

steel quiz

This month's Steel Quiz is all about the 2016 AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360), available at www.aisc.org/specifications.

- 1 A325, A325M, A490, A490M, F1852 and F2280 fasteners standards have been combined into which of the following ASTM Standards:
a. F16 **b.** F3125
c. T1000 **d.** F \uparrow
- 2 The 2016 *Specification* adopted new ASTM HSS material specifications: ASTM A1085/A1085M and A1065/A1065M. Which of these two standards would be more similar to ASTM A500?
- 3 **True or False:** The *Specification* requires that all projects meet the structural integrity provisions provided in Section B3.9.
- 4 Is a shear lag reduction factor provided in the *Specification* for the weld configuration shown below in Figure 1?

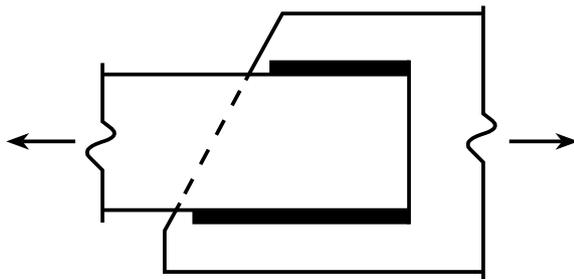


Figure 1

- 5 Which of the following changes regarding composite member design was not included in the 2016 *Specification*?
a. Increased the limit on rebar strength to 80 ksi for composite columns
b. Incorporated provisions for applying the direct analysis method to composite members
c. Inserted general requirements to address minimum composite action in composite beams
d. None of the above
- 6 **True or False:** All of the requirements for hollow structural section (HSS) connection design have been moved into Chapter J of the *Specification*.
- 7 The minimum pretension value has increased for which ASTM F3125 Grade A325 bolts:
a. All bolt diameters
b. $\frac{7}{8}$ -in.-diameter bolts and larger
c. $1\frac{1}{8}$ -in.-diameter bolts and larger
d. The minimum pretension values have not changed
- 8 **True or False:** A hole diameter of $1\frac{1}{8}$ in. provided for a 1-in.-diameter bolt would be considered an oversized hole.
- 9 **True or False:** The factor, Q , is a net reduction factor accounting for all slender compression elements.
- 10 **True or False:** Roof systems need not be investigated to assure adequate strength and stability under ponding conditions for roof slopes of $\frac{1}{4}$ in. per ft or greater toward points of free drainage.

TURN PAGE FOR ANSWERS

- 1 **b.** F3125. The AISC *Specification* adopted an ASTM umbrella bolt specification, ASTM F3125, which includes Grades A325, A325M, A490, A490M, F1852 and F2280. The ASTM F16 Fastener Committee approved ASTM F3125, which replaces the six existing standards.
- 2 **ASTM A1085/A1085M.** ASTM 1085 was developed to improve upon the requirements in ASTM A500. These improvements include tighter the wall thickness tolerance (which means no reduction in wall thickness must be accounted for in the design as is done for ASTM A500 material), better control of F_y and F_u for seismic overstrength and minimum CVN requirements, which can be beneficial for fatigue applications. ASTM A1065 can be viewed as a specification for very large HSS sections and is produced by welding two C-shaped sections together, where the C-shaped sections are formed from flat steel plates.
- 3 **False.** Structural integrity provisions, which have been significantly expanded in the 2016 *Specification* (Section B3.9), state that the requirements in this section shall be met "when design for structural integrity is required by the applicable building code."
- 4 **Yes.** The 2016 *Specification* added a shear lag factor for welded plates or connected elements with unequal length longitudinal welds (see Table D3.1).
- 5 **d.** None of the above.
- 6 **False.** Chapter K, which addresses HSS connection design, has been reorganized in the 2016 *Specification*. This reorganization does include references to Chapter J to check some limit states.
- 7 **c.** 1½-in.-diameter bolts and larger. The material strength for ASTM F3125 Grade A325 was increased to 120 ksi from 105 ksi, requiring an increase in bolt pretension.
- 8 **False.** The 2016 *Specification* incorporated changes that included an increased standard hole sizes (⅛-in. oversize) for 1-in.-diameter and larger bolts. This will also include equivalent increases in short slot and long slot widths. A 1½-in.-diameter hole provided for a 1-in.-diameter bolt would be considered a standard hole in the 2016 *Specification*.
- 9 **False.** This would have been true per the 2010 *Specification*. However, the compressive strength formulation for members with slender compression elements has been revised in the 2016 *Specification* and no longer includes the calculation of a Q factor.
- 10 **False.** Previous editions of this *Specification* suggested that ponding instability could be avoided by providing a minimum roof slope of ¼ in. per ft (20 mm per m). There are cases where this minimum roof slope is not enough to prevent ponding instability. See Commentary Section B3.10 of the 2016 *Specification* for additional information.



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