

NOTE: Read all the responses to each question before selecting your answer. More than one response may be partially correct. Choose the answer which is most correct. The appropriate tank / sump and riser installation instructions should be referenced during the exam.

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This form **MUST** be complete in order to receive your acknowledgment of training

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Number of Correct Responses: _____ (minimum of 35 correct responses required)

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To Complete Registration:

- 1. Complete the test.**
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- 3. PRecord each attendees name and test score on Attachment E form.**
- 4. You keep the completed test and a copy of the Attachment E form.**
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The Attachment E form can be accessed online at containmentsolutions.com and filled out and submitted electronically.

DIRECTIONS: CHOOSE THE BEST ANSWER FROM THE CHOICES LISTED FOR EACH QUESTION. CIRCLE THE CORRESPONDING LETTER. THERE MAY BE MULTIPLE OPTIONS WHICH ARE TRUE FOR A GIVEN QUESTION BUT ONLY ONE CORRECT ANSWER.



1. **Excessive deflection (loss in vertical diameter) of any installed tank can create stress on the tank. During the installation procedure, how do you determine if the deflection is acceptable?**
 - A. Compare the actual deflection measurement with the limits established by the manufacturer on the installation checklist
 - B. Multiply the number of inches of tank deflection by a factor of .0786
 - C. Compare the number of inches of vertical deflection to the nominal diameter of the tank and see if it exceeds 1.4%
 - D. Fill the inside of the tank with water to establish whether the deflection exceeds acceptable stress levels
2. **How do you install a tank in a non-level angled position?**
 - A. Metal chains around the tank
 - B. Slings must be used
 - C. Using lift lugs provided on tank
 - D. Rolling tank into position
 - E. Using guide lugs on tank
3. **What is the major cause of deflection (loss of vertical diameter) in a newly installed tank?**
 - A. Dropping the tank into the excavation, rather than lowering it
 - B. Loss of tank support because of improper backfill material or poor compaction
 - C. Placing the tank in an excavation with excessive distance between the excavation walls and the tank
 - D. Walking heavily on the top of the tank during the installation process
4. **When tanks arrive at the job site, how should they be unloaded?**
 - A. Rolled off the truck by the driver using driver supplied railing
 - B. Pulled off the truck with a winch
 - C. Slid off the truck with skids
 - D. Mechanically lifted with cables attached as defined on the Tank Label found adjacent to the lifting lugs
5. **When you are conducting an air/soap test on a tank, the type of gauge that should be used is:**
 - A. A vacuum gauge
 - B. A pressure gauge with ½ psig or smaller increments and a maximum limit of 15 psig
 - C. A bulwer gauge
 - D. A pressure gauge with 1 pound increments and a maximum limit of 50 psig
6. **According to FRP tank manufacturer's specifications, the burial depth for an FRP tank should not exceed:**
 - A. 2'
 - B. 12'
 - C. 7'
 - D. 4'
7. **After you unload a new tank onto a clean level surface at the job site, what else should you do prior to inspection and pretesting?**
 - A. Loosen the plugs
 - B. Chock the tank to prevent it from rolling
 - C. Tighten the plugs
 - D. Coat the lifting lugs with heavy grease
8. **The tank manufacturer's installation checklist should be properly completed and signed by the tank owner's representative and the installing contractor:**
 - A. Only when requested
 - B. When the job is 1 year old
 - C. To activate the tank warranty
 - D. If this customer is withholding payment
9. **When concrete deadmen are used to mechanically anchor a tank, they should:**
 - A. Be placed outside the tank shadow
 - B. Be tied down in the hole with chance anchors
 - C. Be wrapped in a dielectric plastic
 - D. Be placed inside the tank diameter, but not against the tank
10. **What is the most critical area for backfill support on an underground tank?**
 - A. The area surrounding fill pipe
 - B. The 9 o'clock to 2 o'clock position
 - C. The center area
 - D. The 5 o'clock to 7 o'clock position
11. **The bottom of a dry hole tank excavation without a concrete anchor pad, should be covered with a bedding of backfill material to a depth of at least:**
 - A. 6"
 - B. 2'
 - C. 4'
 - D. 12"



12. After backfilling is completed to sub-grade, what action should be taken with respect to the tank?
- None. It is time to pour the concrete slab or asphalt paving
 - The person in charge of the installation should walk across the backfill to be sure it is well compacted
 - The 4th and 5th vertical diameter measurements should be carefully measured to determine if any excessive deflection has occurred
 - A reading should be taken of the electrical resistivity in the backfill
13. Using Appendix A "Anchor Chart"; when there is an 8' diameter, 15,000 gallon tank, with two access risers, 12" x 12" deadmen anchors and a 6" concrete traffic pad, the minimum burial depth should be:
- 84"
 - 36"
 - 43"
 - 60"
14. Why is geotextile fabric required between the backfill and native soil for certain installations such as unstable soils, bogs, swampy areas, or landfills?
- Keep groundwater from rising to the top of the excavation
 - Prevent the backfill or native soil from migrating and thereby undermining support of the tank, piping, or paving
 - Guard against stray electrical current
 - Serve as a substitute for compacting the backfill
15. When backfilling tanks with approved backfill:
- The first 2' of backfill must be installed in 24" lifts and manually placed or remotely probed completely beneath the tank bottom and under ends
 - The top 2' of backfill must be mechanically compacted
 - The first two 12" lifts of backfill must be installed, manually placed, or remotely probed completely beneath the tank bottom and ends
 - The first 2' of backfill should be sand and then gravel carefully placed to grade
 - Both A and B
16. Fiberglass tanks installed in unstable soils such as muck, peat, swamp, or landfill type, must have a hole size:
- Big enough to allow for 2' of clearance on all sides of the tank
 - Big enough to allow for 3' of clearance on all sides of the tank
 - Big enough to allow a minimum space equal to the tank diameter from the ends and sides of the tank to the excavation walls
 - Big enough to allow a minimum space equal to half the tank diameter from the ends and sides of the tank to the excavation walls
 - None of the above
17. All underground tanks:
- Require anchoring if the water table is higher than the tank midline
 - Should be ballasted prior to backfilling, even if the hole is dry
 - Should be ballasted after backfill is even with the tank top
 - May be placed directly on concrete slab, timbers, beams or cradles as long as operator uses care in placing the tank
 - Both C and D
18. Recommended clearance for tanks 10' in diameter installed in stable soil conditions without CSI deadmen is:
- 12" between adjacent tanks
 - 12" between tanks sides and the ends and the excavation walls
 - 18" between adjacent tanks, 24" between tank and excavation walls
 - None of the above
19. When a concrete traffic pad is used for traffic loads over a fiberglass tank, the concrete must:
- Extend at least 12" beyond the tank perimeter in all directions
 - Extend to the tank outline in all directions
 - Extend at least 6" beyond the tank outline in all directions
 - None of the above
20. When is a tank adequately protected against flotation?
- When straps are installed and tightened onto the deadmen
 - When the tank is backfilled to subgrade and the top slab is in place
 - When the tank is backfilled 75% up to tank diameter
 - The tank will not float once placed into excavation
 - None of the above



- 21. When unloading CSI deadmen from the truck:**
- A. Use one anchor point in the middle of the deadman
 - B. Insure lifting equipment is rated to handle the load
 - C. The angle from the deadman should be between 30° and 60°
 - D. Use two equally spaced anchor points
 - E. Both B and D
- 22. The following minimum clearances must be maintained for internal piping distances from the bottom of the fiberglass tank:**
- A. 2" in 4' – 10' diameter tanks
 - B. 4" in 4' – 10' diameter tanks
 - C. 4" in 12' diameter tanks
 - D. 12" in 12' diameter tanks
 - E. Both B and D
- 23. When conducting a post-installation water test on a non air-testable single-wall tank:**
- A. No water test is required if the tank arrives non air-testable.
 - B. Fill the tank with water, but not high enough that water can exit the inlet/outlet pipes.
 - C. Completely fill the tank with water to a level 2" into the access collar(s). Wait at least 30 minutes before measuring the water level in the collar for changes.
 - D. Make sure backfill is to tank top before filling tank. Install plugs on inlets and outlets to keep water from exiting.
 - E. Both C and D
- 24. Deadmen used to anchor tanks 8' in diameter:**
- A. Must be positioned so they are within the outline of the tank
 - B. Must be designed per ACI code, and placed end to end, equal to tank length
 - C. Need to extend no more than half the length of the tank
 - D. Do not need steel reinforcing rods
 - E. Both A and D
- 25. The installation checklist included in the Installation Instructions:**
- A. Can be ignored
 - B. Must be properly completed and signed
 - C. Must be retained by the tank owner and provided later to CSI to validate any future warranty claim
 - D. Both B and C
 - E. None of the above
- 26. Anchor straps on 6', 8', 10', and 12' diameter fiberglass tanks:**
- A. May be placed on any convenient rib
 - B. Should be placed between ribs
 - C. Must have anchor points at the bottom of the hole aligned within 1" of the designated rib
 - D. Should be tightened with turnbuckles or come-a-longs to give a "snug" fit
 - E. Both C and D
- 27. When job site conditions require an oversized hole, backfill should be placed around the tank:**
- A. Put a minimum 24" of gravel around the tank and then carefully compact sand between the gravel and the excavation walls of the hole
 - B. Fill the entire excavation hole with approved backfill, or use geotextile fabric and alternate backfill to subgrade
 - C. Put gravel half way up tank and then compact sand to grade
 - D. Put a minimum of 18" of gravel around the tank and then carefully compact sand or native soil between the gravel and the excavation walls and the hole
 - E. Both C & D
- 28. Rounded backfill material for tanks:**
- A. Should have a maximum particle size of 1½"
 - B. Should be clean, naturally rounded aggregate with particle sizes no larger than ¾"
 - C. Should contain at least 10% clay to aid in compaction
 - D. May have some debris, rock, ice, snow or organic material as long as it doesn't exceed 10% of volume
 - E. A, B, and D
- 29. Though typically access risers are used, on occasion water tanks will require manways. It is imperative that bolts in manways should be tightened:**
- A. As tight as can be performed with a wrench
 - B. Until gasket seals the opening
 - C. Not more than 50 ft./lb torque
 - D. Both A & B
 - E. Both B & C



- 30. When a concrete bottom anchor pad is used to mechanically anchor an underground tank in a wet hole:**
- A. The tank must be set directly on the concrete as soon as it has hardened sufficiently to support the tank
 - B. The tank must be set directly on the concrete before it has set so as to mold the concrete pad to the bottom of the tank and provide better support
 - C. The tank and the pad must be separated by at least 18" of gravel or crushed stone backfill
 - D. The pad may be shorter than the length of the tank if it is made wider to maintain the same total area
 - E. Both C and D
- 31. Native soil can be used to backfill the tank when:**
- A. The maximum particle size is $\frac{3}{4}$ " diameter
 - B. It is compacted to 90% density
 - C. There is more than 2' of clearance around the tank
 - D. It has less than 20% passing the #200 sieve
 - E. None of the above, native soil is not an approved backfill material
- 32. During ballasting, how can tank damage be avoided?**
- A. By using any liquid to fill and sink the tank
 - B. By adding ballast past full
 - C. When adding ballast, precautions must be taken so that the tank cannot completely fill. Keep tank vented to prevent pressurization of the tank when adding ballast. AS the tank nears full, reduce the fill rate to prevent sudden pressurization
 - D. This problem can be avoided by providing adequate tank venting or removing the fill line and manually bringing the tank to full capacity
 - E. Both C and D
- 33. How do you sink a tank in a wet hole?**
- A. By pushing it down with a bucket or crane
 - B. Add enough ballast inside the tank keeping all compartments equal
 - C. By filling tank to tank top.
 - D. Keeping ballast not more than 12" above the ground water outside the tank
 - E. Both B and D

Refer to ACCESS RISER INSTALLATION INSTRUCTIONS (Pub. No. INST 6056)

- 34. In order to properly prepare the access riser and adhesive channel for bonding, you should:**
- A. Wipe the bonding surface with an oil based solvent
 - B. Sand the entire adhesive channel surface and the mating surface on the bottom of the riser pipe using supplied sandpaper
 - C. Scrub the surface with bio-degradable soap and water
 - D. Add supplemental heat to the surface when temperatures are below 60° F
 - E. Both B and D
- 35. Before moving access riser parts, adhesive in the channel should cure for at least:**
- A. 36 hours
 - B. Overnight
 - C. 18 hours
 - D. 5 hours
 - E. 48 hours
- 36. The mating surfaces on all materials should be sanded:**
- A. Unless the riser is already fiberglass not PVC
 - B. Until the surfaces are clean and white in color
 - C. Any material is sufficient to wipe the edges
 - D. This includes the internal surface of the adhesive channel
 - E. Both B and D
- 37. When applying the adhesive to the adhesive channel:**
- A. Pour adhesive parts A & B into the channel, the liquids will mix naturally
 - B. Thoroughly mix the adhesive before pouring into the adhesive channel
 - C. Completely fill the adhesive channel with adhesive, smooth and even out adhesive with the supplied putty knife and immediately set the riser into the channel
 - D. Both A and B
 - E. Both B and C

