

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 along with your renewal form at the time of renewal 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
Arizona Department of Environmental Quality
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1. What Does NPDES stand for?

2. List two examples of chemical pretreatment for algae control.

3. Define the terms oxidation and reduction.

4. What are the characteristics of chlorine gas?

5. A 1-ton cylinder will have how many fusible plugs?

6. Define/explain the following terms:

A. Trihalomethanes

B. PVC

C. Double Check Valve

D. Bar Screen

E. Anaerobic

7. What are some possible causes of cavitation?

8. What are the maximum allowable slopes for the following types of soil?

A. "A"

B. "B"

C. "C"

9. Describe the following Cycles

A. The Carbon Cycle

B. The Nitrogen Cycle

10. What must the oxygen levels be in a confined space before the space can be entered safely?

11. What is a Comminutor?

12. What is a Weir used for and give three examples of Weir types?

13. What are the five zones of a clarifier and describe what each zone does?

14. What is a Rotating Biological Contactor and how does it operate?

15. Describe two types of activated sludge processes.

16. What is the purpose of an Oxidation Ditch?

17. Define the following

A. Psychrophilic bacteria

B. Mesophilic bacteria

C. Thermophilic bacteria

D. Euglena

E. Chlorella

18. List three types of Activated Sludge Microorganisms.

19. What is an inverted siphon and why would it be used in a collections system?

20. What are three types of fire extinguishers and what type of fire would each be used for?

21. What is SVI? Good settling sludge will have an SVI between what range?

22. Describe the following types of Chlorine

A. Cl_2

B. $\text{Ca}(\text{OCl})_2$

C. NaOCl

23. Define the following terms:

A. Cathodic Protection

B. Flocc

C. Jar Testing

D. MLSS

E. Zoogeal Mass

F. Turbidity Units

G. Coagulation

24. What is the difference between mechanical aeration and diffused aeration?

25. How can foam be controlled in an aerator?

26. What are the types of decanters installed on SBRs?

27. What is the definition of a Wastewater Treatment Plant according to the Arizona Administrative Code?

28. Why should a sludge line never be closed at both ends?

29. Why should a digester be kept completely mixed?

30. What acids are most often used to lower wastewater pH?

31. What chemicals are most often used to raise wastewater pH?

32. What are the chlorine repair kit options and what cylinder sizes do each repair?

33. The NFPA hazard warning label identifies what types of hazards?

34. What could happen if a positive displacement pump is started against a closed discharged valve?

35. What could happen if the floating cover on a digester rises too high or drops too low?

36. How would you titrate a solution?

37. Why is recirculation important in the operation of a trickling filter?

38. What is an Imhoff Cone and what is it used for?

39. What are four diseases that may be spread through wastewater?

40. What are three types of sewers?

41. Give a description of the Vacuum Flotation Process.

42. Describe what Short-circuiting is when it occurs in a clarifier.

43. What is the purpose of disinfection and dechlorination at the end of the treatment process?

44. What happens when chlorine is added to waters containing ammonia and why is this significant?

45. How is the chlorination system inspected for leaks?

46. What are the four types or forms of nitrogen that are common in the wastewater environment?

47. What is an MBR? What are some advantages of MBRs and limitations of MBRs?

48. What is the Sewage Sludge Use and Disposal Rule and why should a Wastewater Operator understand it?

49. What is backwashing, why is it important to backwash and when should it be done?

50. What is an Anionic Polymer and what is the most common use?

51. Why is Phosphorus removed from wastewater?

52. Describe the three major types of systems used to remove phosphorus from wastewater.

53. Define Evapotranspiration.

54. What is the world's largest Wastewater Treatment Plant? What is the capacity per day?

55. What is the difference between direct current (DC) and alternating current (AC)?

56. Define the following:

A. Sewer Gas

B. Specific Gravity

C. IDLH (Immediately Dangerous to Life or Health)

D. Acute Health Effect

57. What is Wet Oxidation and describe the three modes of wet oxidation?

1.

2.

D. Reverse Osmosis

61. What are three types of commonly used rigid pipe material in a collection system?

62. What are four types of commonly used flexible pipe in a collections system?

63. What is a portable changeable message sign (PCMS) and when is it used?

64. What kinds of atmospheric hazards are encountered in manholes?

65. Describe each of the levels of chemical hazards and the types of PPE worn.

Level A

Level B

Level C

Level D

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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>