

Modern Steel Construction's monthly *Steel Quiz* allows you to test your knowledge of steel design and construction. All references to LRFD specifications pertain to the 1999 *LRFD Specification for Structural Steel Buildings*, available as a free download from AISC's web site:

www.aisc.org/lrfdspec

ASD references pertain to the 1989 *ASD Specification for Structural Steel Buildings*. Where appropriate, other industry standards are also referenced.

Anyone is welcome to submit questions for *Steel Quiz*—one question or 10! If you or your firm are interested in submitting a *Steel Quiz* question or column, contact ►

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Get ready, get set, go!

1. Steel fracture toughness _____.
 - a. is not related to the temperature
 - b. decreases with humidity
 - c. decreases with the temperature
 - d. should be specified by a fabricator
 - e. always should be tested by the mill
2. True or False? Use of prequalified welded joints guarantees that lamellar tearing will be avoided.
3. When are washers required in snug-tightened joints using ASTM A325 bolts?
4. What is the color coding for ASTM F1554-S1 Gr. 55 anchor rods?
5. True or False? Every shop or field repair requires Structural Engineer of Record (SER) approval.
6. The Whitmore Section is applicable to _____.
 - a. only bolted tension connections
 - b. bolted and welded tension and compression connections
 - c. only welded tension connections
 - d. bolted and welded shear connections
 - e. only bolted welded compression connections
7. What is the minimum effective length of any segment of intermittent fillet welding?
8. Connection-element rupture strength at welds _____.
 - a. is proportional to the minimum tensile strength of the element
 - b. is proportional to the minimum yield strength of the element
 - c. should be checked only when the connection element is designed for fatigue
 - d. is a serviceability issue.
9. True or False? The requirements for the maximum size of fillet welds in Chapter J of the AISC *Specification* apply only to lap joints.
10. Can fillet welds be wrapped or returned around the ends of a single-plate shear connection?

Turn page for answers

Answers

1. c. decreases with the temperature. Refer to ASTM A709 for CVN requirements as a function of service temperature.
2. False. But lamellar tearing is preventable. Refer to "Avoiding Lamellar Tearing" on page 2-53 and "Lamellar Tearing" on page 8-18 of the 3rd Edition *LRFD Manual* for methods to prevent lamellar tearing.
3. According to Section 6.1 of the 2000 *RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts*, washers are required when:
 - a. The outer surface of the joint has a slope that is greater than 1:20 with respect to a plane that is normal to the bolt axis.
 - b. A slotted hole occurs in an outer ply.
4. According to Section 19.1 of the ASTM F1554-99 Specification, the end of each anchor rod intended to project from the concrete should be color-coded yellow to identify this grade. In addition, the following requirement can be specified in the purchase order or contract: "Section S1.6 – Each anchor bolt (rod) conforming to this supplementary requirement S1 shall be designated by a white paint mark on the side of the bar near the end to be incased in concrete."
5. False. Refer to AISC FAQ 2.5.1 at www.aisc.org/faq. Typically, corrective measures to meet the requirements of shop drawings and specifications are made by the fabricator during fabrication, using qualified personnel and procedures that meet AISC and AWS specifications. This is considered part of the fabricator's quality-control program, and should not require notification of, or approval from, the owner or SER. However, in cases where major work is involved (cutting or removal of welded members from a welded assembly, modification of design, deviation from critical dimensions, etc.), the SER must be consulted and a plan of corrective action agreed upon.
6. b.
7. According to Section J2.2b of the 1999 *LRFD Specification*: "The effective length of any segment of intermittent fillet welding shall be not less than four times the weld size, with a minimum of 1-1/2 in. (38 mm)."
8. a.
9. True. The concept is discussed in the Commentary of Chapter J in the 1999 *LRFD Specification*. It is based on an inspector being able to identify the edge of the plate to properly position a weld gage. This gives the inspector a basis to distinguish the actual weld throat for plates 1/4" thick or larger.
10. No. It reduces the thickness of the plate and of a notch, which can cause large stress concentrations. Refer to the discussion and Figure 3-26 on page 3-30 of *Detailing for Steel Construction* (2nd edition).