

ADEQ

Arizona Department
of Environmental Quality



WASTEWATER PDH WORKBOOK

Completion of this workbook will count for 5 PDHs

Arizona Department of Environmental Quality
Drinking Water Section-Programs Unit
Operator Certification Program
1110 West Washington Street
Phoenix, AZ 85007
www.azdeq.gov

NAME _____

OPCERT NUMBER OPO _____

DATE _____

DIRECTIONS

Answer the questions in the space provided with concise and accurate answers. Mail the completed booklet to the address provided. It is recommended that you keep a copy of the completed booklet for your records. Completion of this workbook will earn the operator five (5) PDHs. Please print clearly. Workbooks that are illegible will not receive PDHs.

PDH means professional development hour.

A professional development hour is equal to one contact hour of continuing education. A total of 30 professional development hours are required for each 3-year renewal period regardless of the number of certificates that are held by an individual operator. Ten of the thirty PDHs must be directly related to an operator's job.

The type of PDH acceptable to the Department for certificate renewal include, but are not limited to: an approved college course, a course offered by a Certified Environmental Trainer, regulatory and tribal agency training, certain types of in-house training, technical conferences, correspondence courses, and manufacturer product training. An accredited college course is usually recorded in credit hours. In general, 1 college credit hour = 10 PDHs. If an operator has a question about a specific type of training, please contact the Operator Certification Program for approval before attending the training.

FOR MORE INFORMATION, CONTACT:

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Operator Certification Outreach
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1. What is the purpose of a wastewater collection system?

2. List and define the common sources of infiltration.

3. List and define the common sources of inflow.

4. Define the terms Aerobic and Anaerobic conditions, and their importance in a wastewater collection system.

5. Describe the physical characteristics of raw wastewater in terms of color, odor, and temperature.

6. Define the following:

A. pH

B. BOD

C. Suspended Solids.

D. Dissolved Solids.

E. Total Solids.

7. Describe the general chemical characteristics of raw wastewater in terms of pH, BOD, and Suspended Solids.

8. Explain the effect on collection system operations of the following problems associated with raw wastewater:

A. Septic Conditions

B. Oil and Grease

C. Solvents

D. Gasoline

E. Toxics

9. Explain the collection system and the function of the following:

A. Combined Sewers.

B. Separate Sanitary Sewers.

C. Storm Sewers.

10. Describe the purpose of a lift station.

11. Explain the importance of wastewater flow measurement.

12. Describe the sources of wastewater in a community.

13. Describe where flow meters should be located to accurately measure influent flows.

14. Describe factors that influence the design of a wastewater collection system.

15. List factors that are used to calculate design flows for a particular design period.

16. What are typical per capita flows from residential sources?

17. Explain the effect on plant operations of the following problems associated with raw wastewater:

A. Septic Conditions

B. Oil and Grease

C. Solvents

D. Gasoline

E. Toxics

18. How are actual wastewater velocities measured in the field?

19. Describe and explain the function of common preliminary wastewater treatment processes.

20. Explain the primary wastewater treatment process.

21. Discuss how detention time affects the results of primary clarification.

22. Describe the following valves used in a wastewater system.

A. Gate Valve

B. Check Valve

C. Plug Valve

D. Pressure Relief Valve

E. Butterfly Valve

F. Telescopic Valve

23. Describe the following pumps and their use in a wastewater collection system:

A. Centrifugal.

B. Submersible.

C. Airlift.

D. Positive Displacement Piston.

E. Positive Displacement Metering.

F. Diaphragm.

G. Progressive Cavity.

24. Define pathogenic organisms and their source in wastewater.

25. List the steps necessary in setting up a preventive maintenance system for equipment and facilities for a wastewater collection system.

26. Explain how to prevent grease and grit build-up in lift station wetwells.

27. Describe various grease and grit clean-up procedures used in lift station wetwell maintenance.

28. What is a building sewer cleanout used for?

29. Describe at least two locations where a building sewer cleanout might be installed.

30. Describe the conditions in which a low pressure or vacuum collection system would be installed instead of a gravity collection system.

31. What are some advantages of installing low pressure systems instead of gravity systems?

32. Discuss the Anaerobic Digestion unit process.

33. What is the typical distance between manholes in a straight run of sewer line?

34. Discuss the health concerns related to the discharge of treated wastewater.

35. Describe the options for steps in a manhole.

36. What is the typical diameter of a manhole lid or opening?

37. How might manhole elevation be adjusted after additional street paving is added?

38. What is the purpose of the eccentric cone section of a manhole?

39. What is the typical diameter of a manhole barrel?

40. Describe the shape of a manhole floor.

41. What factors determine the slope of a sewer line?

42. Why is the velocity of wastewater in a sewer line important?

43. What factors determine the size of a sewer line?

44. Where are sewer lines generally located?

45. What factors determine the depth of a sewer line?

46. Define grab and composite samples.

47. Discuss the water pollution concerns related to the discharge of treated wastewater.

48. Describe the temperature requirements for sample preservation.

49. List the information which must be recorded for every sample.

50. Define Confined Space entry requirements.

51. Identify the most commonly found toxic gases in a wastewater collection system.

52. List the safety precautions necessary to ensure that the air in a manhole or lift station is safe.

53. List the proper actions to take in case of a confined space accident.

54. List some common electrical safety precautions for operators at wastewater collection system.

55. Describe the main safety hazard with anaerobic conditions in collection systems.

56. Describe how each of the following types of pipe joints are constructed.

A. Push-on bell and spigot with gasket

B. Push-on bell and spigot with mechanical joint

C. Coupling with gaskets

D. Rubber coupling with compression bands

57. List potential advantages and limitations for each of the following pipes:

A. Asbestos-cement (ACP)

B. Cast iron (CIP)

C. Ductile iron (DIP)

D. Acrylonitrile butadiene styrene (ABS)

E. Polyvinyl chloride (PVC)

58. What materials might be used for manholes?

59. What are the basic components of the activated sludge process?

60. Name the type of organism (bacteria, virus, or parasite) responsible for causing the following waterborne diseases:

A. Typhoid Fever

B. Dysentery

C. Cholera

D. Salmonellosis

E. Hepatitis A

F. Giardiasis

G. Amoebic Dysentery.

61. List the most common methods of disinfecting treated wastewater.

62. Explain the relationship between chlorine dosage, chlorine demand, and chlorine residual.

63. Describe conditions that affect chlorine demand.

64. Describe ultraviolet disinfection and the main advantage of its use.

65. Describe the location where chlorine should be added for wastewater disinfection in the collection system.

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For additional training/PHDs click on the link below. This course provides 16 hours of PDH-approved training for drinking-water operators in the State of Arizona. These are available as individual lessons for credit or as a whole course.

<http://www.waterhelp.org/index.php/client/arizona>