



NEED-TO-KNOW CRITERIA

Water Distribution Operator Class III

A Need-to-Know Guide when preparing for the:

ABC Water Distribution Operator Class III Certification Exam



The Associated Boards
of Certification

Superior Water Starts Here™

Before You Dive In...

What is the Need-to-Know Criteria?

This **ABC Water Distribution Operator Class III** Need-to-Know Criteria was developed to assist operators in understanding the content that will be covered in the ABC Standardized Water Distribution Operator Class III exam. A methodical and comprehensive international investigation was conducted to determine the most significant job tasks performed by water distribution operators. The content covered on the exam represents the job tasks identified through this research as essential operator competencies, and is not limited to the practices of your system/facility. The following pages organize these job tasks into Content Areas and identify the amount of the test devoted to each area.

Is this Need-to-Know Criteria relevant to MY exam?

WPI offers a variety of standardized and customized exam services. This document is reflective only of the ABC Standardized Water Distribution Operator Class III exam; older editions of the standardized exam and various customized exams are also administered by various certification programs. Please contact your certifying authority to determine whether they have implemented this exam for your program.

Pre-Test Questions

Your exam may include up to 10 extra questions that have not been used on previous versions of the exam. These are known as “pre-test” questions and allow WPI to gather valuable data about the new questions before they are included in future tests. Pre-test questions are unidentified and scattered throughout the exam so you will answer them with the same care in which you address scored questions. The pre-test questions are not included in your final score.

Exam Preparation Resources

Visit gowpi.org to access the formula/conversion table administered with this exam, a list of approved references, information on purchasing study guides available from partner organizations, and more.

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Water Distribution Operator Class III Need-to-Know Criteria

EXAM CONTENT

The Water Distribution Operator Class III exam will test you on essential job tasks. These job tasks have been categorized into the Content Areas detailed in the following pages. The table below summarizes the areas that are included on the exam, the number of test questions in each of these areas, and the complexity of the test questions in each area.

Just as water distribution operators job duties vary in their complexity, so will the questions you are asked on the exam. Some will be more simple and routine, whereas others will be more complex, or cognitively demanding. The following three levels are used to describe the complexity of the questions you will encounter on this exam:



Recall – tasks at this level typically require the simple recall or recognition of specific facts, concepts, processes, or procedures, with little to no problem-solving involved. You may be asked to identify, illustrate, recall, and/or recognize specific information.



Application – tasks at this level will involve some basic problem solving, calculations, or the interpretation and application of data. You may be asked to calculate, categorize, classify, compare, differentiate, explain, specify, translate, and/or apply knowledge.



Analysis – tasks at this level may involve higher level problem solving, evaluation, or the fitting together of a variety of elements into a meaningful whole; they will usually require many steps in the thought process. You may be asked to analyze, evaluate, formulate, generalize, judge, predict, and/or use inductive or deductive reasoning to arrive at a solution.




EXAM CONTENT OUTLINE

| NUMBER OF QUESTIONS | CONTENT AREA | JOB TASK COMPLEXITY LEVELS |
|---------------------|--|----------------------------|
| 26 | Distribution System Components | 5 16 5 |
| 24 | Equipment Installation, Operation, & Maintenance | 10 12 2 |
| 27 | Disinfection Monitoring, Evaluation, Adjustment, & Laboratory Analysis/ Interpretation | 11 14 2 |
| 23 | Security, Safety, Administrative Procedures, & Public Interactions | 7 14 2 |
| 100* | Total | 33 56 11 |

THIS EXAM INCLUDES
12
calculation questions

*Your exam may contain up to 10 extra unscored pre-test questions (see *Before You Dive In* for more details).






-  5 Recall
-  16 Application
-  5 Analysis

Distribution System Components

Job Tasks Included in this Content Area:

- 1. Aid in the design of water distribution projects**
- 2. Assess water production**
(e.g., water restrictions and demand)
- 3. Adjust the water production to meet the demand**
(e.g., start pumps, adjust flow valves)
- 4. Understand backflow prevention and control devices**
- 5. Implement a cross-connection control program**
- 6. Monitor water distribution system pressure**
- 7. Determine water volume**
(e.g., tank, main)
- 8. Determine water flow rate**
(e.g., mains, pumps, services)
- 9. Identify flow characteristics**
(e.g., size, C-factor, head loss)
- 10. Maintain an up-to-date map of the distribution system**
(e.g., GIS, repairs, replacements)
- 11. Maintain distribution system components:**
 - a. Pumps and related equipment
(e.g., packing pumps, starters, controls)
 - b. Mains and related equipment
(e.g., hydrants, valves)
 - c. Metering and related equipment
(e.g., remote readers, meter replacements)
 - d. Finished water storage and related equipment
(e.g., tanks, overflow pipe, vents, access hatches)
- 12. Understand schematic diagrams**



-  10 Recall
-  12 Application
-  2 Analysis

Equipment Installation, Operation, & Maintenance

Job Tasks Included in this Content Area:

- 1. Install water lines:**
 - a. Service lines
(e.g., tapping, curb stops, corporation stops)
 - b. Water mains
(e.g., valves, hydrants)
- 2. Inspect new construction**
- 3. Maintain pump stations and related equipment**
(e.g., check valves, control systems)
- 4. Monitor pump stations and related equipment**
(e.g., records, online monitoring equipment)
- 5. Clean the finished water storage facilities**
- 6. Inspect finished water storage facilities**
(e.g., drains, screens, corrosion control)
- 7. Conduct distribution system flushing**
- 8. Repair water line**
(e.g., install repair clamps and sleeves)
- 9. Repair distribution components**
(e.g., mains, services, meters, valves, hydrants, pumps)
- 10. Disinfect components used during install/repairs**
- 11. Conduct a leak detection program**
(e.g., survey, testing meters, water loss audit)
- 12. Operate well and related equipment**
- 13. Maintain well and related equipment**
- 14. Maintain the sanitary condition of the well**
- 15. Measure static water levels and pumping water levels**
- 16. Locate water lines**
(e.g., valves, hydrants)
- 17. Perform underground locating, marking, and notification**



- 11 Recall
- 14 Application
- 2 Analysis

Disinfection Monitoring, Evaluation, Adjustment, & Laboratory Analysis / Interpretation

Job Tasks Included in this Content Area:

- 1. Adjust the disinfection dosage**
- 2. Perform routine maintenance on the disinfection equipment**
- 3. Handle disinfection chemicals**
- 4. Secure the disinfection chemicals**
(e.g., chain cylinders, lock the disinfection facility)
- 5. Maintain an adequate supply of the disinfection chemicals**
- 6. Monitor the disinfection equipment**
- 7. Collect samples to determine:**
 - Chlorine residual
 - Microbiological
 - Lead/copper
 - pH
 - Radionuclides
 - Organic chemicals
 - Inorganic chemicals
 - Temperature
 - Disinfectant byproducts
- 8. Perform analyses to determine:**
 - Chlorine residual
 - pH
 - Temperature
- 9. Interpret laboratory analysis for:**
 - Chlorine residual
 - Chlorine demand
 - Microbiological
 - Lead/copper
 - pH
 - Radionuclides
 - Organic chemicals
 - Inorganic chemicals
 - Temperature
 - Disinfectant byproducts
 - Compliance with established water quality standards
 - Meeting standard operating practices



7 Recall



14 Application



2 Analysis

Security, Safety, Administrative Procedures, & Public Interactions

Job Tasks Included in this Content Area:

- 1. Participate in safety/compliance program**
- 2. Perform traffic control during maintenance, repairs, and construction**
- 3. Implement a confined space program**
- 4. Communicate observed unsafe workplace conditions**
- 5. Identify opportunities to mitigate risks**
- 6. Work in or around excavation sites:**
 - a. Implement cave-in protection program
 - b. Secure the excavation site
 - c. Excavate the site
 - d. Restore the excavation site
- 7. Work in and around confined spaces:**
 - a. Implement a confined space program
 - b. Enter confined spaces
 - c. Monitor activities in and around confined spaces
- 8. Secure all water system facilities in a manner that protects the supply from contamination and prevents unauthorized entry and vandalism**
- 9. Investigate system tampering**
- 10. Maintain an emergency plan of operations**
- 11. Maintain system records**
(e.g., laboratory, consumption, maintenance)
- 12. Interpret plans, maps, and system standard specifications**
- 13. Participate in the budget process**
- 14. Address water quality communications**
(e.g., taste, odor, color)
- 15. Conduct meter reading**
- 16. Address customer inquiry**
(e.g., pressure, employee performance, billing)
- 17. Answer questions from the public**
- 18. Participate in consumer confidence reports**
- 19. Inform customers of planned repairs or changes in the water line**

Supporting Knowledge

The chart below outlines several types of knowledge that support the performance of the job tasks on which you may be tested. These types of knowledge are rated at one of three levels to represent the extent of knowledge needed to perform the job tasks assigned to each Content Area:

Basic – A fundamental or lower level of knowledge is required. Operators performing tasks requiring this level of knowledge will be able to do so with some training; this level of knowledge may also be acquired and developed through job experience. Such tasks may be routine, utilizing established procedures, and have a low level of complexity. Not having this level of knowledge will have minimal impact or significance on the performance of the tasks listed in the Content Area, or on public safety and welfare.

Intermediate – A level of knowledge beyond the basic level is required. Operators performing tasks requiring this level of knowledge will be able to do so with training beyond that of the basic level. The operator will not only be able to apply required fundamental concepts, but will be able to understand and discuss the application and implications of changes to processes, policies, and procedures within the Content Area. Not having this level of knowledge will have a significant impact on the performance of the job and on public safety and welfare.

Advanced – A very high level of knowledge/job expertise is required and the operator will be functioning at an expert level. The operator can apply all fundamental, as well as highly developed or complex concepts, and will be able to design, review, and evaluate processes, policies, and procedures within the Content Area. Not having this level of knowledge will have a serious impact on the performance of the job and will be very harmful to public safety and welfare.

| Supporting Knowledge Type | Distribution System Components (26%)* | Equipment Installation, Operation, & Maintenance (24%)* | Disinfection Monitoring, Evaluation, Adjustment, & Laboratory Analysis / Interpretation (27%)* | Security, Safety, Administrative Procedures, & Public Interactions (23%)* |
|--|---------------------------------------|---|--|---|
| Characteristics of chlorine and chlorine compounds (e.g., gas/liquid) | | | Intermediate | |
| Chlorination/dechlorination (e.g., safety, storage, handling, feeding, measurements) | | Intermediate | Intermediate | Intermediate |
| Chlorine demand significance and relationship to dose | | | Intermediate | |
| Coliform group (e.g., monitoring, occurrence, significance) | Intermediate | Intermediate | Intermediate | Intermediate |
| Control systems (e.g., SCADA, pumps, valves) | Intermediate | Advanced | | |
| Corrosion control process (e.g., cathodic protection) | Intermediate | Intermediate | | |
| Cross-connection control program and principles (e.g., surveys, method, devices) | Intermediate | Intermediate | | Intermediate |
| Disinfection concepts (e.g., pipes, tanks, repairs, wells) | Intermediate | Intermediate | Intermediate | Intermediate |
| Emergency/contingency response plans | Basic | Basic | Intermediate | Advanced |
| Flow effect of pipe size, type, head loss, and C factor | Intermediate | Intermediate | | |
| Groundwater and surface water supplies (e.g., water quality, characteristics) | | | Intermediate | |

| Supporting Knowledge Type | Distribution System Components (26%)* | Equipment Installation, Operation, & Maintenance (24%)* | Disinfection Monitoring, Evaluation, Adjustment, & Laboratory Analysis / Interpretation (27%)* | Security, Safety, Administrative Procedures, & Public Interactions (23%)* |
|---|---------------------------------------|---|--|---|
| Hazards and safety requirements (e.g., confined space, excavation, trench safety) | | Intermediate | | Intermediate |
| Leak detection and repair (e.g., mains, service lines, meters) | Intermediate | Intermediate | Intermediate | Basic |
| Metering technologies (e.g., AMR, meter types) | Intermediate | Intermediate | | |
| Monitoring requirements (e.g., water quality, pressure) | | Intermediate | Intermediate | Basic |
| Operation of laboratory field equipment (e.g., chlorine monitor, pH monitor) | | Intermediate | Intermediate | |
| Piping materials (e.g., pipes, valves, hydrants, fittings, joints, restraints) | Intermediate | Intermediate | | |
| Potential waterborne diseases (e.g., types, causes, prevention) | | | Intermediate | Intermediate |
| Proper sampling requirements and procedures | | Intermediate | Intermediate | |
| Public notification requirements (e.g., CCR, advisories, violations) | | | | Intermediate |
| Quality control/quality assurance practices (e.g., laboratory, field unit) | | Intermediate | Intermediate | |
| Reporting requirements and frequency (e.g., CCR, samples) | | | | Intermediate |
| Sanitary survey processes (e.g., system responsibilities, preparation) | Intermediate | | | Intermediate |
| Security practices and procedures | Intermediate | | | Intermediate |
| Source water protection (e.g., ground water, surface water) | | Intermediate | | Advanced |
| Standard disinfection methods (e.g., new/repared mains, storage facilities, wells) | Intermediate | Intermediate | Intermediate | |
| System damage prevention (e.g., water hammer, cavitation) | Basic | Intermediate | | |
| System documents (e.g., as-builts, blueprints, records, GIS) | Intermediate | | | Intermediate |
| Tool selection/use (e.g., safety, efficiency) | | Intermediate | | Intermediate |
| Underground utility identification practices | Intermediate | | | Intermediate |
| Variable/positive displacement pumps (e.g., centrifugal, diaphragm, peristaltic) | Intermediate | Intermediate | Intermediate | |
| Water quality standards and compliance procedures (e.g., regional requirements, drinking water legislation) | | | Advanced | Advanced |
| Water storage facilities (e.g., maintenance, security, operation) | Intermediate | Intermediate | | Intermediate |
| Well operation, monitoring, and maintenance | Intermediate | Intermediate | Intermediate | Intermediate |
| Workplace safety rules, regulations, practices, and procedures | | Intermediate | | Advanced |

*Percent of exam associated with the Content Area

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