PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and the General Requirements of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:
1. Aluminum framing members, support members, bracing members and connections.
2. Leveling plates, leveling nuts and bolts.

C. Related Sections:
1. Section 01 11 55 – General Instructions

1.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Section 01 11 55 – General Instructions for the list of applicable regulatory requirements.

B. Aluminum Association, Inc. (AA):
1. Aluminum Design Manual 2010
2. Designation System for Aluminum Finishes

C. ASTM International:
1. ASTM B308 / B308M Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
2. ASTM A307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile
3. ASTM A325/325M Specification for Structural Bolts, Steel, Heat Treated, 120/105ksi Minimum Tensile Strength
4. ASTM A490/490M Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
5. ASTM B209M Specification for Aluminum and Aluminum-Alloy Sheet and Plate
6. ASTM B210M Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
7. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
8. ASTM B429 Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
9. ASTM F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

D. American Welding Society:
   1. A5.10/A5.10M Specification for Bare Aluminum and Aluminum Alloy Welding Electrodes and Rods

E. Canadian Standards Association (CSA International)
   1. CAN/CSA-G164 Hot Dip Galvanizing of Irregularly Shaped Articles
   2. CAN/CSA-S157 Strength Design in Aluminum
   3. CSA W47.2 Certification of Companies for Fusion Welding of Aluminum
   4. CSA W59.2 Welded Aluminum Construction

F. Canadian Standards Association (CSA International)
   1. MPI - EXT 5.5D, Bituminous Paint

1.3 DESIGN REQUIREMENTS

A. Design connections not detailed on the Drawings under the direct supervision of a Structural Engineer experienced in design of aluminum and licensed in the province of British Columbia, Canada.

B. Design details and connections in accordance with requirements of Aluminum Design Manual 2010 and CAN/CSA-S157 to resist forces, moments, shears and allow for movements indicated.

C. If shears are not indicated, select or design connections to support reaction from 120% maximum uniformly distributed load that can be safely supported by beam in bending (60% each end), provided no point loads act on beam.

1.4 SHOP DRAWINGS

A. Submit shop drawings including fabrication and erection documents consisting of connection and design details, shop details, erection diagrams, erection procedures and material lists in accordance with Section 01 11 55 – General Instructions.

B. Connections shall have a minimum of two bolts and the minimum thickness of connection plates shall be 10mm.

C. Submit drawings stamped and signed by qualified professional engineer licensed in Province of British Columbia, Canada.

D. Indicate cuts, copes, connections, holes, threaded fasteners, rivets, welds and other items. Indicate welds using welding symbols as shown in Appendix A of CSA W59.2.

E. Submit description of methods, sequence of erection and type of equipment to be used in erecting structural aluminum.

F. 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 submit

to the Consultant a completed Schedule S-B: Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional, and Schedule S-C: Assurance of Professional Field Review and Compliance by Supporting Registered Professional.

1.5 QUALITY ASSURANCE

A. Submit 2 copies of mill test reports showing chemical and physical properties and other details of aluminum to be incorporated into work, at least 4 weeks prior to fabrication of structural aluminum. Mill test reports shall be certified by metallurgists qualified to practice in province of British Columbia, Canada.

B. Fabricator of structural aluminum shall, in addition, provide an affidavit stating that materials and products used in fabrication conform to applicable material and products standards called for by design drawings and specifications.

1.6 WASTE MANAGEMENT AND DISPOSAL

A. Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Shapes, and Tubes: to ASTM B221M, Alloy and temper 6061-T6 unless otherwise indicated on the Drawings.

B. Aluminum sheet or plate: to ASTM B209M, Alloy and temper 6061-T6.

C. Aluminum bolts and rivets: to ASTM B316M Bolts, Nuts, and Washers.

D. Rivets in Structural Connections: Alloy 6061-T6.

E. Stainless steel bolts: to ASTM F593.

F. Steel bolts: to ASTM A325

G. Bituminous paint: MPI EXT 5.5D, without thinner

H. Galvanizing: hot dip galvanize steel bolts to CAN/CSA-G164, minimum zinc coating of 600 g/m^2.

2.2 FABRICATION

A. Fabricate aluminum members in accordance with CAN/CSA-S157 and in accordance with the approved Shop Drawings.

B. Obtain field measurements necessary for fabrication.

C. Where structural joints are welded, the detail of the joints, welding technique, weld quality and appearance, and methods for correcting defective welds shall conform to the CSA-W59.
   1. Welding Process: Inert shielded gas or resistance welding process.

D. Structural members are selected from generally available rolled sections; however, if the specified sections are not available, provide sections with equivalent physical properties at no additional cost after approval by the Departmental Representative.

2.3 FINISHES

A. Finish exposed surfaces of aluminum components in accordance with Aluminum Association (AA), Designation System for Aluminum Finishes.

B. Plain mill finish if not indicated on drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary supports and internal braces necessary to support structure during erection. Temporary supports and braces shall be adequate for anticipated equipment and erection loads. Remove temporary shoring after the erection is complete.

B. Before erection, paint contact surfaces between dissimilar materials.

3.2 GENERAL

A. Structural aluminum work: in accordance with CAN/CSA-S157.

B. Welding: in accordance with CSA W59.2.

C. Companies to be certified under Division 1 or 2.1 of CSA W47.2 for fusion welding of aluminum and/or CSA W55.3 for resistance welding of structural components.

3.3 EXAMINATION

A. Verify that field conditions are acceptable and are ready for erection.

B. Beginning of installation means Contractor accepts that existing conditions meet the requirements for installation.

3.4 ERECTION

A. Erect structural aluminum as indicated and in accordance with CAN/CSA-S157 and approved erection drawings.

B. Where members can not be properly assembled due to misfabrication or deformation due to handling or transportation, report the condition to the Departmental Representative with a proposed method of correction for approval. Erect structure to the lines and grades indicated on the Drawings and in accordance with the Shop Drawings.

C. Do not field cut or alter structural members without approval of the Departmental Representative.

3.5 INSPECTION AND TESTING

A. Inspection and testing will be performed under provisions of Section 01 11 55 – General Instruction. The Contractor shall be responsible for in-house visual inspection and implementing a quality control program. The Contractor is responsible for the accuracy and completeness of his own work and shall verify that the structural aluminum has been fabricated, erected and finished in accordance with the contract specifications.

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

C. Testing requirements are as follows:
1. Perform visual testing of welds in the fabricator's shop.
2. Visual Field Inspection and Bolt Torque Testing (Random 10% of Bolts) of all bolted connections

D. Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.

E. Submit test reports to Departmental Representative within 1 week of completion of inspection.

F. Costs of tests shall be borne by the Contractor.

3.6 JOINT SEALING AND PAINTING

A. Surface preparation of aluminum in contact with or embedded in dissimilar materials: to CAN/CSA-S157. All locations to be treated for presence of moisture.

B. Paint in accordance with CAN/CSA-S157.

3.7 FIELD PAINTING

A. Touch up damaged surfaces with one coat of zinc chromate primer followed by [one] coat[s] of compatible paint.

END OF SECTION 05 14 00