Practice quiz: API 653 Aboveground Storage Tank Inspector

10 questions. The answer key is on page 2.

Name _____ Date _____

1. **Invented practice tank T-24: a shell course now reads 0.352 in., its minimum allowable thickness is 0.280 in. and its corrosion rate is 0.0045 in./yr. Use remaining life = (t actual - t minimum) / corrosion rate. What is the remaining life?**
   A. 8.0 years
   B. 62.2 years
   C. 16.0 years
   D. 78.2 years

2. **Invented practice tank T-34 has D = 120 ft and holds product with G = 0.85. A corroded area far from welds (E = 1.0) has an average thickness of 0.300 in., and S = 24,000 psi. Use the localized relation H = S x E x t / (2.6 x D x G), with H measured from the bottom of the area. What is H?**
   A. 27.1 ft
   B. 28.1 ft
   C. 23.1 ft
   D. 54.3 ft

3. **Invented practice tank T-44: RTbc = 0.16 in., RTip = 0.19 in., StPr = 0.002 in./yr and UPr = 0.003 in./yr, and the bottom minimum given for this exercise is 0.10 in. Use O = (the lesser of RTbc and RTip - the minimum) / (StPr + UPr). What is O?**
   A. 18.0 years
   B. 20.0 years
   C. 32.0 years
   D. 12.0 years

4. **A WPS for a tank shell repair names its supporting PQR, but the PQR carries no signature or date. What is the finding?**
   A. Acceptable, because the WPS names the PQR
   B. The PQR is incomplete
   C. Acceptable if the welder signs the WPS
   D. Acceptable if every PQR test passed

5. **Why are liquid penetrant materials controlled for sulfur and halogen content before use on austenitic stainless steel?**
   A. They can attack or crack the steel
   B. They dim the glow of fluorescent dyes
   C. They slow the drying of the developer
   D. They lengthen the minimum dwell time

6. **An examiner sets up a pulse-echo contact thickness gauge for shell readings under SE-797. Which reference block suits the calibration?**
   A. Any steel block, whatever its thickness
   B. An aluminum block of the nominal thickness
   C. Blocks of the same material that cover the thickness range
   D. One block thinner than the thinnest plate

7. **Which records does the owner/user keep in the permanent file for a tank?**
   A. Only the most recent inspection report
   B. Construction, inspection and repair records
   C. Only the nameplate data and the drawings
   D. Only repair records from the last five years

8. **Which test checks the welds of a new shell reinforcing plate by applying low air pressure through its telltale hole?**
   A. A hydrostatic test of the whole tank
   B. A vacuum box test of the bottom welds
   C. A magnetic particle test of the plate
   D. A pneumatic test with soap film on the welds

9. **An invented tank stores sodium hydroxide solution warmed by a steam heating coil. Which condition of its shell welds most raises the risk of caustic stress corrosion cracking?**
   A. As-welded, with no postweld heat treatment
   B. Made with low-hydrogen electrodes
   C. Painted on the outside with an epoxy coating
   D. Ground flush with the plate surface

10. **Why might a thick-film or reinforced lining be chosen over a thin-film coating for a pitted tank bottom?**
    A. It needs no surface preparation
    B. It lets soil-side CP protect the product side
    C. It bridges pits and rough areas better
    D. It cures well at any temperature

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Answer key

API 653 Aboveground Storage Tank Inspector. One line of why for each answer.

1. **C** The margin is 0.352 - 0.280 = 0.072 in., and 0.072 / 0.0045 = 16.0 years.
2. **A** S x E x t = 7,200 and 2.6 x 120 x 0.85 = 265.2, so H = 27.1 ft. 28.1 ft adds the 1 ft that belongs only to the whole-course form, 23.1 ft uses a weld E of 0.85 for an area far from welds, and 54.3 ft uses the 60 ft...
3. **D** The lesser thickness is 0.16 in., the margin is 0.06 in. and the rates add to 0.005 in./yr, so O = 12.0 years.
4. **B** The BOK says the WPS must reference its PQR and the PQR must be signed and dated, so an unsigned, undated PQR does not yet support the WPS.
5. **A** Residues containing sulfur or halogens such as chlorine can cause corrosion or cracking of austenitic stainless steel, so their content is limited.
6. **C** Calibration needs blocks with the same sound velocity as the plate and thicknesses that bracket the readings expected.
7. **B** The permanent file holds the construction records, the inspection history and the repair and alteration history, so later decisions can rest on the whole record.
8. **D** Low air pressure in the space behind the reinforcing plate, with soap film over the welds, shows any leak path.
9. **A** Caustic cracking needs tensile stress as well as hot, concentrated caustic, and in tank shells that stress is mostly residual stress from welding, so as-welded shell welds without postweld heat treatment carry the...
10. **C** A thicker or reinforced system can span pits and roughness that a thin film would not cover reliably.

Full explanations

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