

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Conform to General Instructions, Division 1.

1.2 WORK INCLUDED

- .1 Refer to the Contract Drawings for detailed requirements.
- .2 Supply all materials, provide all labour and equipment to erect the structural steel as shown or required by the drawings or specifications. The principal items include, but are not limited to:
 - structural steel beams, columns, angles
 - plates, stiffeners, strap anchors
 - bent plates, bearing plates, angles

1.3 RELATED WORK SPECIFIED ELSEWHERE

- .1 Wood Trusses - Division 6.
- .2 Masonry - Division 4.
- .3 Grouting of bearing plates - Division 3.
- .4 Painting - Division 9

1.4 REFERENCE STANDARDS

- .1 All standards in accordance with latest issue.
- .2 C.S.A. Standard CAN3-S16.1-M, "Steel Structures for Buildings" Limit States Design.
- .3 C.S.A. Standard W59, "Welded Steel Construction" (Metal Arc Welding).
- .4 C.S.A. Standard W.55.2, "Resistance Welding Practice".
- .5 C.S.A. Standard W.55.3, "Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings".
- .6 C.S.A. Standard W.47, "Certification of Companies for Fusion Welding of Steel Structures".

- .7 C.S.A. Standard S.136, "Cold Formed Steel Structural Members".
- .8 C.S.A. Standard G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 ASTM A325-00 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength.
- .10 CISC/CPMA 2-75 Quick Drying Primer for use on Structural Steel.
- .11 National Building Code.
- .12 Workplace Safety Act or any other regulations of the Manitoba Labour Board relating to the work of this section.

1.5 SHOP DRAWINGS

- .1 Examine all drawings forming a part of this Contract and conform to the requirements of all such drawings.
- .2 The Consultant reserves the right to relocate members prior to and during the approval of erection diagrams for the purpose of clearing ducts, piping, walls, etc., and to finalize the location of mechanical roof top units, etc., at no additional cost to the Owner. Any cost involved in revisions to erection diagrams or shop drawings as a result of these changes shall be borne by this Sub-Contractor.
- .3 Any fabrication executed before review of shop drawings shall be at this Sub-Contractor's risk. Fabrication shall be assumed to begin when material is cut to length, whether this be by the fabricator or at the mill to the fabricator's orders.
- .4 The Consultant's review of shop drawings will not relieve the Sub-Contractor from his responsibility for ensuring that his work is complete, accurate, and in accordance with the drawings and specifications.

- .5 Shop drawings are to be submitted as follows:
 - .1 Erection drawings: 2 prints and 1 digital pdf file of each.
 - .2 Shop fabrication drawings: 1 print and 1 digital pdf file of each.
- .6 Provide one hard copy and one set of scanned digital pdf files of the erection diagrams to the Consultant showing "as-built" conditions, including final sizes and locations of openings and final locations of mechanical units.
- .7 All loads, forces and reactions shown on the drawings or noted in the specifications are service loads (unfactored), unless noted otherwise.
- .8 Design and detailing of connections, etc. in accordance with C.S.A. CAN3-S16.M. Service loads must be factored for Limit States Design.
- .9 No levelling plates will be allowed on this project unless the steel fabricator hires a 3rd party inspection firm to confirm that the requirements of clauses 25.3.1.2, 28.5, and 29.7.8 of CSA standard S16-01 have been met for all column bases where levelling plates have been used. Following inspection the inspection firm must submit a letter signed and sealed by a professional engineer confirming that they have inspected all column bases employing levelling plates and that these bases meet the requirements of above noted clauses. The 3rd party inspection firm is to have a minimum 5 years experience inspecting steel structures and shall be certified as CWB certified inspection company.
- .10 Within two weeks of awarding the contract the structural steel fabricator must submit for approval, a drawing showing the top of bearing plate elevations and horizontal dimensions to all bearing plates. The mason and/or concrete Contractor cannot start with blockwork, and/or concrete walls above finished floor elevation until these drawings are reviewed and approved.

1.6 DESIGN CRITERIA

.1 Certificates

1. Provide a certificate signed and sealed by the registered professional engineer responsible for the detailed structural steel connections, stating that the connections have been designed, detailed, and fabricated in accordance with the applicable standards for the loads shown.
 2. Certificates must bear the original seal and signature of an engineer licensed in the province Of Manitoba complete with date when stamped. Photocopies are not acceptable.
- .2 All loads, forces and reactions shown on the drawings or noted in the specifications are service loads (unfactored), unless noted otherwise.
- .3 Typical connection details are shown on the drawings for guidance only. Design and submit for approval suitable bolted or welded connections. In general, bolted connections are to be designed as "bearing" connections with threads included in the shear plane.
- .4 The shear capacity of all beam and girder connections shall be not less than the shear capacity of the section acting as a simple beam loaded uniformly to its moment capacity over the same span nor less than that shown on the drawings, whichever is greater.
- .5 Typical bearing stiffeners for beams continuous over columns are shown on the drawings. Design suitable stiffeners at other locations of concentrated loads, as required to suit the connection design.

1.7 COORDINATION

- .1 Coordinate the work of this Section with the Construction Manager's scheduling in accordance with the General Conditions.

- .2 Coordinate the work of this Section with the work of all affected Divisions to provide proper clearances and assembly of the work.
- .3 Coordinate the work of this Section with the work of the Section 05300 "Metal Deck" to provide a continuous erection procedure.

1.8 SUBSTITUTIONS

- .1 Substitution of available beam and column sections for those shown on the drawings may be permitted, provided that the substituted members have equivalent or greater capacity and stiffness than those shown.
- .2 Proposed substitutions are subject to prior approval of the Consultant and must not interfere with Architectural clearances.

1.9 QUALITY ASSURANCE

- .1 Fabrication and erection of all components to be by Division 1 or Division 2.1 certified company only. Welders must have current CWB certification for the applicable position.

1.10 SPECIAL CONDITIONS

- .1 Structural steel members exposed to view within or outside the building require special attention to welds, fit up, connections and finish.
- .2 Refer to painting specification for special preparation of steel canopy.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Rolled Steel Sections,
 - .1 Currently produced in Canada - in accordance with C.S.A. Standard G.40.21M-350W.
- .2 Plates, Rods and Bars, - C.S.A. Standard G40.21 300W
- .3 Hollow Structural Sections - G40.21M-350W, Class H.

- .4 High Strength Bolts & Washers - in accordance with ASTM Standard A325.
- .5 Shop Primer Paint -
 - i) In accordance with CISC/CPMA Standard 2-75, for steel on interior of building.
 - ii) For all structural steel, plates and miscellaneous metals exposed to the elements, provide the following primer: Catha-Coat 302H Reinforced Inorganic Zinc Primer. Steel to be abrasive blasted steel to SP6, Sa2. Final coat to be compatible with the specified primer. Follow architects specifications. Touch up paint with the same product.
- .6 Anchor bolts - in accordance with C.S.A. Standard G40.21M-300W.
- .7 Galvanizing - zinc coating by hot dipped process after fabrication, shot blasting and pickling to provide a uniform coating of not less than 2.0 ounces per sq. ft.
- .8 Field Touch-up Paint
 - 1. As for shop paint for previously shop primed members
 - 2. Galvafruid zinc rich coating by W.R. Meadows for previously galvanized members.

2.2 FABRICATION

- .1 Fabrication of all structural steel in accordance with C.S.A. Standard CAN3-S16.1-M.
- .2 Carefully make and fit all details and connections to ensure that the finished work presents a neat and workmanlike appearance.
- .3 All shop and field connections are to be welded.
- .4 Splicing will not be allowed without the approval of the Consultant at the shop drawing review stage. Splicing will then only be allowed if the length of the fabricated member required is longer than that normally produced at the mill.

- .5 All members shall be true to length so that assembly may be done without fillers.
- .6 Provide holes for bolted connections for connecting the work of other trades where such holes can be determined prior to fabrication and only at the request of the Engineer or the trade concerned. Such holes shall only be provided where they will not impair the satisfactory performance of the structure.
- .7 Provide welded strap or reinforcing bar anchors for beams for anchorage to concrete or masonry as shown on the typical details.
- .8 Provide holes in webs or welded bar assemblies for masonry anchors as per typical details.
- .9 Supply suitable anchor bolts for base plates and bearing plates for installation under Division 3.
- .10 Bearing plate sizes shown on the drawings are finished sizes. Allow additional thickness as required for milling.
- .11 Provide restraining clip angles at the tops of all masonry walls for lateral support of such walls.
- .12 Thoroughly clean all steel of all loose mill scale, and rust.
- .13 Apply one coat of shop primer on dry clean surfaces for all members except as follows:
 - .1 Do not paint steel in direct contact with concrete,
 - .2 Do not paint steel at locations where field welded moment connections are to be made. (Field prime all steel after welding and after removal of slag down to bare metal)
 - .3 Do not paint any galvanized steel items.
 - .4 Do not paint steel to be fireproofed if the manufacturer of the fireproofing material indicates that the bond of the fireproofing will be adversely affected by the primer.

- .14 Supply suitable anchor bolts for base plates and bearing plates for installation under Division 3.
- .15 Take care to minimize distortion due to welding and galvanizing procedures. Straighten members as required to maintain the fabrication tolerances of C.S.A. CAN3-S16.1-M.
- .16 Galvanizing to C.S.A. Standard G164, including preparation. Blast clean to commercial quality after fabrication, prior to galvanizing. Provide seal welds in addition to structural welds as required by good practice.
- .17 Provide welded "seal" plates (minimum 5mm) as required to close all HSS sections. If this is not possible in all locations, provide drain holes.
- .18 Supply suitable loose lintels as shown on the Lintel Schedule for all openings in masonry walls for installation under Division 4. Lintels included are those for all openings shown on Architectural, Mechanical, and Electrical drawings.
- .19 Sand-blast all steel exposed to the exterior of the building and immediately paint with epoxy primer.

2.3 QUALITY CONTROL

- .1 All materials and fabrication shall be subject to test by a testing and inspection company appointed by the Contractor.
- .2 Provide access to the work in the shop for the personnel of the inspection company.
- .3 Provide such samples of materials and mill test reports as may be required by the inspection company at no cost to the Owner.
- .4 The cost of testing will be paid for by the Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Examine and obtain all necessary measurements of previously executed and existing work which may affect the work of this Section.
- .2 Make a line and level survey of the foundations and anchor bolts. Report any discovered discrepancies to the Consultant so that instructions can be given for the necessary remedial action.

3.2 ERECTION

- .1 Accurately set all steel to the lines and elevations shown on the drawings. Temporarily connect all members with sufficient weld to ensure the safety of the structure until permanent connections are made.
- .2 Assemble all members without twists or open joints. Take particular care that all parts are well pinned up and drawn together before bolting or welding is started.
- .3 Assume full responsibility for the correct plumbing and alignment and for setting of all members.
- .4 If members do not fit properly in the field, repairs must be made by methods to the satisfaction of the Consultant. In no case shall cutting be done with a torch, except where specific approval as to size and location of same is granted by the Consultant. Unfair holes shall be enlarged with a twist drill and larger bolts used.
- .5 Erection tolerances in accordance with Section 28 of C.S.A. CAN3-S16.1.
- .6 Erect the steel frame true and plumb. Place temporary bracing where necessary to take care of all loads to which the incomplete building may be subjected, such as wind, equipment, or construction procedures. Leave temporary bracing in place as long as necessary for the safety of the structure.

- .7 Install restraining clip angles to provide lateral support at the top of all new masonry walls. Carefully co-ordinate with the Contractor and the Masonry Sub-contractor.
- .8 Set column bases and beam bearing plates on steel shims or other suitable supports. Grouting under these plates will be by Division 3, "Cast-in-Place Concrete" or Division 4 "Masonry" for bearing plates built into masonry walls. Should the Structural Steel Contractor choose to employ leveling plates the Structural Steel trade will be responsible for providing and leveling a minimum of four (4) anchor bolts for each baseplate. Fabricator to provide leveling nuts above and the leveling plate to hold it firmly in place during grouting operations

3.3 FIELD PAINTING

- .1 Field paint, using the appropriate finish paint. All scars, blemishes, or those areas damaged by erection procedures.
- .2 For members which are hot-dipped galvanized, touch up all scars, scratches, etc. with a compatible zinc rich paint.

3.4 FIELD QUALITY CONTROL

- .1 Provide access to the work at the site for the personnel of the inspection company.
- .2 Testing shall be carried out at the option of the Consultant and will be paid for by the Owner, except that any re-testing required due to defective work shall be borne by this Sub-Contractor.

3.5 CLEAN-UP

- .1 At the completion of the work of this Section, remove any excess materials, debris, and equipment from the site.

END OF SECTION