

TOOLBOX TALK #9

Architecturally Exposed Structural Steel (AESS)

(10 minutes)

QUESTION: How do we identify and communicate architecturally exposed structural steel?

The *Code* says...

10.1. General Requirements

When members are specifically designated as *architecturally exposed structural steel* or *AESS* in the *contract documents*, the requirements in Sections 1 through 9 shall apply as modified in Section 10. Surfaces exposed to view of *AESS* members and components shall be fabricated and erected with the care and dimensional tolerances that are stipulated in Sections 10.2 through 10.6.

Commentary:

The designation of steel as *AESS* adds cost, and that cost is higher as the level of the *AESS* designation increases. However, not all exposed steel must be designated as *AESS*. There are many applications in which the as-produced appearance of fabricated and erected *structural steel* may be deemed sufficient without any special additional work.

10.1.1. The following categories shall be used when referring to *AESS*:

AESS 1: Basic elements

AESS 2: Feature elements viewed at a distance greater than 20 ft (6 m)

AESS 3: Feature elements viewed at a distance less than 20 ft (6 m)

AESS 4: Showcase elements with special surface and edge treatment beyond fabrication

AESS C: Custom elements with characteristics described in the *contract documents*

Commentary:

The categories are listed in the *AESS* matrix shown in Table 10.1. Each category describes characteristics with successively more detailed—and costly—requirements.

Basic elements in AESS 1 are those that have workmanship requirements that exceed what would be done in non-*AESS* construction.

Feature elements in AESS 2 and 3 exceed the basic requirements, but the intent is to allow the viewer to see the art of metalworking. AESS 2 is achieved primarily through geometry without finish work and treats things that can be seen at a larger viewing distance, like enhanced treatment of bolts, welds, *connection* and fabrication details, and tolerances for gaps, copes, and similar details. AESS 3 is achieved through geometry and basic finish work and treats things that can be seen at a closer viewing distance or



TOOLBOX TALKS

If you're using structural steel, the *Code of Standard Practice for Steel Buildings and Bridges* (ANSI/AISC 303-22) applies to your contract.

Simply put, the AISC *Code* defines who's in charge of what, when, where—including before any potential conflict arises—and other members of your project team are already using it in their own contracts. Download it for free at aisc.org/code.

Section 10 of the Code provides the requirements for architecturally exposed structural steel (*AESS*) and should be referenced during preconstruction for managing these activities with your fabricator and/or erector.

TOOLBOX TALK #9

Architecturally Exposed Structural Steel (AESS)

(10 minutes)

are subject to touch by the viewer, with welds that are generally smooth but visible. AESS 3 involves the use of a mock-up and acceptance is based upon the approved conditions of the mock-up.

Showcase elements in AESS 4 are those for which the designer intends that the form is the only feature showing in an element. All welds are ground and filled, edges are ground square and true. All surfaces are filled and sanded to a smoothness that doesn't catch on a cloth or glove. Tolerances of fabricated forms are more stringent—generally half of standard tolerance. AESS 4 involves the use of a mock-up and acceptance is based upon the approved conditions of the mock-up.

Custom elements in AESS C are those with other requirements defined in the *contract documents*, which may be more or less stringent than the other categories because individual desired characteristics may be required at the discretion of the specifier.

- 10.1.2. A mock-up shall be required for AESS 3 and 4. If a mock-up is to be used in other *AESS* categories, it shall be specified in the *contract documents*. When required, the nature and extent of the mock-up shall be specified in the *contract documents*. Alternatively, when a mock-up is not practical, the first piece of an element or *connection* can be used to determine acceptability.

Commentary:

Generally, a mock-up is produced and approved in the shop and subsequently placed in the field. The acceptability of the mock-up can be affected by many factors, including distance of view, lighting, and finishing. The expectations for the location and conditions of the mock-up at time of approval should be defined in the *contract documents*.

10.2. Contract Documents

The following additional information shall be provided in the *contract documents* when *AESS* is specified:

- (a) Specific identification of members or components that are *AESS* using the *AESS* Categories listed in Section 10.1.1 and Table 10.1.
- (b) Fabrication and/or erection tolerances that are to be more restrictive than provided for in this section, if any
- (c) For Category *AESS C*, the *AESS* matrix included in Table 10.1 shall be used to specify the required treatment of the element.
- (d) Any variations from the *AESS* characteristics of Table 10.1.
- (e) Any other special requirements for *AESS* members and components, such as the orientation of HSS weld seams and bolt heads.

10.3. Approval Documents

All members designated as *AESS* shall be clearly identified to a Category, either *AESS 1, 2, 3, 4, or C*, in the *approval documents*. Tack welds, temporary braces, backing, and fixtures used in fabrication of *AESS* shall be shown in the *fabrication documents*. Architecturally sensitive connection details shall be submitted for approval by the *owner's designated representative for design* prior to completion of the *approval documents*.

TOOLBOX TALK #9

Architecturally Exposed Structural Steel (AESS)

(10 minutes)

TABLE 10.1
AESS Category Matrix

ID	Characteristics	Reference Section	Category			
			AESS 4 Showcase Elements	AESS 3 Feature Elements in Close View	AESS 2 Feature Elements not in Close View	AESS 1 Basic Elements
1.1	Butt and plug weld reinforcement limited to 1/16 in. (2 mm)	10.4.9			•	•
1.2	Surface preparation to meet paint specification	10.4.11	•	•	•	•
1.3	Sharp edges eased	10.4.7	•	•	•	•
1.4	Continuous weld appearance	10.4.8	•	•	•	•
1.5	Consistent bolt appearance	10.4.1(g)	•	•	•	•
1.6	Weld spatters removed	10.4.8	•	•	•	•
Category 2						
2.1	Mock-ups	10.1.2	•	•	Optional	
2.2	The fabricated product shall have one-half the applicable ASTM or AWS straightness tolerance	10.4.3(b) & 10.4.5	•	•	•	
2.3	Fabrication, and erection marks not visible	10.4.2	•	•	•	
Category 3						
3.1	Mill marks not visible	10.4.2	•	•		
3.2	Butt and plug welds ground smooth and filled	10.4.9	•	•		
3.3	HSS weld seam oriented for reduced visibility	10.4.12	•	•		
3.4	Cross-sectional abutting surfaces aligned	10.4.3(a)	•	•		
3.5	Joint gap tolerances minimized	10.4.6	•	•		
Category 4						
4.1	HSS seam treated to comply with mock-up	10.4.12	•			
4.2	Welds contoured and blended	10.4.8	•			
4.3	Surfaces filled and sanded	10.4.7	•			
4.4	Weld show-through to meet acceptance criteria established by mock-up	10.4.10	•			

Notes:

1. AESS C are custom elements with characteristics described in the contract documents.
2. Standard structural steel contains no AESS characteristics.

Commentary:

Variations, if any, from the AESS Categories listed must be clearly noted. These variations could include machined surfaces, locally abraded surfaces, and forgings. In addition, if distinction is to be made between different surfaces or parts of members, the transition line/plane must be clearly identified/defined on the *approval documents*.

TOOLBOX TALK #9

Architecturally Exposed Structural Steel (AESS)

(10 minutes)



Standard Structural Steel (SSS)



AESS 1: Basic Elements
Elements that have workmanship requirements that exceed what would be done in non-AESS construction.

aisc.org/aess



AESS 2: Feature Elements Not in Close View

- Exceeds the basic requirements, but the intent is to allow the viewer to see the art of metalworking.
- AESS 2 is achieved primarily through geometry without finished work and treats things that can be seen at a larger viewing distance (>20 ft)



AESS 3: Feature Elements in Close View

- Exceeds the basic requirements, but the intent is to allow the viewer to see the art of metalworking.
- AESS 3 is achieved through geometry and basic finish work and treats things that can be seen at a closer viewing distance or are subject to touch by the viewer (<20 ft).
- It involves the use of a mock-up, and acceptance is based upon the approved conditions of the mock-up.



AESS 4: Showcase Elements

- AESS 4 is for when the designer intends that the form is the only feature showing in an element.
- All welds are ground and filled; edges are ground square and true.
- It involves the use of a mock-up, and acceptance is based upon the approved conditions of the mock-up.

Need help understanding the *Code*?



STEEL SOLUTIONS CENTER

aisc.org/askaisc
solutions@aisc.org
866.ASK.AISC