

Steel Quiz, a monthly feature in *Modern Steel Construction*, 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 at

www.aisc.org/lrfdspec

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

If you or your firm are interested in submitting a *Steel Quiz* question or column, contact:



One E. Wacker Dr., Suite 3100
Chicago, IL 60601
tel: 312.670.2400
fax: 312.423.4651

solutions@aisc.org

Victor Shneur, P.E., of LeJeune Steel in Minneapolis, Minnesota, wrote this month's *Steel Quiz*.

QUESTIONS

1. What is an acceptable minimum fillet weld size if a $\frac{5}{16}$ in. effective throat thickness is required and the weld is to be made by the submerged arc (SAW) process?
2. Which of the following camber ordinates for a 30 ft W16×26 beam are not recommended?
 - a. $\frac{1}{4}$ in.
 - b. $\frac{1}{2}$ in.
 - c. $1\frac{1}{2}$ in.
 - d. 2 in.
 - e. 5 in.
3. True or False? The full strength of a connection plate or stiffener can be developed only with a complete joint penetration weld.
4. Which of the following items are not considered to be structural steel per the 2000 AISC *Code of Standard Practice*? Select all that apply.
 - a. Permanent shims
 - b. Leveling plates
 - c. Girts made from standard structural shapes
 - d. Steel deck
 - e. Steel joist girders
5. What is the minimum effective throat thickness of a partial joint penetration weld for the connection of a 2 in. thick member to a 4 in. thick member?
6. What is the minimum preheat temperature for gas metal arc welding of 3 in. thick ASTM A572 grade 50 plates?
 - a. no preheat needed
 - b. 150°F
 - c. 225°F
 - d. 500°F
7. What is the minimum diameter of the hole for a plug weld?
8. Is it acceptable to correct an excessively large root opening for a CJP weld by welding? If so, what is the limitation for the opening?
9. True or False? When discrepancies exist between the Design Drawings and Specifications, the Design Drawings govern.
10. Is it the Fabricator's responsibility to discover discrepancies in the Contract Documents?

TURN PAGE FOR ANSWERS

STEEL QUIZ

ANSWERS

1. $\frac{5}{16}$ in. Per Section J2.2a of the 1999 *LRFD Specification*, "...for fillet welds made by the submerged arc process, the effective throat thickness shall be taken equal to the leg size for $\frac{3}{8}$ in. (10 mm) and smaller fillet welds..."
2. **a, b** and **e**. Usually cambers of $\frac{3}{4}$ in. or less are avoided because the cost of cambering may exceed the potential savings in concrete. They are so small and the cambering process is not so exact to begin with. Choice **e** is an impractical, large camber that may cause unacceptable beam web buckling.
3. False. It is often (typically for $\frac{1}{2}$ in. or thinner plates, A36 or A572 grade 50) more economical to develop the full strength using fillet welds at both sides. Alternatively, double-sided PJP groove welds with fillet reinforcement may also be more economical than a CJP weld.
4. **d** and **e**. Although these items do carry loads, the *Code* definition is intended to address items made by the steel fabricator. Deck and joist are buyout items.
5. $\frac{1}{2}$ in. Refer to Table J2.3 of the 1999 *LRFD Specification*.
6. **c**. Refer to Table 3.2 of AWS D1.1 - 2002.
7. Per Section J2.3b of the 1999 *LRFD Specification*, the minimum diameter "shall not be less than the thickness of the part containing it plus $\frac{5}{16}$ in. (8 mm), rounded to the next larger odd $\frac{1}{16}$ in. (even mm)."
8. Per Section 5.22.4.3 of AWS D1.1 - 2002, "Root openings greater than those allowed in 5.22.4.1, but not greater than twice the thickness of the thinner part or $\frac{3}{4}$ in. [20 mm], whichever is less, may be corrected by welding to acceptable dimensions prior to joining the parts by welding." See the Commentary on this section for more information.
9. True. Refer to *Code of Standard Practice* Section 3.3.
10. No. The *Code* requires discrepancies found to be reported for resolution, but does not obligate the fabricator, detailer, or erector to discover discrepancies. See the Commentary on Section 3.3 in the *Code of Standard Practice* for further explanation.