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Continuing Education Course #406
Disinfection of Water System Components

1. What is the purpose of surface disinfection?
 - a. Inactivate microorganisms
 - b. Improve water quality
 - c. Confirm pipe integrity
2. What is a wetted surface?
 - a. Saturated material
 - b. Surfaces exposed to the elements
 - c. Interior surfaces in contact with the service water
3. Which standards cover the disinfection of PWS components?
 - a. WEF 156 to 160
 - b. AWWA C651, 652, 653 & 654
 - c. NSF 60 & 61
4. Which is NOT a chlorine chemical used for disinfection?
 - a. Liquid chlorine (gas)
 - b. Sodium hypochlorite
 - c. Chlorine trifluoride
 - d. Calcium hypochlorite
5. What is the most common concentration for sodium hypochlorite found at WTP's?
 - a. 5%
 - b. 12.5%
 - c. 20%
6. Which is NOT a form of calcium hypochlorite used for disinfection?
 - a. Bricks
 - b. Tablets
 - c. Granules
7. Chemicals used for disinfection should have which approval?
 - a. NFPA 60
 - b. NSA 20
 - c. NSF 60
8. What is the hold time for the tablet/granule method and the continuous method?
 - a. 6 hours
 - b. 24 hours
 - c. 36 hours

9. What is the maximum spacing for sample locations on a long water main?
- a. 1,200 feet
 - b. 1,500 feet
 - c. 2,000 feet
10. For the continuous method and slug method, is flushing the pipe done before or after chlorination?
- a. Before
 - b. After
 - c. Both
11. Which method allows disinfecting multiple pipe segments with the same chlorine solution?
- a. Slug
 - b. Continuous
 - c. Tablet
12. Which is NOT an application for the spray method, per AWWA C651?
- a. Large transmission mains
 - b. Short pipe connections
 - c. Pipe repairs
 - d. Long water mains
13. What is the approximate concentration of a 1% chlorine solution.
- a. 1,000 mg/L
 - b. 10,000 mg/L
 - c. 100,000 mg/L
14. What can be used to swab a surface with chlorine?
- a. Sponge
 - b. Tablet
 - c. Slug
15. A storage tank should be filled with a chlorine solution to what water level?
- a. Average water level
 - b. Maximum water level
 - c. Overflow level
16. For the 100% fill method, what allows decreasing the hold time to 6 hours?
- a. Granules added to the tank floor
 - b. Chlorine added to the inlet pipe during filling
 - c. Walls and floors sprayed
17. How many bacteriological tests are typically required at each sample location?
- a. 1
 - b. 2
 - c. 3
18. For the spray method on a storage tank, how should the drain pipe be disinfected?
- a. Fill with a chlorine solution
 - b. Swab accessible parts of the pipe
 - c. Spray accessible parts of the pipe

19. For the 5% fill method on a 30-foot tall ground storage tank, to what height should the tank be filled with the initial chlorine solution?
- a. 1'-0"
 - b. 1'-6"
 - c. 2'-0"
20. Why is it good practice to disinfect all WTP components, even upstream of filters?
- a. Meet AWWA standards
 - b. Improve performance
 - c. Avoid potential positive fecal coliform results
21. What are the two methods in AWWA C653 for disinfecting a gravity filter?
- a. Swab & Spray
 - b. Forward & Reverse
 - c. Backwash & Influent
22. What are the three steps for disinfecting a raw water well, per AWWA C654.
- a. Gravel, Equipment, and Well Casing
 - b. Spray, Fill, and Dechlorinate
 - c. Flush, Chlorinate, and Discharge
23. Which disinfection method allows the shortest hold time?
- a. Tablet
 - b. 5% Fill
 - c. Spray or Swab
24. Which tank disinfection method requires checking the final chlorine concentration?
- a. Method 1 - 100% Fill
 - b. Method 2 - Spray
 - c. Method 3 - 5% Fill
25. The AWWA methods for surface disinfection have been confirmed to provide what removal of bacteria and viruses?
- a. 99.9% (3-log)
 - b. 99.99% (4-log)
 - c. 99.999% (5-log)

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