

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 2005 Specification for Structural Steel Buildings, available as a free download from AISC's web site:

www.aisc.org/2005spec

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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This month's Steel Quiz was developed by the staff of AISC's Steel Solutions Center. Sharpen your pencils and go!

1. What is a faying surface?
2. Does the shear strength of a bearing-type bolted joint need to be reduced for the presence of fillers or shims if they are 1/2" in thickness? If yes, by how much?
3. Which of the following are considered stiffened elements?
 - a. leg of an angle
 - b. flange of a channel
 - c. web of a wide-flanged shape
 - d. wall of an HSS
4. **True/False:** The specified minimum yield stress of structural steel and reinforcing bars used in calculating the strength of a composite column shall not exceed 75 ksi.
5. Which of the following limit states can occur as a result of an applied concentrated load?
 - a. flange local bending
 - b. web local yielding
 - c. web crippling
 - d. web sidesway buckling
6. What is the ADA guideline for the maximum ramp slope upon which parking or pedestrian traffic is allowed?
 - a. 4%
 - b. 5%
 - c. 6%
 - d. 7%
7. What type of shape and plate tolerances are contained in ASTM A6?
 - a. mill tolerances
 - b. fabrication tolerances
 - c. erection tolerances
 - d. all of the above
8. Where can one find a wealth of LEED information online?
9. Bolted joints in Seismic Load Resisting Systems are required to be prepared as:
 - a. finger-tightened joints
 - b. snug-tightened joints
 - c. pretensioned joints
 - d. slip-critical joints
10. **True/False:** WT shapes are usually made by cutting W-shapes in half.

Turn page for answers

Answers

1. According to the glossary of the 2004 *RCSC Bolt Specification* (a free download from www.boltcouncil.org), “faying surface” is defined as the plane of contact between two plies of a joint.

2. If the filler or shim in a bearing joint is developed, the answer is no. If not, the answer is yes. According to Section 5.1 of the 2004 *RCSC Bolt Specification*, fillers ¼” or less in thickness do not require a reduction. However, a reduction is required for thicknesses between ¼” and ¾” based on the linear factor $[1 - 0.4(t - 0.25)]$, where t is the total thickness of the fillers and shims. Hence for ½” thickness, the factor is $[1 - 0.4(0.5 - 0.25)]$, or 0.9. The answer to the second part of the question is a 10% reduction in nominal strength. Please note that fillers and shims greater than ¾” must be developed.

3. The answers are **c** and **d**. The web of a wide-flange shape is stiffened at its end by the flanges, as are the walls of HSS. Refer to Table B4.1 in the 2005 *AISC Specification* (a free download from www.aisc.org).

4. True. Section I1.2 of the 2005 *AISC Specification* states that the specified

minimum yield stress cannot exceed 75 ksi. This is an increase from recent past AISC specifications.

5. All of these choices are potential limit states when concentrated loads are applied to members. Refer to Section J10 (for rolled shapes) and Chapter K (for HSS) in the 2005 *AISC Specification* for additional information.

6. The answer is **c**, 6% maximum. However, 5% is recommended. Refer to page four of *AISC Design Guide 18: Steel-Framed Open-Deck Parking Structures*; a free download to AISC members from www.aisc.org/epubs (and available for purchase as a printed publication from www.aisc.org/bookstore).

7. The answer is **a**. ASTM A6 contains shape and plate mill tolerances. For fabrication and erection tolerances, refer to the 2005 *AISC Code of Standard Practice* (a free download from www.aisc.org/code).

8. For a detailed listing of readily available LEED articles and information for steel construction, be sure to visit www.aisc.org/sustainability. For more general information, visit the web

site of the U.S. Green Building Council at www.usgbc.org.

9. The answer is **d**; however, the joint is not designed as slip-critical. According to Section 7.2 of the 2002 *AISC Seismic Provisions*, “All faying surfaces must be prepared as required for Class A or better Slip-Critical Joints.” This means that the joint can be designed as a bearing joint, but must be fabricated and erected with surface preparation to achieve a slip resistance at least equal to that of Class A and have pretensioned bolts. See the corresponding Commentary in the *AISC Seismic Provisions*, which is a free download at www.aisc.org.

10. True. It is more economical for steel producers to provide WT shapes cut from W-shapes rather than to hot-roll the final tee shape. Most W-shapes (all, in the case of the WTs listed in the *AISC Manual*) are cut in half along the centerline of the web to produce two WT sections. Off-center splitting or splitting on two lines is uncommon, but can be obtained by special order. The resulting shapes are non-standard and not listed in the *AISC Manual*. ★