

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

1. Why do W and WT Shapes have two k-dimensions listed in the LRFD Manual of Steel Construction, Third Edition?
2. What ASTM specification lists mill tolerances for structural shapes and plates?
  - a. A36
  - b. A572
  - c. A992
  - d. All of the above
  - e. None of the above
3. **True/False:**  $Kl/r = 200$  is the specified limiting slenderness ratio for compression members.
4. **True/False:** Channels are considered in a separate classification than doubly symmetric shapes when calculating the nominal flexural strength.
5. An example of a "Double Connection" is:
  - a. Standard framed double angles in a beam web connection.
  - b. Seat and beam web connection providing dual support.
  - c. Bolts in combination with welds sharing load transfer.
  - d. Connections sharing common bolts on either side of a central member.
  - e. Top and bottom flange plate connections.
6. **True/False:** Ordinary Moment Frames (OMF) in the 2002 AISC Seismic Provisions do not require the use of prequalified moment connections.
7. What is the maximum Seismic Response Modification Factor for which a structural steel lateral load resisting system can be designated according to 2003 IBC and ASCE 7-02, for Seismic Design Category C before AISC Seismic Provisions must be incorporated in the design?
8. **True/False:** A hole for a galvanized structural fastener can be made extra-oversized to compensate for the coating without affecting the design requirements.
9. **True/False:** ASTM A325 bolts are allowed to be galvanized when used in structural connections.
10. What material type is commonly specified for floor plate?
  - a. ASTM A36
  - b. ASTM A572
  - c. ASTM A992
  - d. All of the above
  - e. None of the above

**Turn page for answers**

## Answers

**1.** The k-dimension for fillets of W-shapes can have a significant variance depending on the practices of the manufacturer. To ensure that a designer would never overestimate the strength and a detailer would never overestimate the available flat web depth, the *Manual* now publishes two k-dimensions, a decimal value for design purposes and a fractional value for detailing.

**2. e. None of the above.** Mill tolerances for structural shapes and plates are given in ASTM A6.

**3. False.**  $Kl/r = 200$  is the preferred limiting slenderness ratio for compression members. (See section B7. of the 1999 AISC *LRFD Specification*.) Thus, the engineer can decide to exceed this slenderness value.

**4. False.** Doubly Symmetric Shapes and Channels are listed in the same category for determining the nominal

flexural strength of the flexural member. (See Section F1. of the 1999 AISC *LRFD Specification*.)

**5. d. Connections sharing common bolts on either side of a central member.** (See OSHA 1926.751.)

**6. True.** OMF in the 2002 AISC *Seismic Provisions* utilize a prescriptive connection defined directly in the AISC *Seismic Provisions*. Referring to Appendix P of the 2002 AISC *Seismic Provisions*, prequalification of connections in moment frames applies to Special Moment Frames (SMF) and Intermediate Moment Frames (IMF).

**7. Seismic Response Modification Factor R=3.** See 2003 IBC Table 1617.6.2, Section 8 and/or ASCE 7-02 Table 9.5.2.2, "Structural Steel Systems Not Specifically Detailed for Seismic Resistance."

**8. False.** The AISC *Specification* makes no special provision for allowable extra over-sizing of holes to accommodate coated structural bolts. (See 1999 AISC *LRFD Specification*, J3.2 and Table J3.3 or J3.3M for Size and Use of Holes.) Thus, the same hole sizes are used in galvanized steel framing.

**9. True.** ASTM specifications permit the galvanizing of ASTM A325 bolts but not ASTM A490 bolts. (See RCSC *Specification for Structural Joints Using ASTM A325 or A490 Bolts*, Section 2.3 Commentary available as a free download from the RCSC web site [www.boltcouncil.org](http://www.boltcouncil.org).)

**10. e. None of the above.** ASTM A786 is the standard specification for rolled steel floor plates. The plate will often be supplied without specific mechanical properties. (See *LRFD Manual of Steel Construction*, Third Edition page 2-23 for discussion.) ★