

SECTION 05 12 13-ARCHITECTURALLY EXPOSED STRUCTURAL STEEL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Section.

1.2 SUMMARY

Editor's Note: It is critical to define to the bidders what members will be considered as Architecturally Exposed Structural Steel (AESS) and what category of AESS applies to each area. Furthermore, any variations to the requirements of the American Institute of Steel Construction (AISC) Code of Standard Practice for Steel Buildings and Bridges ANSI/AISC 303-16 (COSP) must be spelled out. Delete references to AESS categories not required for the project

- A. This Section includes requirements regarding the appearance and surface preparation of Architecturally Exposed Structural Steel. (AESS). Refer to division 5 section 'Structural Steel' for all other requirements regarding steel work not included in this section. Requirements of Section 05 12 23 also apply to material covered under this section.

This section applies to any members noted on Architectural [and Structural] drawings as AESS 1, AESS 2, AESS 3, AESS 4 and AESS C; and in the areas defined as AESS below.

1. The following structural steel elements and connections are to be supplied and erected per AESS 1:
2. The following structural steel elements and connections are to be supplied and erected per AESS 2:
3. The following structural steel elements and connections are to be supplied and erected per AESS 3:
4. The following structural steel elements and connections are to be supplied and erected per AESS 4:
5. The following structural steel elements and connections are to be supplied and erected per AESS C:

Editor's Note: Narratively describe the areas on the drawings that have been designated as AESS 1, AESS 2, AESS 3, AESS 4 and AESS C. Delete sentences where the AESS category is not used for the project. The specifier may consider using AESS C. Refer to the Editor's Note to section 1.3.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1

- a. Section 01 22 00 "Submittal Procedures" for Fabrication Documents, Product Data, and Samples
 - b. Section 01 43 00 "Quality Assurance" for fabricator and installer qualifications independent testing agency procedures and administrative requirements.
 - c. Section 01 45 00 "Quality Control" for Source and Field quality control requirements.
2. Division 5 Sections 05 12 00 "Structural Steel Framing" Sections 05 20 00 "Steel Joist Framing" for metal joist requirements.

Editor's Note: Address alignment and location of bridging where joists are visible in Division 5 Section "Open Web Metal Joists"

3. Division 5 Sections 05 30 00 "Metal Decking" for erection requirements relating to exposed steel decking and its connections

Editor's Note: Address fastener spacing and weld show through in areas where decking is visible in the finished structure. Coordinate paint system requirements with that of AESS

4. Division 5 Sections 05 50 00 "Metal Fabrications" for loose steel bearing plates and miscellaneous steel framing.
5. Division 9 Sections 09 97 00 "Special Coatings" for finish coat requirements and coordination with primer and surface preparation specified in this section.

1.3 DEFINITIONS

- A. Architecturally Exposed Structural Steel: Structural Steel conforming to one of the categories of Architecturally Exposed Structural Steel or AESS Refer to ANSI/AISC 303-16 "Code of Standard Practice for Steel Buildings and Bridges".
- B. AESS 1: Structural Steel designated as "AESS 1 in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 definition of AESS1. These are basic elements with workmanship requirements exceeding those in non AESS construction.
- C. AESS 2: Structural Steel designated as "AESS 2 in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 definition of AESS2. These are feature elements viewed at a distance greater than 20 feet. The art of metalworking is intended to be visible to the viewer.
- D. AESS 3: Structural Steel designated as "AESS 3 in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 definition of AESS3. These are feature elements viewed at a distance less than 20 feet. The art of metalworking is intended to be visible to the viewer.
- E. AESS 4: Structural Steel designated as "AESS 4 in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 definition of AESS4. These are showcase elements with special surface and edge treatment beyond fabrication. The intent is the form is the only feature showing in an element.

- F. AESS C: Structural Steel designated as “AESS C in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 definition of AESS C. These are custom AESS elements with characteristics described in the contract documents.

Editor’s Note: The specifier may consider using AESS C. The AESS categories defined in the COSP provide steps in quality from one category to the next. The specifier may define a custom category by modification of one or more of the characteristics of the COSP defined AESS categories. For example: *All steel on this project designated as AESS C shall conform to the characteristics of AESS 3 except the SSPC6 surface preparation is replaced with “surface preparation shall conform to the paint manufacturer’s minimum requirements.* In this case paragraph 1.3 F and other appropriate following paragraphs would be modified accordingly. Consider each characteristic included in the COSP matrix when defining AESS C.

1.4 ACTION SUBMITTALS

- A. General: Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified. Submit “Special Coatings” under Division 9.
- C. Fabrication Documents: Detailing for fabrication of AESS components.
1. Provide erection documents clearly indicating which members are AESS members and the AESS category of each part.
 2. Include details that clearly identify all the requirements listed in sections 2.3 "Fabrication" and 3.3 "Erection" of this specification for each part. Provide connections for exposed AESS consistent with concepts shown on the architectural or structural drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined herein.
 4. Indicate orientation of HSS seams and mill marks (where applicable).
 5. Indicate type, size, finish and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tensioned shear/bearing connections. [Indicate which direction bolt heads should be oriented.]
 6. Clearly indicate which surfaces or edges are exposed and what class of surface preparation is being used.
 7. Indicate special tolerances and erection requirements as noted on the drawings or defined herein.
 8. Indicate vent or drainage holes for HSS members.
- D. Mock Up: Provide mock ups of the nature and extent indicated on the contract documents.
1. Locate mockups on-site or in the fabricator’s shop as directed by Architect. Mockups shall be full size unless the Architect approves smaller models. Alternatively, when a mockup is not practical, the first piece of an element or connection can be used to determine acceptability.
 2. Notify the Architect one week in advance of the dates and times when mockups will be available for review.
 3. Demonstrate all applicable AESS characteristics for the specified category of AESS on the elements and joints in the mock up.

4. Build mockups using member sizes and materials indicated for final Work.
5. The mock up shall demonstrate weld quality, contouring of the welds at the aligned walls of the members.
6. The mock up shall demonstrate the specified surface preparation and finish coating.
7. HSS members shall extend at least 6" from the joint in the mock-up.
8. Obtain Architect's written approval of mockups before starting fabrication
9. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
 - a. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed work.

Editor's Note: The contract documents (architectural drawings) need to indicate the framing to be submitted as a mock up. The Architect must define the size and extent of the pieces required and what specific finishes must be demonstrated. The typical mock up is a standalone item that is not incorporated into the final work. However, the specifier may designate a larger mock up that is incorporated into the final work. This intent must be clearly indicated on the architectural drawings and the specifier should consult with the fabricator and contractor regarding the practicality and sequencing of incorporating a mock up into the final work.

Mock ups are only required for AESS 3, AESS 4 and AESS C. Delete "D" for AESS 1 and 2.

- E. Samples: Provide samples of specific AESS characteristics. Samples may be small size samples or components of conventional structural steel demonstrating the following specific AESS characteristics.
1. Continuous weld appearance
 2. Sharp edges ground smooth
 3. Surface preparation
 4. Fabrication mark removal
 5. Weld show through.

Editor's Note: Delete samples for AESS 3, 4 and C where a mock up is used. Section E provides the editor with the option to obtain samples for AESS 1 and 2 without requirement for a full mock up. Delete section E if samples are not desired. Consider expanding section E to include AESS 3 and 4 characteristics if a full-scale mock up is not used for AESS 3 and 4.

1.5 INFORMATIONAL SUBMITTALS

- A. General: Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Qualification data for firms and persons specified in the 'Quality Assurance' Submittal to demonstrate their capabilities and experience. Include lists of completed projects names and address, names and addresses of architects and owners, and other information specified. [For each project, submit photographs showing detail of installed AESS.]

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: In addition to those qualifications listed in Division 5 Section 'Structural Steel', engage an AISC Certified Fabricator, experienced in fabricating AESS similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AESS without delaying the Work.
- B. Erector Qualifications: In addition to those qualifications listed in Division 5 Section 'Structural Steel', engage an AISC Certified Erector, experienced in erecting AESS work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303-16," Code of Standard Practice for Steel Buildings and Bridges", Section 10.
- D. Pre-installation Conference: The General Contractor shall schedule and conduct conference at the project site to comply with requirements of Division 1 Section "Project Meetings." As a minimum, the meeting shall include the General Contractor, Fabricator, Erector, the finish-painting subcontractor, and the Architect. Coordinate requirements for shipping, special handling, storage, attachment of safety cables and temporary erection bracing, final coating, touch up painting, mock up coordination, architect's observations, and other requirements for AESS.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver AESS to Project site in such quantities and at such times to ensure continuity of installation. All tie downs on loads shall be nylon straps or shall use softeners when using chains or wire rope slings to avoid damage to edges and surfaces of members. The standard for acceptance of delivered and erected members shall be equivalent to the standard employed at fabrication.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Use special care in handling to prevent twisting or warping of AESS members.
- C. Handle finish pieces using nylon type slings, or chains with softeners, or wire ropes with softeners such that they are not damaged. Conform to ANSI/AISC 303-16 Sections 10.4, 10.5, and 10.6.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Where AESS is indicated to fit against walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Fabrication Documents. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.9 COORDINATION

- A. Coordinate installation of anchors for AESS members that connect to the work of other trades. Furnish setting drawings, templates, and directions for installing anchors, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to the project site in time for installation. Anchorage concepts shall be as indicated on drawings and approved on final Fabrication Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Meet requirements Division 5 Section 'Structural Steel 05 12 23' as amended below.
- B. High-Strength Bolts, Nuts, and Washers: Per section 05 12 23 heavy hex heads and nuts Provide [rounded bolt heads with twist off bolts] [Heavy Hex bolt heads with standard bolts]. Provide [standard carbon steel] [Cadmium plated] [Mechanically galvanized] finish.

2.2 PAINT SYSTEM

- A. Compatibility: All components/procedures of the AESS paint system shall conform to the coating system specified, submitted, and approved per Division 9. As a minimum identify required surface preparation, primer, intermediate coat (if applicable), and finish coat. Primer, intermediate coating and finish coating shall be from a single manufacturer combined in a system documented by the manufacturer with adequate guidance for the fabricator to procure and execute.
- B. Primer: As specified in 09 97 00 Special Coatings. Primer shall comply with all federal standards for VOC, lead and chromate levels
- C. Primer: Acrylic water-soluble shop coat with good resistance to normal atmospheric corrosion. Primer shall comply with all federal standards for VOC, lead and chromate levels.]
- D. [Primer: Fast curing two-part epoxy. Primer shall comply with all federal standards for VOC, lead and chromate levels.]
- E. [Primer: Organic, epoxy/zinc rich meeting class B surface requirements for slip critical connections. Primer shall comply with all federal standards for VOC, lead and chromate levels.]
- F. [Primer: Inorganic zinc rich meeting class B surface requirements for slip critical connections. Primer shall comply with all federal standards for VOC, lead and chromate levels.]
- G. Zinc Rich Primer: High-zinc-dust-content paint for galvanized steel, with dry film coating not less than 90 percent zinc dust by weight.

Editors' Note: The primer specified in section 05 12 13 must be a component of the finish coat system listed in section 09 97 00 to ensure coating compatibility. Editor to select either C, D, E, F, or G as required for compatibility with 09 97 00. Delete H if galvanizing is not used.

The use of the Federal Specification System (i.e. FS TT-P-6664) is obsolete since many of these specifications do not address current VOC regulations and other environmental standards such as lead and chromate's. Primers for steel come in a variety of resins such as alkyd, waterborne epoxy, and zinc rich.

Acrylic Primer: Acrylic primers are corrosion resistant and water soluble often providing a lower VOC. They are available in shop coat quality up to a universal primer for use under high performance coatings such as epoxies and urethanes.

Epoxy Primer: Epoxy primers provide excellent corrosion protection for steel and can be top coated with a variety of finishes. Epoxy primers can be applied in the shop and typically have a high film build that will hide minor imperfections.

Zinc Rich Primer: Zinc rich primer provides superior corrosion protection by providing cathodic protection to the steel. Zinc rich coatings can be specified as either organic zinc or inorganic zinc. Both inorganic and organic will meet class B slip coefficients for bolted connections. In arid regions (such as the Rocky Mountain Region) organic epoxy/zinc primers should be specified, as they do not rely on an outside source (humidity) for cure. Inorganic zinc requires a constant humidity of no less than 40% RH for proper cure. If an intermediate and finish coat are to be completed in the shop, the lack of humidity can cause delays in both the painting process and project as the zinc must be cured prior to top-coating. Although a urethane finish coat may be applied directly over an organic zinc, it is suggested an intermediate epoxy coating be used to prevent "pin holing" in the urethane coating, promote adhesion of the system, and increase film build to hide imperfections in the steel. Alkyd finish coats should not be specified over zinc primers. For galvanizing repair, an organic zinc with not less than 90% zinc by weight in the dry film should be used for re-galvanizing welds and damaged due to erection.

- H. Finish Coating: Field apply intermediate and top coats per section 09 97 00.

FINISHES

When possible, finishing coating should be done in the field after erection. Finish coats applied in the shop almost always incur damage from handling in shipping and erection. This often results in applying an additional finish coat in the field or completing costly touch up which often does not blend in with the original finish. Finish coats for aggressive environments such as swimming pools may require special preparation of the steel, primer and finish coating. Consult with a manufacturer's representative for such special conditions.

*Note-If finish painting is to be done prior to delivery of the steel, special sections should be added to ensure proper handling and minimize damage.

Common Finish coatings for commercial projects with AESS fall into the following categories.

- Alkyds (Oil based): Acceptable finish coat for interior applications and some exterior application. Dries to hard durable finish. When applied specified for exterior use, alkyds will chalk and fade with UV exposure in a relatively brief period. Can be brush, roll, or spray applied.
- Acrylics (Waterborne): Acceptable finish coat for both interior and exterior service. Acrylics provide good color and gloss retention under UV exposure. Can be easily applied by brush, roller, or spray. Low odor and VOC for interior application.
- Epoxy: Can be applied as a finish for interior use where abrasion resistance is required. The high build nature of film can help cover imperfections in the steel. It will chalk and fade with UV exposure.
- Polyurethane: Provides high performance protection with excellent color and gloss retention. It has a higher film build than alkyd or acrylic will help cover imperfections in the steel. Should be sprayed applied for best appearance.

2.3 FABRICATION AESS 1

- A. Use special care in handling and shipping of AESS both before and after shop painting minimize damage to any shop finish. Use Nylon type slings or softeners when using chains or wire rope slings.
- B. The permissible tolerances for member depth, width, out of square, and camber and sweep shall be as specified in ASTM A6/A6M-2014 Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling (ASTM A6/A6M), ASTM A500/A500M-2013 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (ASTM A500/A500M), and Standard Specification for Cold-Formed Welded Carbon Steel Structural Sections (HSS) (ASTM A1085/A1085M).
- C. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.
- D. Remove blemishes or unsightly surfaces resulting from temporary braces or fixtures.

- E. Remove all backing and run out tabs.
- F. Grind all sharp edges smooth, including all sheared, punched or flame cut edges
- G. Provide a continuous appearance to all welded joints including tack welds. Provide joint filler at intermittent welds.
- H. Bolted Connections: Make in accordance with Section 05 12 00. Provide bolt type and finish as noted herein.
- I. Weld Connections: Comply with AWS D1.1 and Section 05 12 00. Appearance and quality of welds shall be consistent. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.
- J. Install all bolts on the same side of the connection. Oriented uniformly in the direction indicated Consistent from one connection to another.
- K. Remove all weld spatter, slivers and similar surface discontinuities.
- L. Grind off projections larger than 1/16" at butt and plug welds.
- M. Continuous Weld Appearance: Where continuous welding is noted on the drawings, provide welds of a uniform size and profile
- N. Seal Welds: Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide venting as required for galvanized members.

Editor's Note: drainage and venting holes need to be coordinated to account for the galvanizing process and in-service drainage.

2.4 FABRICATION AESS 2

- A. Fabricate to Requirements of 2.3 and as follows
- B. The as-fabricated straightness tolerance shall be one-half of that specified in ASTM A6/A6M, ASTM A500/A500M, or ASTM A1085/A1085M.
- C. For curved structural members, whether composed of a single standard structural shape or built-up, the as-fabricated variation from the theoretical curvature shall be equal to or less than the standard camber and sweep tolerances permitted for straight members in the applicable ASTM standard.
- D. The tolerance on overall profile dimensions of welded built-up members shall one-half of that specified in AWS D1.1/D1.1M: 2015 Structural Welding Code – Steel (AWS D1.1).
- E. Provide hidden part marks to part marks that may be fully removed after erection.

2.5 FABRICATION AESS 3

- A. Fabricate to Requirements of 2.4 and as follows
- B. Fabricate AESS with exposed surfaces smooth, square and of surface quality consistent with the approved mock up.
- C. Grind projections at butt and plug welds to be smooth with the adjacent surface.
- D. Orientation of HSS seams shall be as shown.
- E. Copes, miters, and cuts in surfaces exposed to view shall have a maximum gap of 1/8" in an open joint. If the gap is shown to be in contact, the contact shall be uniform within 1/16".
- F. Mill marks shall not be exposed to view. If it is not possible to hide mill marks, then the mill marks are to be removed by appropriate length cutting of mill material. If this is not possible, the fabricator shall remove the mill mark, grind, and fill the surface to be consistent with the approved mock up.
- G. The matching of abutting cross sections is required

2.6 FABRICATION AESS 4

- A. Fabricate to the requirements of 2.5 and as follows.
- B. Contouring and blending of welds: Where welds are indicated to be ground contoured, or blended, oversize welds as required and grind to provide a smooth transition and match profile on approved mock-up.
- C. Minimize Weld Show Through: At locations where welding on the opposite side of an exposed connection creates distortion, weld show through shall be minimized to conform to the approved mock up.
- D. Open holes shall be filled with weld metal of body filler and smoothed by grinding or filling to the standards applicable to the shop fabrication of the materials.

2.7 FABRICATION AESS C

- A. X
- B. X
- C. X

Editor's Note: Refer to the Editor's Note to Paragraph 1.3

2.8 SHOP PRIMING

- A. Provide surface preparations to SSPC-SP6. Coordinate the required surface profile with the approved paint submittal prior to beginning surface preparation. Prior to blasting remove any grease and oil using solvent cleaning to meet SSPC-SP 1. Weld spatter, slivers and similar

surface discontinuities shall be removed. Sharp corners resulting from shearing, flame cutting or grinding shall be eased.

- B. Shop prime steel surfaces, except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections,

Editor's Note: The default surface preparation for all AESS per the COSP is SSPC-SP-6. Consider if SSPC-SP6 is needed, or if a lower cost preparation will suffice. Many coatings can utilize SP2 or SP3 and the cost savings is significant. Refer to section 1.1 in the COSP for instructions for the specification of alternatives to the COSP.

The level of surface preparation must be compatible with the specified coating system. It is important the correct level of surface preparation be specified in the contract documents to avoid change orders during construction and to ensure the performance of the paint system.

The most common levels of SSPC surface preparation specifications are listed below:

SSPC SP 1 – SSPC Surface Preparation Specification 1, Solvent Cleaning.

SSPC SP 2 – SSPC Surface Preparation Specification 2, Hand Tool Cleaning. (This level of surface preparation may not be adequate for various paint systems for AESS construction)

SSPC SP 3 – SSPC Surface Preparation Specification 3, Power Tool Cleaning. (This level of surface preparation is the minimum for most AESS projects. It may be acceptable for alkyd primers and acrylic or alkyd finish coats, particularly in interior applications.)

SSPC SP 6 – SSPC Surface Preparation Specification No. 6, Commercial Blast Cleaning. (This level of surface preparation adds significantly to the cost. It is required for epoxy primers for adequate bonding to the steel and recommended for locations where a rust inhibitive primer will be used in an exterior application. It is also required where polyurethane finish coats will be used over the primer.)

- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop primer to surfaces that are inaccessible after assembly or erection.

Editor's Note: Finish painting in the shop is not recommended by either the fabrication or painting community that contributed to this specification. If finish painting is to be done prior to delivery of the steel special paragraphs should be added here.

2.9 GALVANIZING

Editor's Note: Galvanized steel should not be painted with alkyd top coats as loss of adhesion will occur. An intermediate coat of high build epoxy should be used if an alkyd paint is described as the finish coat. Zinc coatings produced by the hot dip galvanizing process are excellent corrosion protection systems but, when the coating becomes very thick or dull gray, the coating may not be suitable for architectural applications. The appearance can become blotchy with sections of dull finish and sections with bright finish. Almost all of these surface effects last for the first couple of years and then the coating becomes uniformly dull gray as the protective layer of corrosion products is formed on the surface of the galvanized steel. The cause of the irregular surface finishes is the variation in steel chemistry of the parts to be hot dip galvanized. ASTM A385/A385M - 2015 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip) and ASTM A123/A123M – Standard Specification for Zinc (hot Dip Galvanized) coatings on Iron and Steel Products describe the effects of steel chemistry on the hot dip galvanized finish. The two elements with the most influence are silicon and phosphorus. If these elements are controlled to recommended levels, the finish will be bright and shiny. Many steel makers control the overall impurity content but not these two specific elements so there may be some parts that are bright and shiny and some that are dull gray. Care should be taken when hot dip galvanizing if an architectural finish is expected.

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to AESS indicated for galvanizing according to ASTM A123/A123M – 2015 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. Fabricate such that all connections of assemblies are made in the field with bolted connections where possible.

2.10 FABRICATION QUALITY CONTROL AND QUALITY ASSURANCE AESS 1 AND 2

- A. Structural requirements:
 - 1. Conform to Quality Control requirements per ANSI/AISC 360-16 “Specification for Structural Steel Buildings” Chapter N and ANSI/AISC 303-16,” Code of Standard Practice for Steel Buildings and Bridges”, Section 10. Refer to Section 05 12 00 “Structural Steel” for additional requirements.
 - 2. Owner will engage a Quality Assurance agency per the requirements of ANSI/AISC 360-16 “Specification for Structural Steel Buildings” Chapter N and ANSI/AISC 303-16,” Code of Standard Practice for Steel Buildings and Bridges”, Section 10
- B. AESS acceptance: The Architect shall observe the AESS steel in the shop at a viewing distance consistent with the final installation and determine acceptability based on the qualification data and submittals. The Quality Assurance agency shall have no responsibility for enforcing the requirements of this section.

2.11 FABRICATION QUALITY CONTROL AND QUALITY ASSURANCE AESS 3 AND 4

- A. Conform to 2.10 and as follows.

- B. AESS acceptance: The Architect shall observe the AESS steel in the shop at a viewing distance consistent with the final installation and determine acceptability based on the approved mock up. The Quality Assurance Agency shall have no responsibility for enforcing the requirements of this section.

Editor's Note: Consider if a shop visit by the architect is appropriate based on the scale and complexity of the project. Delete if not required.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. The erector shall check all AESS members upon delivery for twist, kinks, gouges or other imperfections which may result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.2 PREPARATION

- A. Provide connections for temporary shoring, bracing and supports only where noted on the approved Fabrication Documents. Temporary connections not shown shall be made at locations not exposed to view in the final structure or as approved by the Architect. Handle, lift and align pieces using nylon straps or chains with softeners required to maintain the appearance of the AESS through the process of erection.

Editor's Note: The following is a list of special erection issues that may impact the final appearance of the AESS. Many of these items have cost premiums and should not be used indiscriminately. Refer to the AISC cost matrix for anticipated range of added cost associated with each line.

3.3 ERECTION AESS 1

- A. Employ special care to handle and erect AESS. Erect finish pieces using nylon straps or chains with softeners such that they are not damaged.
- B. Place weld tabs for temporary bracing and safety cabling at points concealed from view in the completed structure or where approved by the Architect during the pre-installation meeting. Methods of removing temporary erection devices and finishing the AESS members shall be approved by the Architect prior to erection.
- C. AESS Erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of ANSI/AISC 303-16.

Editor's Note: ANSI/AISC 303-16 specifies that AESS framing shall be fabricated to one-half the tolerance of typical structural steel frames. This requirement is intended to improve fit up when the exposed steel interfaces with other materials such as curtain wall masonry, etc. The variations permitted under the standard frame tolerances noted in Chapter 7 will typically be acceptable when viewed by eye (without instruments). Therefore, standard frame tolerances are allowed for Erection tolerances. Adjust if tighter tolerances are required.

- D. Set AESS accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.
- E. Remove blemishes or unsightly surfaces resulting from temporary braces or fixtures.
- F. Remove all backing and run out tabs.
- G. When temporary braces or fixtures are required to facilitate erection, care shall be taken to avoid any blemishes, holes or unsightly surfaces resulting from the use or removal of such temporary elements.
- H. Bolted Connections: Align bolt heads uniformly as indicated on the approved fabrication or erection documents.
- I. Weld Connections: Comply with AWS D1.1 and Section 05 12 00. Appearance and quality of welds shall be consistent. Employ methods that will maintain alignment of members without warp exceeding the tolerance of this section.
- J. Remove all weld spatter exposed to view.
- K. Grind off projections larger than 1/16" at field butt and plug welds.
- L. Continuous Welds: Where continuous welding is noted on the drawings, provide continuous welds of a uniform size and profile.
- M. Do not enlarge holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.
- N. Splice members only where indicated.
- O. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock up.

3.4 ERECTION AESS 2

- A. Erect to the requirements of 3.3 and as follows.
- B. AESS Erection Tolerances: Erect to standard frame tolerances for structural steel per Chapter 7 of ANSI/AISC 303-16.

3.5 ERECTION AESS 3

- A. Erect to the requirements of 3.4 and as follows.
- B. Field Welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.

- C. Provide a continuous appearance to all welded joints including tack welds. Provide joint filler at intermittent welds.
- D. Where welds are indicated to be ground, contoured, or blended, oversize welds as required and grind to provide a smooth transition and match profile on approved mock-up.

3.6 ERECTION AESS 4

- A. Erect to the requirements of 3.5 and as follows.
- B. Welds ground smooth: Erector shall grind welds smooth.
- C. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection creates distortion, grind distortion and marking of the steel to a smooth profile with adjacent material.
- D. Filling of weld access holes: Where holes must be cut in the web at the intersection with flanges on W shapes and structural tees to permit field welding of the flanges, they shall be filled with joint filler.

3.7 ERECTION AESS C

- A.
- B.
- C.

3.8 FIELD QUALITY CONTROL AND QUALITY ASSURANCE AESS 1 and 2

- C. Structural requirements:
 - 3. Conform to Quality Control requirements per ANSI/AISC 360-16 “Specification for Structural Steel Buildings” Chapter N and ANSI/AISC 303-16,” Code of Standard Practice for Steel Buildings and Bridges”, Section 10. Refer to Section 05 12 00 “Structural Steel” for additional requirements.
 - 4. Owner will engage a Quality Assurance agency per the requirements of ANSI/AISC 360-16 “Specification for Structural Steel Buildings” Chapter N and ANSI/AISC 303-16,” Code of Standard Practice for Steel Buildings and Bridges”, Section 10
- D. AESS acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the qualification data and submittals. The Quality Assurance Agency shall have no responsibility for enforcing the requirements of this section.

3.9 FIELD QUALITY CONTROL AESS 3, 4, and C

- A. Conform to 3.7 and as follows.
- B. AESS acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the approved mock up. The Quality Assurance Agency shall have no responsibility for enforcing the requirements of this section.

3.10 ADJUSTING AND CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces of AESS. Such touch up work shall be done in accordance with manufacturer's instructions and as specified in Division 9, Section "Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded area. Any repairs to galvanized surfaces shall comply with ASTM A780/A780M – 2015 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings.

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