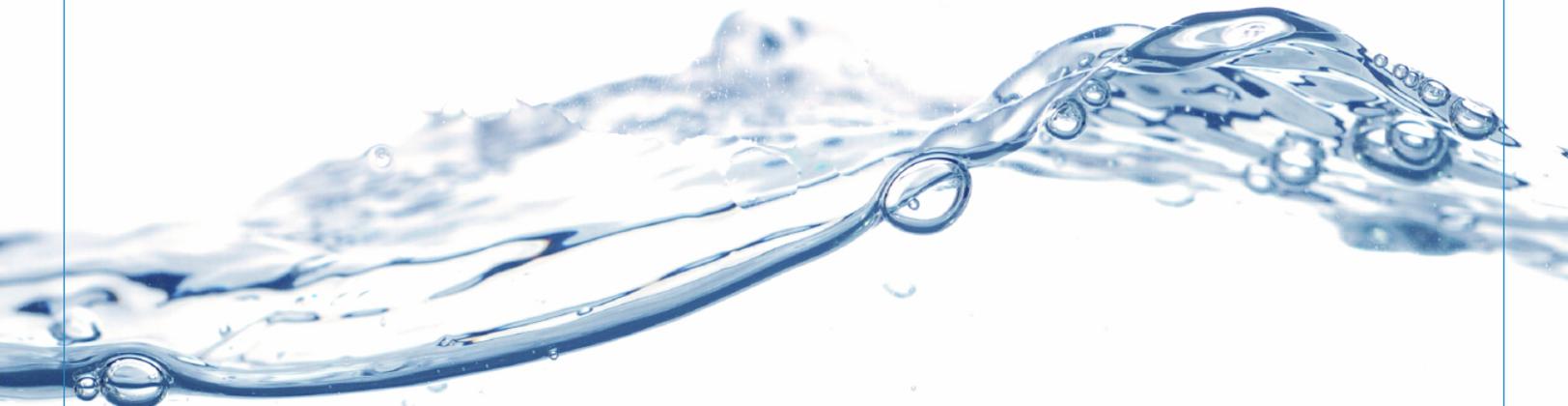




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A large, dynamic splash of clear water is shown in the upper half of the page, with many bubbles and droplets. The water is bright blue and white, creating a sense of movement and freshness.

# ABC

Association of Boards of Certification

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***Water Distribution Need-to-Know Criteria***

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*A Need-to-Know Guide when preparing for the  
ABC Water Distribution Certification Examination.*

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## **Acknowledgement**

The Association would like to thank the members of the 2010-2011 Water Distribution Validation and Examination Committee for their effort in conducting the job analysis and developing the ABC *Need-to-Know Criteria* for Water Distribution Operators. Committee members included:

- Ray Olson, Colorado (Chair)
- Tom Arnbrister, Washington
- Audrey Burchanan, Nova Scotia
- Brian Kellsey, Alberta
- Martin Nutt, Arkansas
- Kathy Weinsaft, Wyoming
- Mike Wentink, Nebraska
- Chuck Van Der Kolk, Michigan

## **Introduction**

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As part of the development of its certification exams, the Association of Boards of Certification (ABC) conducted a job analysis of water distribution operators in 2010. As part of this process, ABC conducted a national survey of distribution operators. This *Need-to-Know Criteria* was developed from the results of ABC's 2010 distribution operator job analysis.

## **How the *Need-to-Know Criteria* Was Developed**

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### **Review of Task Survey**

The results of the 2010 task analysis survey were provided to the ABC Distribution V&E Committee. In the task analysis survey, operators rated job tasks and capabilities for frequency of performance and seriousness of inadequate or incorrect performance. These two rating scales were used because they provide useful information (i.e., how critical each task is and how frequently each task is performed) pertaining to certification. Of the 617 individuals in the water distribution industry who completed the survey, 122 were class I operators, 151 were class II operators, 124 were class III operators, and 135 were class IV operators.

### **Analysis of Ratings**

The composite criticality ratings and percentage of operators reporting that they performed the tasks were presented to the Distribution V&E Committee in January 2011 to begin development of the new *Need-to-Know Criteria*. V&E committee members were given the opportunity to retain tasks which did not meet decision criteria (a criticality value of at least 10.5 and a percent performing value of at least 50%) if a significant rationale could be provided for their importance on the examination. The V&E committee members were also given the opportunity to remove any tasks which met criteria on the survey but were deemed untestable or inappropriate for the water distribution certification examination. Final examination blueprint weights were calculated by summing the criticality values of all remaining tasks, and dividing the criticality value of each task by the grand total criticality value. Weights of individual tasks were summed for each core competency area to determine the proportion of the water distribution certification examination devoted to each core competency.

## Core Competencies

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The essential tasks and capabilities that were identified through this process are called the core competencies. The following pages list the core competencies for distribution operators. The core competencies are clustered into the following job duties:

- System Information/Components
- Monitor, Evaluate, and Adjust Disinfection
- Laboratory Analysis
- Install Equipment
- Operate Equipment
- Perform Maintenance
- Perform Security, Safety, and Administrative Procedures

The level of knowledge (i.e., comprehension, application, analysis) required for each task is also identified in the following pages.

- **Comprehension** is the most basic level of understanding and remembering. Items written at the comprehension level require examinees to recognize, remember, or identify important ideas.
- Items written at the **application** level require examinees to interpret, calculate, predict, use or apply information and solve problems.
- Items written at the **analysis** level require examinees to compare, contrast, diagnose, examine, analyze, and relate important concepts.

The level of knowledge is a hierarchy from basic comprehension to analysis. The level of knowledge tested is cumulative. Therefore, tasks identified as application may include questions written at both the application and comprehension levels. Tasks identified as analysis may include questions written at the comprehension, application, and analysis levels.

## About the Association of Boards of Certification

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Established in 1972, the Association of Boards of Certification (ABC) is a non-profit member-driven organization dedicated to protecting public health and the environment by advancing the quality and integrity of environmental certification programs. ABC membership includes almost 100 certifying authorities, representing more than 40 states, nine Canadian provinces as well as several international programs. Existing solely for its members, ABC is the voice for the profession and serves as the conduit for information in an ever-changing industry.

Over 70 certification programs currently test approximately 35,000 operators and laboratory analysts annually through ABC's industry-leading Certification & Testing Services. Over 400,000 water and wastewater operators, laboratory analysts, and backflow prevention assembly testers have taken an ABC exam since the testing program began in 1982.

### ABC Vision

Promote integrity in environmental certification throughout the world.

### ABC Mission

ABC is dedicated to advancing the quality and integrity of environmental certification programs.

### ABC Objectives

- Promote certification as a means of protecting public health, the infrastructure, and the environment.
- Promote uniformity of standards and best practices in certification.
- Serve as the technical resource for certification entities.
- Facilitate the transfer of certification between certifying authorities.
- Serve the needs of our members.

## ABC Distribution Certification Exams

The ABC distribution certification exams evaluate an operator's knowledge of tasks related to the operation of distribution systems. The ABC Distribution V&E Committee determined the content of each exam based on the results of the national task analysis survey. To successfully take an ABC exam, an operator must demonstrate knowledge of the core competencies in this document.

Four levels of certification exams are offered by ABC, with class I being the lowest level and class IV the highest level. The specifications for the exams are based on a weighting of the job analysis results so that they reflect the criticality of tasks performed on the job. The specifications list the percentage of questions on the exam that fall under each job duty. For example, 18% of the questions on the ABC class I distribution exam relate to the job duty "Operate Equipment." For a list of tasks and capabilities associated with each job duty, please refer to the list of core competencies on the following pages.

| ABC Water Distribution Exam Specifications              |         |          |           |          |
|---|---------|----------|-----------|----------|
| Blueprint Area  | Class I | Class II | Class III | Class IV |
| System Information/Components                           | 9%      | 9%       | 9%        | 9%       |
| Monitor, Evaluate, and Adjust Disinfection              | 11%     | 11%      | 10%       | 10%      |
| Laboratory Analysis                                     | 21%     | 21%      | 21%       | 20%      |
| Install Equipment                                       | 5%      | 5%       | 5%        | 5%       |
| Operate Equipment                                       | 18%     | 18%      | 18%       | 18%      |
| Perform Maintenance                                     | 20%     | 20%      | 20%       | 21%      |
| Perform Security, Safety, and Administrative Procedures | 16%     | 16%      | 17%       | 17%      |

| System Information/Components             | Class I       | Class II      | Class III     | Class IV      |
|---|---------------|---------------|---------------|---------------|
| Assess system demand                      | Application   | Application   | Analysis      | Analysis      |
| Install joint restraints                  | Application   | Application   | Application   | Analysis      |
| Install shoring                           | Application   | Application   | Application   | Analysis      |
| Install thrust blocks                     | Application   | Application   | Application   | Analysis      |
| Layout system                             | N/A           | N/A           | Application   | Application   |
| Map system                                | Comprehension | Comprehension | Comprehension | Comprehension |
| Perform pressure readings                 | Application   | Application   | Application   | Analysis      |
| Preparedness contingency/contingency plan | Application   | Application   | Application   | Analysis      |
| Read blueprints, readings, and maps       | Application   | Application   | Application   | Analysis      |
| Select materials                          | Application   | Application   | Analysis      | Analysis      |
| Select type of pipes                      | Comprehension | Application   | Application   | Analysis      |

| System Information/Components Continued | Class I       | Class II      | Class III   | Class IV |
|---|---------------|---------------|-------------|----------|
| Size mains                              | Comprehensive | Comprehensive | Application | Analysis |
| Write plans                             | Application   | Application   | Application | Analysis |

## Required Capabilities

### Knowledge of:

- Approved backflow methods and devices
- Biological science
- Blueprint readings
- Building codes
- Corrosion control process (including cathodic protection)
- Fire flow requirements
- Function of recordkeeping system
- General hydraulic principles
- Hydrology
- Local codes and ordinances
- Measuring instruments
- Mechanical drafting
- Operation and maintenance practices
- Pipe fittings and joining methods
- Piping material, type and size
- Potential causes of disasters in facility
- Potential impact of disasters in facility
- Regulations
- Standards
- Watershed management

### Ability to:

- Adjust equipment
- Assess likelihood of disaster occurring
- Generate a written safety program
- Generate capital plans
- Generate long- and short-term plans
- Interpret data
- Organize information
- Perform distribution math
- Perform impact assessments
- Perform physical measurements
- Record information
- Write policies and procedures
- Review reports

| Monitor, Evaluate, and Adjust Disinfection | Class I     | Class II    | Class III   | Class IV    |
|--|-------------|-------------|-------------|-------------|
| <b>Monitor Disinfection</b>                |             |             |             |             |
| Calcium hypochlorite disinfection          | Application | Application | Application | Application |
| Chlorine gas disinfection                  | Application | Application | Application | Analysis    |
| Sodium hypochlorite disinfection           | Application | Application | Application | Application |
| <b>Evaluate Disinfection</b>               |             |             |             |             |
| Calcium hypochlorite disinfection          | Analysis    | Analysis    | Analysis    | Analysis    |
| Chlorine gas disinfection                  | Analysis    | Analysis    | Analysis    | Analysis    |
| Sodium hypochlorite disinfection           | Analysis    | Analysis    | Analysis    | Analysis    |

| Monitor, Evaluate, and Adjust Disinfection Continued                  | Class I     | Class II    | Class III   | Class IV    |
|---|-------------|-------------|-------------|-------------|
| <b>Adjust Disinfection</b>  |             |             |             |             |
| Calcium hypochlorite disinfection                                     | Analysis    | Analysis    | Analysis    | Analysis    |
| Chlorine gas disinfection   | Analysis    | Analysis    | Analysis    | Analysis    |
| Sodium hypochlorite disinfection                                      | Analysis    | Analysis    | Analysis    | Analysis    |
| <b>Inspect Source Water</b>   |             |             |             |             |
| Identify and evaluate potential sources of source water contamination | Analysis    | Analysis    | Analysis    | Analysis    |
| Wells   | Application | Application | Application | Application |

## Required Capabilities

### Knowledge of:

- Biological science
- Disinfection concepts
- Disinfection design parameters
- Disinfection process
- General chemistry
- Laboratory equipment
- Measuring instruments
- Physical science
- Proper chemical handling and storing
- Regulations
- Reporting requirements
- Safe Drinking Water Act (SDWA)
- Safety procedures
- Sampling requirements
- Testing instruments
- Watershed management
- 40 CFR 141 Subpart C: Monitoring and Analytical Requirements (turbidity, coliforms, organic contaminants, organic contaminants)
- 40 CFR 141 Subpart D: Reporting and Recordkeeping Requirements
- 40 CFR 141 Subpart F: Maximum Contaminant Level Goals and Maximum Residual Disinfectant Level Goals
- 40 CFR 141 Subpart G: National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels
- 40 CFR 141 Subpart H: Filtration and Disinfection

### Ability to:

- Adjust equipment
- Adjust flow patterns
- Adjust system units
- Calibrate equipment
- Calibrate instruments
- Interpret data
- Perform distribution math
- Recognize normal and abnormal analytical results

## Required Capabilities Continued

### Knowledge of:

- 40 CFR 141 Subpart L: Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors
- 40 CFR 141 Subpart P: Enhanced Filtration and Disinfection Systems Serving 10,000 or More People
- 40 CFR 141 Subpart T: Enhanced Filtration and Disinfection Systems Serving Fewer Than 10,000 People
- 40 CFR 141 Subpart U: Initial Distribution System Evaluations
- 40 CFR 141 Subpart V: Stage 2 Disinfection Byproducts Requirements

| Laboratory Analysis                 | Class I     | Class II    | Class III | Class IV |
|-------------------------------------|-------------|-------------|-----------|----------|
| <b>Collect and Preserve Samples</b> |             |             |           |          |
| Chlorine demand                     | Application | Application | Analysis  | Analysis |
| Chlorine residual                   | Application | Application | Analysis  | Analysis |
| Coliforms                           | Analysis    | Analysis    | Analysis  | Analysis |
| Lead/copper                         | Application | Application | analysis  | Analysis |
| Nitrate                             | Application | Application | Analysis  | Analysis |
| Nitrite                             | Application | Application | Analysis  | Analysis |
| pH                                  | Application | Application | Analysis  | Analysis |
| Radionuclides                       | Application | Application | Analysis  | Analysis |
| Synthetic organic chemicals (SOC)   | Application | Application | Analysis  | Analysis |
| Temperature                         | Application | Application | Analysis  | Analysis |
| Volatile organic chemicals (VOC)    | Application | Application | Analysis  | Analysis |
| <b>Perform Laboratory Analysis</b>  |             |             |           |          |
| Chlorine demand                     | Analysis    | Analysis    | Analysis  | Analysis |
| Chlorine residual                   | Analysis    | Analysis    | Analysis  | Analysis |
| pH                                  | Application | Application | Analysis  | Analysis |
| Temperature                         | Application | Application | Analysis  | Analysis |

| Laboratory Analysis Continued        | Class I     | Class II    | Class III   | Class IV |
|--------------------------------------|-------------|-------------|-------------|----------|
| <b>Interpret Laboratory Analysis</b> |             |             |             |          |
| Chlorine demand                      | Analysis    | Analysis    | Analysis    | Analysis |
| Chlorine residual                    | Analysis    | Analysis    | Analysis    | Analysis |
| Coliforms                            | Application | Application | Analysis    | Analysis |
| Hardness                             | Application | Application | Analysis    | Analysis |
| Iron                                 | Application | Application | Analysis    | Analysis |
| Lead/copper                          | Analysis    | Analysis    | Analysis    | Analysis |
| Nitrates                             | Application | Application | Analysis    | Analysis |
| Nitrites                             | Application | Application | Analysis    | Analysis |
| pH                                   | Application | Application | Application | Analysis |
| Radionuclides                        | Application | Application | Analysis    | Analysis |
| Synthetic organic chemicals (SOC)    | Application | Application | Analysis    | Analysis |
| Temperature                          | Application | Application | Application | Analysis |
| Turbidity                            | Application | Application | Application | Analysis |
| Volatile organic chemicals (VOC)     | Application | Application | Analysis    | Analysis |

## Required Capabilities

### Knowledge of:

- Biological science
- Disinfection concepts
- Disinfection design parameters
- Disinfection process
- General chemistry
- Laboratory equipment
- Monitoring requirements
- Normal characteristics of water
- Physical science
- Proper chemical handling and storing
- Proper sampling procedures
- Quality control/quality assurance practices
- Record keeping policies
- Regulations
- Reporting requirements
- Safe Drinking Water Act (SDWA)
- Safety procedures
- Sampling requirements
- Testing instruments
- 40 CFR 141 Subpart B: Maximum Contaminant Levels (arsenic, nitrate, turbidity)

### Ability to:

- Calibrate equipment
- Calibrate instruments
- Determine what information needs to be recorded
- Diagnose/troubleshoot equipment
- Follow written procedures
- Interpret data
- Interpret Material Safety Data Sheets
- Organize information
- Recognize normal and abnormal analytical results
- Record information
- Review reports
- Transcribe data
- Translate technical language into common terminology

## Required Capabilities Continued

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### Knowledge of:

- 40 CFR 141 Subpart C: Monitoring and Analytical Requirements (turbidity, coliforms, organic contaminants, organic contaminants)
- 40 CFR 141 Subpart D: Reporting and Recordkeeping Requirements
- 40 CFR 141 Subpart E: Special Regulations, Including Monitoring Regulations and Prohibition on Lead Use
- 40 CFR 141 Subpart F: Maximum Contaminant Level Goals and Maximum Residual Disinfectant Level Goals
- 40 CFR 141 Subpart G: National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels
- 40 CFR 141 Subpart H: Filtration and Disinfection
- 40 CFR 141 Subpart I: Control of Lead and Copper
- 40 CFR 141 Subpart L: Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors
- 40 CFR 141 Subpart S: Ground Water Rule
- 40 CFR 141 Subpart V: Stage 2 Disinfection Byproducts Requirements

| Install Equipment                  | Class I       | Class II    | Class III   | Class IV    |
|------------------------------------|---------------|-------------|-------------|-------------|
| <b>Backflow prevention devices</b> | Comprehension | Application | Analysis    | Analysis    |
| <b>Hydrants</b>                    | Application   | Application | Application | Application |
| <b>Meters</b>                      | Application   | Application | Application | Application |
| <b>Piping</b>                      | Application   | Application | Application | Application |
| <b>Service connections</b>         | Application   | Application | Application | Application |
| <b>Taps</b>                        | Application   | Application | Application | Analysis    |
| <b>Valves</b>                      | Application   | Application | Application | Analysis    |
| <b>Water mains</b>                 | Application   | Application | Application | Analysis    |

## Required Capabilities

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### Knowledge of:

- Approved backflow methods and devices
- Blueprint readings
- Building codes
- Corrosion control process (including cathodic protection)
- Dechlorination process
- Different types of cross-connections
- Different types of joints, restraints and thrust blocks
- Function of tools
- Personal protective equipment
- Pipe fittings and joining methods
- Piping material, type and size
- Pneumatics
- Proper lifting techniques
- Protective coatings and paints
- Safety procedures

### Ability to:

- Demonstrate safe work habits
- Diagnose/troubleshoot equipment
- Identify potential safety hazards
- Inspect pumps
- Operate safety equipment
- Perform distribution math
- Recognize unsafe work conditions
- Select safety equipment
- Use hand tools
- Use power tools

| Operate Equipment                   | Class I       | Class II      | Class III     | Class IV      |
|-------------------------------------|---------------|---------------|---------------|---------------|
| <b>Blowers and compressors</b>      | Comprehension | Comprehension | Comprehension | Comprehension |
| <b>Chemical feeders</b>             | Application   | Application   | Application   | Analysis      |
| <b>Chlorinators</b>                 | Analysis      | Analysis      | Analysis      | Analysis      |
| <b>Computers</b>                    | Comprehension | Application   | Application   | Application   |
| <b>Drives</b>                       | Comprehension | Application   | Application   | Analysis      |
| <b>Electrical motors</b>            | Application   | Application   | Analysis      | Analysis      |
| <b>Electronic testing equipment</b> | Comprehension | Comprehension | Application   | Analysis      |
| <b>Engines</b>                      | Comprehension | Application   | Application   | Application   |
| <b>Generators</b>                   | Application   | Application   | Application   | Application   |
| <b>Hand tools</b>                   | Application   | Application   | Application   | Application   |
| <b>Heavy equipment</b>              | Comprehension | Comprehension | Application   | Analysis      |
| <b>Hydrants</b>                     | Application   | Application   | Application   | Analysis      |
| <b>Hydraulic equipment</b>          | Comprehension | Comprehension | Application   | Application   |
| <b>Instrumentation</b>              | Application   | Application   | Application   | Analysis      |
| <b>Leak correlators/detectors</b>   | Application   | Application   | Application   | Analysis      |
| <b>Pipe locators</b>                | Application   | Application   | Application   | Analysis      |
| <b>Power tools</b>                  | Application   | Application   | Application   | Application   |
| <b>Pumps</b>                        | Application   | Application   | Application   | Analysis      |
| <b>Samplers</b>                     | Comprehension | Application   | Application   | Analysis      |

| Operate Equipment Continued | Class I       | Class II    | Class III   | Class IV |
|-----------------------------|---------------|-------------|-------------|----------|
| SCADA                       | Comprehension | Application | Application | Analysis |
| Tapping equipment           | Comprehension | Application | Application | Analysis |
| Telemetry system            | Application   | Application | Analysis    | Analysis |
| Valve locators              | Application   | Application | Application | Analysis |
| Valves                      | Application   | Application | Analysis    | Analysis |

## Required Capabilities

### Knowledge of:

- Facility operation and maintenance
- Function of tools
- General electrical principles
- General hydraulic principles
- General mechanical principles
- Internal combustion engines
- Lubricant and fluid characteristics
- Operation and maintenance practices
- Pipe fittings and joining methods
- Piping material, type and size
- Pneumatics
- Quality control/quality assurance practices
- Start-up and shut down procedures
- Testing instruments

### Ability to:

- Adjust equipment
- Adjust flow patterns
- Adjust system units
- Calibrate equipment
- Calibrate instruments
- Demonstrate safe work habits
- Operate safety equipment
- Perform distribution math
- Perform physical measurements
- Recognize unsafe work conditions
- Select safety equipment
- Use hand tools
- Use power tools

| Perform Maintenance             | Class I       | Class II    | Class III   | Class IV    |
|---------------------------------|---------------|-------------|-------------|-------------|
| Blowers and compressors         | N/A           | N/A         | N/A         | Application |
| Chemical feeders                | Application   | Application | Application | Analysis    |
| Chlorinators                    | Application   | Application | Analysis    | Analysis    |
| Corrosion control               | Application   | Application | Analysis    | Analysis    |
| Cross-connection control        | Application   | Application | Analysis    | Analysis    |
| Drives                          | N/A           | N/A         | N/A         | Analysis    |
| Electric motors                 | Application   | Application | Application | Application |
| Electrical grounding            | Application   | Application | Application | Application |
| Engines                         | Comprehension | Application | Application | Analysis    |
| Evaluate operation of equipment | Application   | Application | Analysis    | Analysis    |
| Facility inspection             | Application   | Application | Analysis    | Analysis    |
| Generators                      | Application   | Application | Application | Application |
| Hydrants                        | Application   | Application | Analysis    | Analysis    |

| Perform Maintenance Continued | Class I     | Class II    | Class III   | Class IV    |
|-------------------------------|-------------|-------------|-------------|-------------|
| Hydraulic equipment           | N/A         | N/A         | Application | Analysis    |
| Hypochlorinators              | Application | Analysis    | Analysis    | Analysis    |
| Instrumentation               | Application | Application | Application | Analysis    |
| Leak detection                | Application | Application | Analysis    | Analysis    |
| Lock-out/tag-out              | Application | Application | Application | Application |
| Meters                        | Application | Application | Application | Analysis    |
| Pressure sensors              | Application | Application | Analysis    | Analysis    |
| Pumps                         | Application | Application | Analysis    | Analysis    |
| Service connection            | Application | Application | Application | Analysis    |
| Service pipes                 | Application | Application | Application | Application |
| Valves                        | Application | Application | Application | Analysis    |
| Water mains                   | Application | Application | Analysis    | Analysis    |
| Water storage facility        | Application | Application | Analysis    | Analysis    |

## Required Capabilities

### Knowledge of:

- Approved backflow methods and devices
- Blueprint readings
- Building codes
- Corrosion control process (including cathodic protection)
- Different types of cross-connections
- Different types of joints, restraints and thrust blocks
- Facility operation and maintenance
- Facility security
- Function of tools
- General electrical principles
- General hydraulic principles
- General mechanical principles
- Internal combustion engines
- Laboratory equipment
- Local codes and ordinances
- Lubricant and fluid characteristics
- Measuring instruments
- Operation and maintenance practices
- Personal protective equipment
- Pipe fittings and joining methods
- Piping material, type and size
- Pneumatics
- Potential causes of disasters in facility
- Potential impact of disasters in facility

### Ability to:

- Adjust equipment
- Adjust flow patterns
- Adjust system units
- Assess likelihood of disaster occurring
- Assign work to proper trade
- Calibrate equipment
- Calibrate instruments
- Demonstrate safe work habits
- Diagnose/troubleshoot equipment
- Diagnose/troubleshoot system units
- Differentiate between preventative/corrective maintenance
- Discriminate between normal/abnormal conditions
- Evaluate facility performance
- Evaluate operation of equipment
- Evaluate system units
- Identify potential safety hazards
- Inspect pumps
- Interpret data
- Interpret Material Safety Data Sheets
- Maintain inventory control system
- Maintain system in normal operating condition
- Monitor electrical equipment
- Monitor mechanical equipment
- Obtain unbiased data
- Operate safety equipment
- Organize information

## Required Capabilities Continued

### Knowledge of:

- Proper chemical handling and storing
- Proper lifting techniques
- Protective coatings and paints
- Quality control/quality assurance practices
- Record keeping policies
- Safety procedures
- Sanitary survey processes
- Start-up and shut down procedures
- Testing instruments
- Well-head protection

### Ability to:

- Perform distribution math
- Perform general maintenance
- Perform general repairs
- Perform physical measurements
- Recognize normal and abnormal analytical results
- Recognize unsafe work conditions
- Record information
- Review reports
- Select safety equipment
- Translate technical language into common terminology
- Use hand tools
- Use power tools

| Perform Security, Safety, and Administrative Procedures | Class I       | Class II    | Class III   | Class IV    |
|---|---------------|-------------|-------------|-------------|
| <b>Manage System</b>                                    |               |             |             |             |
| Administer safety/compliance program                    | Comprehension | Application | Application | Analysis    |
| Conduct cross-connection surveys                        | Application   | Application | Analysis    | Analysis    |
| Develop budget  | N/A           | N/A         | Analysis    | Analysis    |
| Develop operation and maintenance plan                  | Application   | Application | Analysis    | Analysis    |
| Develop/maintain sample site plan                       | Application   | Application | Analysis    | Analysis    |
| Participate in sanitary surveys                         | Application   | Application | Application | Application |
| Regulatory reporting                                    | Analysis      | Analysis    | Analysis    | Analysis    |
| <b>Promote Public Relations</b>                         |               |             |             |             |
| Promote customer service program                        | N/A           | Application | Analysis    | Analysis    |
| Respond to complaints                                   | Application   | Application | Application | Analysis    |

| Perform Security, Safety, and Administrative Procedures Continued | Class I     | Class II    | Class III   | Class IV    |
|---|-------------|-------------|-------------|-------------|
| <b>Safety Program</b>   |             |             |             |             |
| Chemical safety   | Application | Application | Application | Analysis    |
| Confined space entry  | Application | Application | Application | Application |
| Excavation, shoring and trenching                                 | Application | Application | Application | Application |
| General safety  | Application | Application | Application | Application |
| Personal protective equipment                                     | Application | Application | Application | Application |
| Public protection   | Application | Application | Application | Application |
| <b>Recordkeeping</b>  |             |             |             |             |
| Compliance  | Application | Application | Application | Application |
| Corrective actions to system deficiencies                         | Application | Application | Application | Application |
| Equipment repair/replacement                                      | Application | Application | Analysis    | Analysis    |
| Laboratory  | Application | Application | Analysis    | Analysis    |
| Maintenance   | Application | Application | Application | Application |
| System operation  | Application | Application | Analysis    | Analysis    |

## Required Capabilities

### Knowledge of:

- Biological science
- Blueprint readings
- Building codes
- Data acquisition techniques
- Disciplinary procedures
- Emergency plans
- Employment laws
- Facility security
- Function of recordkeeping system
- General chemistry
- General electrical principles
- General hydraulic principles
- General mechanical principles
- Human resource practices
- Hydrology
- Local codes and ordinances
- Memorandums of understanding and agreements
- Monitoring requirements
- Potential causes of disasters in facility

### Ability to:

- Assess likelihood of disaster occurring
- Assign work to proper trade
- Communicate in writing
- Communicate verbally
- Conduct meetings
- Conduct training programs
- Coordinate emergency response with other water organizations relative to the distribution system
- Determine what information needs to be recorded
- Develop a staffing plan
- Develop a work unit
- Evaluate facility performance
- Evaluate promotional materials
- Evaluate proposals
- Follow written procedures
- Generate a written safety program
- Generate capital plans
- Generate long- and short-term plans

## Required Capabilities Continued

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### Knowledge of:

- Potential impact of disasters in facility
- Principles of finance
- Principles of general communication
- Principles of management
- Principles of measurement
- Principles of public relations
- Principles of supervision
- Public notification requirements
- Public participation requirements
- Quality control/quality assurance practices
- Record keeping policies
- Regulations
- Reporting requirements
- Risk management
- Safe Drinking Water Act (SDWA)
- Sanitary spring design
- Sanitary survey processes
- Standards
- Water reuse
- Watershed management
- 40 CFR 141 Subpart A: General (definitions, coverage, variances and exemptions, siting requirements, and effective dates)
- 40 CFR 141 Subpart D: Reporting and Recordkeeping Requirements
- 40 CFR 141 Subpart O: Consumer Confidence Reports
- 40 CFR 141 Subpart Q: Public Notification of Drinking Water Violations

### Ability to:

- Identify potential safety hazards
- Interpret data
- Negotiate contracts
- Obtain unbiased data
- Organize information
- Perform distribution math
- Perform impact assessments
- Prepare proposals
- Recognize normal and abnormal analytical results
- Recognize unsafe work conditions
- Record information
- Review reports
- Select safety equipment
- Transcribe data
- Translate technical language into common terminology
- Write policies and procedures

## References

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The following are approved as reference sources for the ABC distribution examinations. Operators should use the latest edition of these reference sources to prepare for the exam.

### **American Water Works Association (AWWA)**

- *Water Transmission and Distribution*
- *Water Distribution Operator Training Handbook*
- *Basic Science Concepts and Applications*
- *Water System Security, A Field Guide*
- *Water Quality*

**To order, contact:**

American Water Works Association  
6666 West Quincy Ave  
Denver, CO 80235  
Web site: [www.awwa.org](http://www.awwa.org)  
Phone: (800) 926-7337  
Fax: (303) 347-0804  
E-mail: [custsvc@awwa.org](mailto:custsvc@awwa.org)

### **Association of State Drinking Water Administrators (ASDWA) and National Rural Water Association (NRWA)**

- *Security Vulnerability Self Assessment Guide for Small Drinking Water Systems*

**To order, contact:**

ASDWA  
1025 Connecticut Ave NW Ste 903  
Washington DC 20036  
Available online in PDF format  
Web site: [www.asdwa.org](http://www.asdwa.org)  
Phone: (202) 293-7655  
Fax: (202) 293-7656  
E-mail: [info@asdwa.org](mailto:info@asdwa.org)

### **California State University, Sacramento (CSUS) Foundation, Office of Water Programs**

- *Water Distribution System Operation and Maintenance*
- *Small Water System Operation and Maintenance*
- *Utility Management*
- *Manage for Success*

**To order, contact:**

Office of Water Programs  
California State University, Sacramento  
6000 J Street  
Sacramento, CA 95819-6025  
Web site: [www.owp.csus.edu](http://www.owp.csus.edu)  
Phone: (916) 278-6142  
Fax: (916) 278-5959  
E-mail: [wateroffice@owp.csus.edu](mailto:wateroffice@owp.csus.edu)