

# steel quiz

This month's Steel Quiz  
is all about steel castings.

- 1 Which organization represents steel casting producers?
    - a. SSINA
    - b. SSPC
    - c. SFSA
    - d. NHDSC
  - 2 The U.S. steel castings industry produces approximately how many tons annually?
    - a. 1.3 million tons
    - b. 12.4 million tons
    - c. 36 million tons
    - d. 50 million tons
  - 3 **True or False:** Design and fabrication of cast and forged steel components are not covered in the AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360, [www.aisc.org/specifications](http://www.aisc.org/specifications)).
  - 4 **True or False:** When designing a casting, "beam theory" generally does not apply.
  - 5 In general, castings may be appropriate in which of the following cases:
    - a. Fatigue-critical connections
    - b. Complex connections
    - c. Repetitive details
    - d. Architecturally exposed joints, particularly for HSS connections
    - e. All of the above
  - 6 **True or False:** Brittleness is a common consideration when working with steel castings.
  - 7 **True or False:** Steel castings are weldable.
  - 8 Surface finish quality of steel castings typically has the appearance of a(n):
    - a. Egg shell
    - b. Popcorn ceiling
    - c. Orange peel
    - d. Hot-rolled steel member
  - 9 In casting molds, risers are provided to:
    - a. Allow access to fill the mold
    - b. Take shrinkage out of the casting
    - c. Cause thick sections to solidify faster
    - d. Separate sand to make internal passages or special features
  - 10 What information should be provided in the contract documents when specifying castings?
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- TURN PAGE FOR THE ANSWERS

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- 1 **c.** SFSA. The Steel Founders' Society of America has represented the interests of steel foundries since 1902.
- 2 **a.** 1.3 million tons.
- 3 **True.** While there is a section in A3 addressing steel casting materials, the design and fabrication of steel castings falls outside the scope of the *Specification*. SFSA's *Steel Castings Handbook* discusses a number of standards useful for steel structures.
- 4 **True.** Castings usually consist of non-prismatic, complex geometries. Typically, finite element analysis will be required.
- 5 **e.** All of the above. The suitability of castings is increased in situations where more than one of these conditions applies. Also note that castings may be appropriate for connections that require large welds (due to high loading) that are difficult to apply and inspect.
- 6 **False.** Note that cast steel is not the same as cast iron. Steel castings can be just as ductile as rolled steel products.
- 7 **True.** While steel casting certainly can contain material properties that would provide adequate weldability, there are currently no cast steel grades listed as prequalified base metals in AWS D1.1 Weld qualification, as covered in Clause 4 of ASW D1.1, would be required.
- 8 **c.** Orange peel. Surface quality needs to be addressed for architecturally exposed structural steel (AESS) castings. Appropriateness of the surface finish will depend on many factors, including the casting process, coating system used, viewing distance and AESS category.
- 9 **b.** Take shrinkage out of the casting. A riser is a reservoir built into a casting mold to prevent cavities due to shrinkage that occurs during cooling.
- 10 The answer is too extensive to cover here. You can find guidance in the following article and presentation (and note that most of this quiz was generated from these two sources): "Steel Castings for AESS and Beyond" (December 2011, available at [www.modernsteel.com](http://www.modernsteel.com)) and "Steel Castings in Architecture—Do You Know How to Design Them?" at [tinyurl.com/steecastarch](http://tinyurl.com/steecastarch).



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Anyone is welcome to submit questions and answers for the 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 [solutions@aisc.org](mailto:solutions@aisc.org).