

steel quiz

LOOKING FOR A CHALLENGE? *Modern Steel Construction's* monthly Steel Quiz tests your knowledge of steel design and construction. Most answers can be found in the 2005 *Specification for Structural Steel Buildings*, available as a free download from AISC's web site, www.aisc.org/2005spec. Where appropriate, other industry standards are also referenced.

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

- 1 Does the 13th edition AISC manual provide information on the dimensional tolerances for rolled structural steel shapes?
- 2 What is the reason for differentiating between K_{des} and K_{det} in Table 1-1 of the 13th Edition AISC manual?
- 3 What is the warping constant C_w , and how can one evaluate it?
- 4 Does the AISC manual provide recommended minimum inside radius values for cold bending of plates?
- 5 Are washers required for snug-tight joints?
- 6 When evaluating the risk of corrosion, how is galvanized steel base metal affected when connected using stainless steel fasteners?
 - a. It is not affected at all.
 - b. The corrosion of the base metal may be markedly increased by the fastener
 - c. The base metal causes corrosion within the fastener to be markedly increased
- 7 How can a single-plate shear connection be considered pinned? Does it not introduce minimal moment into the supported beam?
- 8 How much (or little) rotational stiffness is required to consider connections as pinned, partially restrained (PR), and fully restrained (FR)?
- 9 What is the recommended maximum hole size in a base plate for a 1¼-in.-diameter anchor rod?
 - a. 1⅜ in.
 - b. 1¾ in.
 - c. 2⅛ in.
- 10 How much of the nut must be engaged by ASTM A325 bolt threads, in order to be considered as properly installed?

TURN PAGE FOR ANSWERS

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- 1** **Yes.** Tables 1-22 to 1-26 of the 13th edition AISC manual include ASTM A6 tolerances for structural shapes. Table 1-27 includes tolerances for rectangular and square HSS, Table 1-28 has tolerances for round HSS and pipe, and Table 1-29 has permissible variations from flatness for rectangular sheared plates.
- 2** The two distinct values for K are used depending on whether one is designing or detailing. A survey of steel producers has shown that there is variation in the radii used in production. To avoid fit-up problems during detailing, or overstating the section property for design, two different values are given.
- 3** The warping constant is a section property that indicates how much warping contributes to torsional stiffness in open sections. It is listed for wide flanges, channels, and WT sections in Table 1 of the

ANSWERS

- AISC manual. AISC *Design Guide* 9 also includes equations for the evaluation of C_w for various common sections and provides a general equation in Appendix C.
- 4** **Yes.** Table 10-12 of the AISC manual includes minimum inside radius for cold-bending of plates.
 - 5** As per Section 6.1 of the RCSC specification, washers are not required in snug-tight joints unless sloping surfaces or slotted holes are included.
 - 6** **b.** Table 2-6 in the AISC manual presents a summary of information that can be used for corrosion related preliminary material selection purposes.
 - 7** Within Part 10 of the AISC manual there are various simple shear connections presented that have sufficient rotational ductility to be considered pinned. How such ductility is achieved is described on page 9-13 in Part 9 of the manual (a combination of plate deformation, rotation at the bolt line, and bolt hole deformation).
 - 8** As discussed in the commentary to section B3.6 of the 2005 AISC specification, a minimum stiffness of $20EI/L$ is required to consider a moment connection fully restrained (FR). At $2EI/L$ the connection is considered pinned while the intermediate values are classified as PR moment connections.
 - 9** **c.** Table 14-2 in the AISC manual recommends that the hole size not exceed $2\frac{1}{16}$ in.
 - 10** **a.** As per section 2.3.2 of the RCSC specification (included in Part 16 of the AISC manual), "the bolt length shall be such that the end of the bolt extends beyond or is at least flush with the outer face of the nut when properly installed."

Anyone is welcome to submit questions and answers for Steel Quiz. If you are interested in submitting one question or an entire quiz, contact AISC's Steel Solutions Center at 866.ASK.AISC or at solutions@aisc.org.



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