

**SECTION 05 14 00
STRUCTURAL ALUMINUM**

SPEC WRITER NOTE: Delete text between // _____ // when it does not apply to your project. Edit the remaining text to suit your project.

PART 1 - GENERAL

1.1 SCOPE OF WORK

The work under this Section includes the design, fabrication, and erection of structural aluminum.

1.2 RELATED REQUIREMENTS

- A. Materials Testing and Inspection During Construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Fireproofing: Section 07 81 00, APPLIED FIREPROOFING.
- C. Framing: // Section 08 44 13, GLAZED ALUMINUM CURTAIN WALLS // Section 13 34 19, METAL BUILDING SYSTEMS //.
- D. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- E. Painting: Section 09 91 00, PAINTING.

1.3 REFERENCES

- A. Comply with references to extent specified in this section.
- B. Aluminum Association (AA):
 - 1. Aluminum Design Manual 2020 Edition:
 - a. Part I: Specification for Aluminum Structures
 - b. Part IX: Code of Standard Practice for Fabricating and Erecting Structural Aluminum
- C. American Welding Society (AWS):
 - 1. A5.10/A5.10M:2017 Welding Consumables – Wire Electrodes, Wires and Rods for Welding of Aluminum and Aluminum Alloys – Classification
 - 2. D1.2/D1.2M:2014 Structural Welding Code – Aluminum
- D. ASTM International (ASTM):
 - 1. A193/A193M-20 Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
 - 2. A194/A194M-20a Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
 - 3. A307-14e1 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
 - 4. ASTM A563-15 Standard Specification for Carbon and Alloy Steel Nuts

5. B209-14 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 6. B211/B211M-19 Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire
 7. B221-14 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 8. B308/B308M-20 Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
 9. F467-13(2018) Standard Specification for Nonferrous Nuts for General Use
 10. F468-16 Standard Specification for Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws, and Studs for General Use
 11. F2329/F2329M-15 Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
 12. F3125/F3125M-19e1 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
 13. F593-17 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
 14. F594-09(2020) Standard Specification for Stainless Steel Nuts
 15. F844-07a(2013) Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
- E. Occupational Safety and Health Administration (OSHA):
1. 29 CFR 1926.752(e) Guidelines for Establishing the Components of a Site-Specific Erection Plan
 2. 29 CFR 1926-2001 Safety Standards for Steel Erection
- F. Research Council on Structural Connections (RCSC):
1. Specification for Structural Joints Using High Strength Bolts (2014)

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings: Show size, configuration, and fabrication and erection details.
- C. Submittal Calculations: Calculations shall comply with the Specification for Aluminum Structures and shall be signed and sealed by a registered professional engineer licensed in the state where the project is located.
- D. Quality Control Programs:
 1. Fabricator Quality Control Program

- 2. Erector Quality Control Program
- E. Sustainable Construction Submittals; Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- F. Test Reports:
 - 1. Procedure Qualification Record (PQR) for each Weld Procedure Specification (WPS)
 - 2. Welding Personnel Performance Qualification Records (WPQR) for welding personnel.
- G. Material Certificates: Certify each product complies with specifications.
- H. Welding Procedure Specifications (WPS)
- I. Record Surveys: Signed and sealed by responsible surveyor or engineer.

1.5 QUALITY ASSURANCE

- A. Fabricator Quality Control Program shall comply with the Specification for Aluminum Structures, Chapter N.
- B. Erector Quality Control Program shall comply with the Specification for Aluminum Structures, Chapter N.

1.6 WARRANTY

- A. Warranty: // provide any warranty requirements here //

PART 2 - PRODUCTS

2.1 DESIGN

- A. General
 - 1. Design shall comply with the Specification for Aluminum Structures.
 - 2. Structure shall be designed to resist the loads indicated in Section 01 33 16 – DESIGN DATA
- B. Design structural aluminum connections to comply with specified performance:
 - 1. Load Capacity: // Resist loads indicated on drawings // Resist full capacity of connected member //
 - 2. Configuration: Design and detail connections to resist the loads and reactions indicated on the drawings or specified herein. Details shown on drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted.

2.2 MATERIALS

- A. Extruded Bars, Rods, Wire, Profiles and Tubes: ASTM B221
- B. Standard Structural Profiles: ASTM B308
- C. Plate and Sheet: ASTM B209
- D. Rolled or Cold Finished Bar, Rod, and Wire: ASTM B211

- E. Galvanized Bolts, Nuts and Washers:
 1. High-strength bolts: ASTM F3125
 2. Heavy hex nuts: ASTM A194
 3. Hardened steel washers for high-strength bolts: ASTM F436
 4. Bolts other than high-strength: ASTM A307, Grade A
 5. Carbon and alloy steel nuts: ASTM A563
 6. Plain steel washers: ASTM F844
- F. Stainless Steel Bolts, Nuts and Washers:
 1. Standard hex head bolts: ASTM F593 // Type 304 // Type 316 //
 2. Standard hex nuts: ASTM F594 // Type 304 // Type 316 //
 3. Heavy hex head bolts: ASTM A193 // Type 304 // Type 316 //
 4. Heavy hex nuts: ASTM A194 // Type 304 // Type 316 //
 5. Washers: Stainless steel // Type 304 // Type 316 //
- G. Aluminum Bolts, Nuts and Washers:
 1. Aluminum bolts: ASTM F468
 2. Aluminum nuts: ASTM F467
 3. Aluminum washers: Alclad 2024-T4
- H. Welding Consumables: AWS A5.10

2.3 FABRICATION

- A. Fabricate structural aluminum in accordance with the Specification for Aluminum Structures Chapter M.
- B. Shop Connections:
 1. Welding shall comply with AWS D1.2. Welding shall be performed only at locations indicated to be welded on the shop drawings.
 2. Bolts shall be tightened in accordance with the Specification for Aluminum Structures.

2.4 FINISHES

- A. Mechanical finishes: // Specify any mechanical finishes here //
- B. Anodized finishes: // Specify any anodized finishes here //
- C. Shop Painting: Apply primer and finish paint as specified in Section 09 91 00, PAINTING. Do not paint surfaces receiving sprayed-on fireproofing.
- D. Galvanized Bolts, Nuts, and Washers: ASTM F2329, hot-dipped

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

- A. Upon delivery to the site, store aluminum in a manner that keeps the material dry and out of contact with the ground and dissimilar materials.

3.2 ERECTION

- A. Erect structural aluminum in compliance with the Code of Standard Practice for Fabricating and Erecting Structural Aluminum.
- B. Set structural aluminum at locations and elevations indicated on the erection drawings.
- C. Install fasteners as specified on the erection drawings.
- D. Welding is not permitted in the field.

3.3 FIELD QUALITY CONTROL

- A. Record Survey:
 - 1. Engage registered land surveyor or registered civil engineer as specified in Section 01000, GENERAL REQUIREMENTS to perform survey.
 - 2. Measure and record structural aluminum plumbness, level, and alignment after completing bolting and before installation of work supported by structural aluminum.
 - 3. Identify deviations from allowable tolerances specified in the Code of Standard Practice for Fabricating and Erecting Structural Aluminum.

END OF SECTION