

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:

The logo for Steel SolutionsCenter features the word "Steel" in a small blue font above "SolutionsCenter" in a larger, bold blue font. A blue swoosh underline is positioned above the "SolutionsCenter" text.

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This month's *Steel Quiz* was contributed by Victor Shneur, P.E., of Lejeune Steel, Minneapolis, MN.

1. What is the effective shearing area of plug and slot welds?
2. True or False? The shear and tensile strengths of ASTM A325 and A490 bolts are not affected by the presence of pretension in the bolt.
3. Which of the following statements are correct?
 - a. preheat is not required at all if welding is to be done at temperature 70 °F and above
 - b. preheat is required for CJP welds only
 - c. preheat reduces shrinkage stresses in the weld and adjacent base metal and reduces the incidence of cracking
 - d. Welding Procedure Specifications (WPS) should include preheat temperature
 - e. typical minimum preheat and interpass temperatures are 600 °F
4. How do unstiffened and stiffened seated connections provide for rotational ductility?
5. What is the necessary strength development for groove-welded splices in beams and girders?
6. True or False? The magnitude of the clamping force that exists in a snug-tightened joint is not a consideration.
7. When is it the Fabricator's responsibility to furnish certified mill test reports?
8. What is the maximum variation in dimension between the centers of any two anchor rods within an anchor rod group?
9. Are structural tees rolled to produce the final cross-section?
10. When is it necessary to finish or grind welds of AESS members?

TURN PAGE FOR ANSWERS

STEEL QUIZ

ANSWERS

1. According to the 1999 *LRFD Specification* Section J2.3a, "The effective shearing area of plug and slot welds shall be considered as the nominal cross-sectional area of the hole or slot in the plane of the faying surface."
2. True. Refer to *Commentary* of Section 5.1 of the 2000 *RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts* (free download at www.boltcouncil.org). For additional information, see *AISC Design Guide 17: High Strength Bolts – A Primer for Structural Engineers*.
3. c. and d.
4. As explained in the section "Rotational ductility" on page 9-12 in 3rd edition *LRFD Manual*, "For unstiffened and stiffened seated connections, the geometry and thickness of the top or side stability angle is configured so that flexing of that connection element accommodates the simple-beam end rotation."
5. According to the 1999 *LRFD Specification* Section J7, "Groove-welded splices in plate girders and beams shall develop the full strength of the smaller spliced section. Other types of splices in cross sections of plate girders and beams shall develop the strength required by the forces at the point of the splice."
6. True.
7. As stated in Section 5.1.1 of the 2000 *AISC Code of Standard Practice for Steel Buildings and Bridges*, "...Certified mill test reports shall be furnished by the Fabricator if requested to do so by the Owner's Designated Representative for Design, either in the Contract Documents or in separate written instructions given to the Fabricator prior to ordering Mill Materials."
8. $\frac{1}{8}$ -inch. Refer to Section 7.5.1(a) of the 2000 *Code of Standard Practice for Steel Buildings and Bridges* for additional requirements.
9. No. According to the 3rd Edition *LRFD Manual*, page 2-22, "Structural tees are split from W-, M- and S-shapes to make WT-, MT- and ST-shapes, respectively."
10. As stated in Section 10.2.5 of the 2000 *Code of Standard Practice for Steel Buildings and Bridges*, "...Finishing or grinding of welds shall not be necessary, unless such treatment is required to provide for clearances or fit of other components." For additional information, contact the AISC Steel Solutions Center to obtain a copy of the *Modern Steel Construction* article "Designing Architecturally Exposed Steel Tubes" by Lawrence A. Kloiber, P.E. (March, 1993), and be sure to check out this month's special pull-out guide to AESS.