - .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
 - .5 Provide components for building by other sections in accordance with shop drawings and schedule.
 - .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
 - .7 Hand items over 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.
 - .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- 3.2 Miscellaneous Steel Brackets, Caps, Shoes, Beam Supports and Angles
 - .1 Supply for installation by respective trades. Drill for countersunk screws and anchor bolts.
- 3.3 Air Pass Through Grille
 - .1 Description: construct in accordance with details shown on Drawing.
 - .2 Use security screws for 6 mm Φ carriage bolts (weld head on).
 - .3 Prime paint.

Cleaning

- .1 Perform cleaning after installation to remove construction and accumulate environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

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