
SECTION 05 12 10

ARCHITECTURALLY EXPOSED STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide architecturally exposed structural steel (AESS); requirements are in addition to structural steel requirements.
 - 1. Provide AESS steel posts at Port Cochere.
 - 2. AESS shall comply with requirements specified for structural steel.
 - 3. Provide complete AESS work including fabrication, transportation, assembly, erection, and any other endeavor required to provide complete AESS in conformance with Contract Documents.
- B. Related Sections:
 - 1. Section 05 12 00: Structural steel framing.
 - 2. Section 05 50 00: Miscellaneous metal fabrications.
 - 3. Section 09 90 00: Painting and coating.

1.2 REFERENCES

- A. American Institute for Steel Construction (AISC): Specification for Architecturally Exposed Structural Steel.
 - 1. Responsibility of accuracy of shop drawings rests with Contractor, regardless of wording in references.
- B. American Welding Society (AWS): D1.1 "Structural Welding Code - Steel."

1.3 SUBMITTALS

- A. General: Submit information required for structural steel.
- B. Shop Drawings: In addition to requirements for structural steel, submit following information to Architect.
 - 1. Indicate type and location of AESS shop and field connections; location, type, size and extent of welds (spot welds or continuous welds).
 - 2. Indicate location, size and spacing of bolts and holes in AESS.
 - 3. Review of shop drawings will cover only general scheme, design and character of details, but not checking of dimensions.
 - a. This review will not relieve Contractor from responsibility for executing work in accordance with Contract Documents.

- C. Samples: Submit samples of materials, shapes, finishes and connections, including one sample of each primary type of AESS and each type of weld.

- 1. Furnish sample with one half with surface preparation and specified primer.
 - 2. Ship samples weighing over 15 pounds to Project field office for review; do not send to Architect's office.

1.4 QUALITY ASSURANCE

- A. Qualification of AESS Welders: Welders shall have not less than five years successful experience welding architecturally exposed structural steel.
 - 1. Welds shall be judged by appearance as well as performance with welds smooth, uniform, and free of voids and irregularities inconsistent with concept of architecturally exposed structural steel.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Before and during erection, keep AESS clean.
- B. Ship, handle and store AESS in manner to keep clean and to avoid damage to members; members showing evidence of rough handling or damage will be rejected; prevent bends, twists, and distortions.
- C. Store steel materials, both plane and fabricated, above ground on platforms, pallets, skids, or other supports.
- D. Keep AESS free from dirt, grease, and other foreign matter.
- E. Protect AESS from corrosion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide architecturally exposed structural steel (AESS); requirements are in addition to structural steel requirements.
- B. Performance Criteria: Comply with requirements for structural steel.
- C. Design Requirements: AESS to be new, free of defects which may impair strength, functioning, durability, and which may impair appearance of AESS and related work.
- D. Architecturally Exposed Structural Steel (AESS): Unless otherwise required by structural steel specifications, comply with following.
 - 1. Plates and Rolled Shapes: ASTM A36.
 - 2. Pipes: ASTM A53, Grade B.
 - 3. Tubular Sections: ASTM A500, Grade B.

- E. Fasteners:
 - 1. High-Strength Threaded Fasteners: ASTM A325.
 - 2. Anchor Bolts: ASTM A307, Grade A.
- F. Welding Filler Metal: AWS, D11.
 - 1. Shielded Metal Arc-Welding: E70 XX.
 - 2. Submerged Arc-Welding: F7 XX-EXXX-X.
- G. Miscellaneous Items: Furnish miscellaneous structural steel items and related components required to complete AECS in accordance with intent of Contract Documents requirements for AECS.
- H. Prime Painting: Shop prime AECS unless otherwise indicated. Provide primers compatible with finish paints specified in Section 09 90 00 – Painting and Coating.
 - 1. Exterior Structural Steel Primer: Zinc-rich primer; spray applied.

2.2 FABRICATION

- A. AECS Fabrication: Comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
 - 1. Fabrication and assembly shall be executed in shop to fullest extent practicable.
 - 2. Work not shop-assembled shall be shop-fitted.
 - 3. Secure field measurements required for proper, adequate fabrication and installation of AECS; exact measurements shall be Contractor's responsibility.
- B. Straighten column base plates by pressing to provide satisfactory contact bearing between plate and column; plane bearing surfaces for full contact.
- C. Camber: Fabricate beams and girders with natural camber upward, unless otherwise indicated.
- D. Holes: Cut, drill or punch holes for bolts and as required; do not make or enlarge holes by burning, drill holes in bearing plates.
 - 1. Provide holes in members to permit connecting work of other trades.
 - 2. Holes shall be clean-cut without torn or ragged edges.
 - 3. Remove outside burrs resulting from drilling and reaming operations with tool making 1/16" bevel.
- E. Shop Connections: Use HS A325 fasteners where not otherwise indicated; conform to standards of AISC "Manual of Steel Construction," for joining members.
 - 1. Make connections capable of accommodating reaction from total allowable load to smaller member.

- F. Shop and Field Welding: Comply with AWS. Weld by shielded arc method or submerged arc method; flux cored arc method and other methods approved by AWS subject to special review and approval based in part on appearance.
 - 1. Welding of AESS shall be done in manner and by persons capable of providing smooth uniform welds free of voids and irregularities.
 - 2. Use AWS minimum weld size, but not less than 3/16" fillet welds, if sizes of fillet welds are not shown on Drawings.
 - 3. Radius of Welds: 3/16" unless otherwise directed.
- G. High Strength Bolts: "Bearing type" connections with threads excluded from shear plane, unless otherwise indicated.
 - 1. Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
 - 2. Use "Direct Tension Indicator Method" of installation in accordance with manufacturers printed instructions.
- H. Prior to fabrication, straighten material by methods that will not injure materials.
- I. Prior to assembling component parts of connection, thoroughly clean contact surfaces of loose scale, rust and burrs and remove local twists and bends.
- J. Provide holes required for other work secured to or passing through AESS in accordance with approved shop drawings.
- K. Surface Preparation: After fabrication, inspection and acceptance, and before shipping, clean steel to be encased in concrete or fireproofing of loose mill scale, rust, weld slag or flux deposit, dirt and foreign matter.
 - 1. Remove burrs; fill gouges with weld and grind flush. Remove oil and grease deposits by solvent. Grind exposed body filler and dress smooth and flush within profiles indicated on Drawings.
 - 2. Comply with Steel Structures Painting Council Specification SSPC-SP-10, "Near White Blast Cleaning."
 - 3. Grind smooth irregular ends including those resulting from cutting and burning operations.
 - 4. Grind smooth welds to provide clean smooth surface.
 - 5. Clean and grind areas subject to ultrasonic or radiographic inspection.
 - 6. Surfaces within 2" of field weld location shall be free of materials that could prevent proper welding or produce objectionable fumes during welding.
- L. Mark each member with erection identification corresponding to mark on erection drawings.

2.3 SHOP PRIME PAINTING

- A. Shop prime AESS exposed to view in completed Work only.
- B. Shop prime paint structural steel with one coat of primer, including parts of braces, brackets and similar work.
 - 1. Do not shop prime surfaces to be machined, contact surfaces and edges and surface areas adjacent to field welds.
 - 2. Apply two coats to parts inaccessible after assembly or erection.
- C. Touch-Up: In shop, after assembly, and in field, after installation of AESS, touch-up damaged and abraded portions of shop prime paint with specified primer.

PART 3 - EXECUTION**3.1 INSPECTION**

- A. Examine conditions and surfaces receiving or affecting AESS; do not proceed until unsuitable conditions have been corrected.
 - 1. Provide for in-place tolerances of building structure and other construction that interfaces with AESS.
- B. Unsuitable conditions include, without limitation, steel work that has not been inspected, tested, and accepted and preparatory work that does not conform to requirements of this section.
- C. Beginning of AESS erection constitutes acceptance of building structure and interfacing construction.

3.2 ERECTION

- A. Surveys: Employ registered professional engineer or land surveyor, experienced in survey work, to establish permanent bench marks as shown and as required for accurate erection of AESS.
 - 1. Check elevations of bearing surfaces and location of anchor bolts and similar devices before erection starts.
 - 2. Report discrepancies to Architect do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Architect.
- B. Carefully plan erection of structural steel so no cutting and removal of material will be necessary; do not torch burn in field, except in areas to be fully concealed in Project and as approved by Architect
 - 1. Do not use no materials, equipment or practices that could adversely affect functioning, appearance, and durability of completed AESS and related construction.

2. Install AESS without buckling, opening of joints, opening of welds, or other harmful effects.
 3. Match materials to produce continuity of line, texture, and color.
 4. Provide for cutting and welding for attachment of other work in contact with AESS where required for proper subsequent installation of other work.
 5. Make provision in AESS for support of other materials and as required for completion of Project; AESS members shall not have holes except where required, detailed, and approved.
- C. Bracing and Shoring: Provide bracing and shoring capable of holding steel work plumb and properly aligned while field connections are being made, and until lateral forces resisting elements can brace structure.
1. Maintain AESS plumb, level and true.
- D. Bases and Bearing Plates: Clean concrete bearing surfaces of bond-reducing materials and roughen to improve bond, clean bottom surface of base and bearing plates.
1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
 2. Tighten anchor bolts after supported members have been positioned and plumbed, do not remove wedges or shims, but, if protruding, cut off flush with base or bearing plate before grouting.
- E. Field Assembly: Set AESS accurately to lines and elevations indicated; align and adjust various members forming part of complete frame or structure before permanently fastening.
1. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
 2. Perform adjustments to compensate for discrepancies in elevations and alignment.
 3. Level, plumb and align individual members of structure within specified AISC tolerances, drifting to enlarge unfair holes is not permitted.
- F. Connections: Fabricator shall be responsible for detailing connections in accordance with current requirements of AISC.
1. Detail full moment capacities of members where moment connections are indicated on Drawings.
 2. Grade of connection material shall be same as connecting member unless otherwise shown on Drawings or unless it can be shown by calculations that lower grade steel is adequate.

3. Make member splices with full penetration welds to develop full capacity of member unless otherwise shown on Drawings.
 4. Welds in built-up AESS members shall be continuous unless otherwise shown on Drawings and shall be designed to transfer stresses caused by forces on members framing into built-up members.
- G. AESS Tolerances: AESS shall be plumb, square, level, and correctly aligned within limitations described in "Specification for Architecturally Exposed Structural Steel".
- H. Installation of AESS shall be sound, watertight, and free from defects in materials and workmanship.

3.3 WELDING

- A. General: Conform to AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," AWS "Code for Welding in Building Construction," and requirements of this section.
1. Location and type of welds shall be as indicated, make no other welded splices, except those indicated.
- B. Preparation of Surface: Surfaces to be welded shall be free of loose scale, slag, rust, grease, paint and other foreign materials.
- C. Equipment: Use equipment with devices to regulate speed and manually adjust operating amperage and voltage; amperage capacity shall be sufficient to overcome line drop and to give adequate welding heat.
- D. Remove run-off tabs and grind surfaces smooth where tabs could interfere with fireproofing and architectural treatment.
- E. Automatic End Welded Studs: Automatically end weld in accordance with manufacturer's recommendations to provide complete fusion between end of stud and plate.
1. There shall be no porosity or evidence of lack of fusion between welded end of stud and plate.
 2. Stud shall increase in length during welding approximately 1/8" for 5/8" diameter and under, and 3/16" for over 5/8" diameter.
- F. Assemble and weld butt-up sections by methods that will produce true alignment of axes without warp; minimize shrinkage strains in welded joints by proper welding techniques including preheating as necessary.
1. Steel with lamellar tearing shall be rejected and replaced without additional cost to Owner.

3.4 CLEANING AND PROTECTION

- A. Clean AESS. Clean is defined as free of substances that cannot be removed by normal cleaning with detergent and water.
- B. Protect AESS from materials, equipment, and practices that could impair functioning, appearance, or durability of AESS or other construction.
- C. Remove and replace or repair AESS damaged prior to Substantial Completion to satisfaction of Architect.

END OF SECTION