

Part 1 General

1.1 GENERAL CONDITIONS

- .1 The General Conditions of the Contract, Supplementary General Conditions and General Requirements are hereby made part of this Section.

1.2 WORK INCLUDED

- .1 Structural steel framing members, structural steel support members, struts, complete with required bracing, welds, washers, nuts, shims, anchor plates and bolts.
- .2 Baseplates, connectors and bearing plates.
- .3 Erection.

1.3 RELATED WORK

- .1 Cast-in-Place Concrete Section 03 30 00
- .2 Steel Decking Section 05 31 00
- .3 Painting and Finishing Section 09 90 00

1.4 QUALITY ASSURANCE

- .1 Structural steel fabricator to be certified as minimum Division 2 Company under CSA W47.1-09 - "Certification of Companies for Fusion Welding of Steel Structures" or CSA Standard W55.3-08 "Resistance Welding Qualification Code for Fabricators of Structural Members" or both, as applicable.
- .2 Design to strictly adhere to all codes and standards as enumerated under Section 1.5 Reference Standards.
- .3 In the event of conflict between pertinent codes, standards and/or regulations, most stringent shall govern.

1.5 REFERENCE STANDARDS

- .1 CSA Standard CAN/CSA-S16-01 - "Limit States Design of Structural Steel Buildings".
- .2 CSA G40.21-04 (R2009) - "Structural Quality Steel".
- .3 ASTM Standard A325M - "High Strength Bolts for Structural Steel Joints including Suitable Nuts and Plane Hardened Washers".
- .4 CSA Standard W59-03 (R2008) - "Welded Steel Construction".
- .5 CSA Standard W47.1-09 - "Certification of Companies for Fusion Welding of Steel Structures".
- .6 ASTM Standard A53 - "Welded and Seamless Steel Pipe".

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with General Conditions.
- .2 Clearly indicate sizes, spacing and locations of structural members, connections, attachments, anchorages, framed openings and size and type of fasteners and welds.
- .3 Indicate all shop and erection details including cuts, copes, connections, holes, threaded fasteners and welds.
- .4 Show all welds, both shop and field, by the currently recommended symbols of the Canadian Welding Bureau.
- .5 Prepare shop drawings under direction of a qualified Professional Engineer registered in the Province of Saskatchewan.
- .6 Review of shop drawings for size and arrangement of principal and auxiliary members only. Such review will not relieve the Contractor of responsibility for general and detail dimension and fit, or any errors or omissions.

1.7 INSPECTION AND TESTING

- .1 Materials and workmanship subject to inspection on behalf of Owner.
- .2 Report failure of material to fit together properly to Consultant. No corrective measures permitted unless approved by Consultant in writing.

Part 2 Products

2.1 MATERIALS/COMPONENTS

- .1 *Standard Rolled Sections*: new material conforming to CSA G40.21-04 (R2009), Grade 350W.
- .2 *Hollow Structural Sections*: new material conforming to CSA G40.21-04 (R2009), Grade 350W, Class C.
- .3 *Steel Pipe Sections*: new material conforming to ASTM Standard A53, Grade 241.
- .4 *Base and Cap Plates*: new material conforming to CSA G40.21-04 (R2009), Grade 300W.
- .5 *Beam End Plates, Ledger Angles and Miscellaneous Steel*: new material conforming to CSA G40.21-04 (R2009), Grade 300W.
- .6 *Anchor Bolts*: new material conforming to CSA G40.21-04 (R2009), Grade 260W.
- .7 *Bolts, Nuts and Washers*: high strength type recommended for structural steel joints, conforming to requirements of ASTM A325M-83c.
- .8 *Paint for Primer*: shall be grey (unless approved otherwise) and meet requirements of one of the following:
 - .1 CGSB 1-GP-40d, Primer, Structural Steel, oil alkyd type.
 - .2 CISC/CPMA Standard 1-73a, quick drying one-coat paint for use on structural steel.

2.2 FABRICATION

- .1 Fabricate structural steel members in accordance with building design drawings and all requirements of CAN/CSA S16-01. Welding to conform to CSA W59-03 (R2008) "Welded Steel Construction". Verify all dimensions prior to fabrication.
- .2 No cutting of openings in structural members except as shown on structural drawings. Reinforce openings to maintain required design strength.
- .3 Accurately cut and mill column ends to assure full contact of bearing surfaces.
- .4 Camber horizontal members as specified on drawings. Mill camber up where not specifically detailed.
- .5 All bolted connections to be "bearing" type connections except where subject to stress reversal which are to be "slip resistant" type connections.
- .6 All connections showing combined axial load (tension or compression) across the joint to be designed for loads shown. Such connection to be bolted through columns only.
- .7 All beams to be connected for the greater of the following conditions.
 - .1 Loads shown on drawings.
 - .2 50% of the total uniformly distributed load resistance of the member.
 - .3 Half depth of the connected member using M20 bolts (minimum two bolts) in double shear.

2.3 PAINTING

- .1 All steel in contact with concrete and all faying surfaces of high strength bolted slip-resistant connections shall not be primed.
- .2 All structural steel shall be prepared in accordance with SSPC Standard SP2 "Hand Tool Cleaning" and have one coat of specified shop applied primer.
- .3 Hot dipped galvanizing zinc coating. 600 grams/m² to CAN/CSA G164-M92.

Part 3 Execution

3.1 ERECTION

- .1 Erect structural steel in accordance with building design drawings and all requirements on CAN/CSA S16-01.
- .2 Make adequate provision for all erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection. Leave such bracing in place as long as required for safety and integrity of the structure.
- .3 As erection progresses, securely bolt work to take care of full design loads and to provide structural integrity as required.
- .4 Use high tensile bolts for field connections unless otherwise noted on building design drawings.

- .5 Set all baseplates which are shop welded to columns to proper elevation on steel shims. Maximum tolerance from stated elevations to be ± 2 mm.
- .6 Masonry Ledgers
 - .1 All masonry ledgers shall be erected with provision for full site adjustment. Position ledgers accurately to correct elevations and plan location and field weld in place prior to laying up masonry.
- 7. Tolerances
 - .1 Tolerance of all structural steel shall be maintained strictly in accordance with CAN/CSA S16-01.
- .8 After erection, prime all welds, abrasions, bolted connections and all other surfaces not shop primed, except surfaces to be in contact with concrete.
- .9 Obtain written permission of Consultant prior to altering or field welding of structural members.

3.2 ELEVATOR REQUIREMENTS

- .1 Provide erection and lifting beams, installed, to suit elevator supplier requirements.

END OF SECTION

Part 1 General

1.1 GENERAL CONDITIONS

- .1 The General Conditions of the Contract, Supplementary General Conditions and General Requirements are hereby made part of this Section.

1.2 WORK INCLUDED

- .1 Steel floor deck, complete with cover plates, cell closures and flashings.
- .2 All closure angles, channels, plates, as well as supplementary deck support or anchorage where required to provide continuous deck membrane.
- .3 Contractor to study Contract Drawings and Specifications with regard to the work shown and required under this Section to ensure its completeness. Supplementary items necessary to complete the work although not specifically shown or specified shall be supplied and installed.

1.3 RELATED WORK

- | | |
|------------------------------------------|------------------|
| .1 Cast-in-Place Concrete | Section 03 30 00 |
| .2 Structural Steel for Buildings | Section 05 12 23 |
| .3 Metal Fabrications | Section 05 50 00 |
| .4 Painting and Finishing | Section 09 90 00 |

1.4 REFERENCE STANDARDS

- .1 Canadian Sheet Steel Building Institute (CSSBI) - "Standard Steel Roof Deck" and "Steel Roof Deck".
- .2 CAN/CSA S136-07 - "Cold Formed Steel Structural Members".
- .3 ASTM A446 - "Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process, Physical (Structural Quality)".
- .4 Welding to CSA W59-03 (R2008) except where specified elsewhere.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with General Conditions.
- .2 Clearly indicate decking plan, deck profile, dimensions, anchorage, supports, projects, openings and reinforcement, applicable details and accessories.
- .3 Clearly indicate position of temporary shoring of decking if required by design criteria.
- .4 Review of shop drawings will not relieve Contractor of responsibility for general and detail dimensions and fit, or any errors or omissions.
- .5 Prepare shop drawings under the direction of a professional engineer registered in the Province of Saskatchewan, Canada.

- .6 Submit shop drawings stamped and signed by qualified professional engineer registered in Province of Saskatchewan, Canada.

Part 2 Products

2.1 MATERIALS/COMPONENTS

- .1 *Sheet Steel:* Grade A or Grade B structural quality, conforming to ASTM A446.

2.2 DECKING/RELATED ACCESSORIES

- .1 *Floor Decking:* HB-38 Hi-Bond Steel Floor Deck - 38 mm deep by 914 mm wide sheets by 0.76 mm core thickness as manufactured by VicWest or approved equivalent. Galvanized to ZF075 (Wipe Coat) Standard.
- .2 Any substitution of specified material to be approved in writing by the Consultant.
- .3 *Closure Strips, Flashings, Cover Plates and Related Accessories:* minimum 1.6 mm (16 gauge) sheet steel.
- .4 *Primer:* Zinc rich, ready mix to CGSB-1-GP-181M.
- .5 *Closures to external walls:* neoprene as recommended by manufacturer.

2.3 FABRICATION

- .1 Fabricate metal decking in accordance with Drawings and as recommended by the Canadian Sheet Steel Building Institute (CSSBI) Standards. Fabricate to accommodate maximum deflections of 1/360 span.
- .2 Supply steel fillers between decking and supporting members where required.
- .3 Deck units to be 3 span continuous where possible; under no circumstances should deck be less than 2 span continuous except where detailed.

Part 3 Execution

3.1 INSTALLATION

- .1 Erect metal decking in accordance with drawings and as recommended by the CSSBI. Properly align and level on structural supports.
- .2 Allow minimum 40 mm bearing when supported by structural steel and minimum 100 mm bearing when supported by concrete.
- .3 Mechanical fasten male/female side laps at maximum 300 mm.
- .4 Reinforce openings 150 mm to 450 mm in size with L51 x 51 x 4.8 steel angles or as indicated on the Drawings. Place angles perpendicular to flutes, extended minimum two flutes each side of openings and weld to deck.
- .5 Reinforce openings over 450 mm in accordance with details indicated on Drawings.

- .6 Install minimum 150 mm cover plates where deck changes direction. Spot weld in place at maximum 300 mm on centre.
- .7 Install strip closures at slab edges to match thickness of slab, as required to contain poured concrete. Ensure closures are of sufficient strength to remain in place without distortion.
- .8 Immediately after installation, touch up welds, burned areas and damaged spots with prime paint. Use type of primer recommended for galvanized surfaces.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A276-13a, Standard Specification for Stainless Steel Bars and Shapes.
 - .3 ASTM A307-12, Standard 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.
 - .2 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
 - .4 CSA W48-06(R2011), 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).

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 QUALITY ASSURANCE

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 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 or 350W.
- .2 Steel pipe: to ASTM A53/A53M extra strong, galvanized finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Stainless steel: to ASTM A276, Type 302 commercial grade.
- .7 Welded wire mesh: 6.4 mm cold rolled steel wire, welded, 102 mm square openings. Galvanized.
- .8 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

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 and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

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

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.

2.6 ANGLE LINTELS

- .1 Steel angles: prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
- .2 Weld or bolt back-to-back angles to profiles as indicated.
- .3 Finish: shop painted.

2.7 PIPE RAILINGS

- .1 Steel pipe: 38 mm nominal outside diameter, formed to shapes and sizes as indicated.
- .2 Galvanize exterior pipe railings after fabrication.

2.8 CORNER GUARDS

- .1 Stainless steel angle: 89 x 89 x 2 mm thick x 2440 mm high, with 8 anchors each guard.
- .2 Satin finish for all applications.

2.9 WELDED WIRE MESH

- .1 Welded wire mesh: 6.4 mm wire diameter, welded, 102 mm square openings, 89% open area. Galvanized.

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 and zinc finish coating where burned by field welding.

3.2 PIPE RAILINGS

- .1 Install pipe railings to stairs, catwalk, and ramp.

3.3 CHANNEL FRAMES

- .1 Install steel channel frames to openings as indicated.

3.4 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

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A123/A123M-13, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM E935-13e1, Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- .2 Canadian Standards Association (CSA International).
 - .1 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .3 The Society for Protective Coatings (SSPC).
 - .1 SSPC Painting Manual Volume 2.

1.2 DESIGN REQUIREMENTS

- .1 Installed guardrail assembly and attachments to resist lateral force of 333 N at any point without damage or permanent set. Test in accordance with ASTM A935.

1.3 SUBMITTALS

- .1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Submit Shop Drawings in accordance with Section 01 33 00 - Submittal Procedures. Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- .4 Submit Samples in accordance with Section 01 33 00 - Submittal Procedures. Submit two, 300 mm long samples of handrail. Submit two samples, of elbows, Tees, escutcheons, and end stops.

1.4 QUALITY ASSURANCE

- .1 Perform welding to CSA W59.
- .2 Submit Test Reports and substantiating engineering data and test results of previous tests which purport to meet performance criteria, and other supportive data.
- .3 Design structural support framing components and site inspect the installation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Saskatchewan.
- .4 Co-ordinate the Work with installation of roofing assembly and sheet metal work.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.

1.6 SUSTAINABLE REQUIREMENTS

Part 2 Products

2.1 GUARDRAIL SYSTEM

- .1 Roof Edge Protection
 - .1 Freestanding base mounted guardrail system with 1070 mm minimum height to provide a barrier on the roof to withstand a minimum load of 333 N at any point.
 - .2 Pipe: Steel, 38 mm schedule 40 mm, galvanized.
 - .3 Tube: Galvanized tube, 2.75mm (12ga), 38 mm OD.
 - .4 Rails and Posts: Galvanized Tube, 2.75 mm (12ga), 38mm diameter.
 - .5 Mounting Bases: Steel bases are galvanized and are supplied with a rubber pad on underside of the component.
 - .6 Fasteners: stainless steel or galvanized. Flush countersunk screws or bolts; consistent with design of railing.
 - .7 Galvanizing: to ASTM A123, provide minimum 380 g/sq m galvanized coating.
 - .1 Touch-Up Primer for Galvanized Surfaces: SPCC 20 Type I Inorganic zinc rich.
 - .8 Shop Prefinishing: Enamelled to colour as selected from manufacturer's standard range of colours.

2.2 FABRICATION

- .1 Fit and shop assemble components in largest practical sizes for delivery to site.
- .2 Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- .3 Provide anchors, plates, and angles required for connecting railings to structure.
- .4 Exposed Mechanical Fastenings: flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
 - .1 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 Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - .3 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.

- .4 Accurately assemble components to each other and to building structure.
- .5 Accommodate for expansion and contraction of members and building movement without damage to connections or members.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- .1 Supply items required for freestanding system with setting templates, to appropriate sections.

3.3 INSTALLATION

- .1 Install steel guardrails in accordance with manufacturer's instructions and reviewed shop drawings.
- .2 Install components plumb and level.
- .3 Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- .4 Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- .5 Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.4 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: 6 mm.
- .2 Maximum Out-of-Position: 6 mm.

3.5 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

