

steel quiz

This month's Steel Quiz focuses on fabrication, erection and industrial building design. Most of the answers can be found in the *AISC Specification* (AISC 360) and *AISC Manual*, as well as on the AISC and *Modern Steel Construction* websites.

- 1 True/False: AISC 360 Appendix 4 pertains to sustained elevated temperatures.
- 2 True/False: The use of the turn-of-nut method is acceptable for pretensioned installation of TC bolts.
- 3 Which AWS standard defines the standard symbols and nomenclature for weld callouts?
a) AWS D1.1 b) AWS D1.8
c) AWS A2.4 d) AWS B1.11
- 4 Which part of the 14th Edition AISC *Manual* has information on OSHA requirements for erection safety?
a) Part 2 b) Part 9
c) Part 14 d) None of the above
- 5 True/False: Chapter N in the 2010 AISC *Specification* provides requirements for inspection that can be used as a guide for developing in-house procedures and inspection training.
- 6 True/False: Weld access holes at the flange-to-web interface are not required when attaching the flanges of a wide-flange column to a base plate using complete-joint-penetration (CJP) groove welds.
- 7 Which Chapter in the 2010 AISC *Specification* contains requirements that apply to thermal cutting?
a) L b) M
c) N d) None of the above
- 8 True/False: Lifting lugs (or pad eyes) that meet the dimensional requirements of AISC *Specification* Section D5.2 can be designed using the provisions of Section D5 for pin-connected members.
- 9 True/False: Only qualified paints that have been tested to result in a Class A or Class B slip resistance are allowed to be applied to the faying surfaces in slip-critical connections.
- 10 True/False: AISC determines the dimensional properties of the steel shapes shown in the *AISC Manual*.

TURN PAGE FOR ANSWERS

- 1 False. Appendix 4 is for steel exposed to fire conditions, which is a temporary exposure to elevated temperatures. It is not intended for the design of steel that experiences sustained elevated temperatures. There are other resources for this type of design. ASME *Boiler and Pressure Vessel Code* Section II, Part D provides tables for sustained elevated temperature properties, including values of F_y and F_u at elevated temperatures, and design values for numerous carbon and alloy steels.
- 2 True. Any of the installation methods in RCSC *Specification* Section 8.2 are permitted when installing tension control (TC) bolts. The usual approach with TC bolts is to use the twist-off feature and method, but sometimes this can't be done (e.g., in cases where there is no access to enter the TC installation tool). In such cases another method, like the turn-of-nut method, can be used. It is important to note that the splined end of the TC bolt will not be sheared off in this case; this is not a cause for rejection of the installation.
- 3 (c) AWS A2.4 *Standard Symbols for Welding, Brazing, and Non-Destructive Examination* provides standard welding symbols and nomenclature. The current edition of AWS A2.4 was published in 2012 and is available at www.aws.org.
- 4 (d) Part 2 of the 14th Edition AISC *Manual* includes a discussion of the OSHA requirements for erection safety. The actual regulations are available on the OSHA website at www.osha.gov. The ten most frequently cited OSHA regulations in our industry are listed on the AISC Safety web page www.aisc.org/safety.
- 5 True. Chapter N can be used as a guide for developing these procedures. There are also other publications that may be useful, such as SSTC's *Shop Inspection Handbook for Structural Steel Buildings*. Visit www.steelstructures.com.
- 6 False. In order to use an AWS D1.1 prequalified joint, a weld access hole is required. The weld access hole provides clearance for a backing bar if welding from one side, or access to back gouge and re-weld if welding the joint from both sides without the use of a backing bar. The weld access hole should be dimensioned as required by AISC 360 Section J1.6. Most column bases require only fillet welds, which do not require weld access holes.
- 7 (b) AISC *Specification* Chapter M provides general requirements for fabrication and erection. Section M2.2 addresses the quality requirements for thermally cut edges. Sections M2.5 and M2.9 address the requirements for thermally cut holes for bolts and anchor rods, respectively.
- 8 True. Pin material is governed by Section D5 in the 2010 AISC *Specification*. However, spreader beam lifting lugs typically do not meet the dimensional requirements of Section D5.2. Usually, the pin hole diameter exceeds the maximum of $\frac{1}{32}$ in. clearance provided in this section. When lifting lugs fall outside the limits imposed by Chapter D for pin-connected members, other resources, such as ASME BTH-1, are needed to design the lug.
- 9 True. Non-qualified coatings are not allowed on the faying surfaces of slip-critical connections. The area that must be kept free of non-qualified paint is illustrated in RCSC *Specification* Figure C-3.1 on page 16.2-20 of the 14th Edition AISC *Manual*.
- 10 False. The dimensional and physical properties of hot-rolled steel shapes are specified in ASTM A6. Pipes are defined in ASTM A53, and HSS cross-sections are determined by the Steel Tube Institute of North America following the information provided in ASTM A500.