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Need-to-Know Criteria

Water Distribution

Operator Class II

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

Water Distribution Operator Class II Certification Exam

WPI WATER PROFESSIONALS INTERNATIONAL
The Associated Boards of Certification

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Before You Dive In…

What is the Need-to-Know Criteria?

This Water Distribution Operator Class II Need-to-Know Criteria was developed to assist operators in understanding the content that will be covered in the Standardized Water Distribution Operator Class II 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 Standardized Water Distribution Operator Class II 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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Exam Content

The Water Distribution Operator Class II 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 displayed on Page 4 of this document summarizes the areas that are included on the exam, the number of test questions in each of these areas, the cognitive format of the test questions, and number of calculation questions in each area.

Just as operator job duties vary in their complexity, so will the questions you are asked on the exam. Some will be simpler, whereas others will be more complex or cognitively demanding. The following two cognitive levels are used to describe the format of the questions you will encounter on this exam:

Recall – Tasks at this cognitive 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. An example of a Recall type item follows:

Although the required contact time for chlorine to kill bacteria may vary depending on certain water characteristics, the typical industry standard is:

A. 15 minutes
B. 30 minutes
C. 45 minutes
D. 60 minutes

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. An example of an Application type item follows:

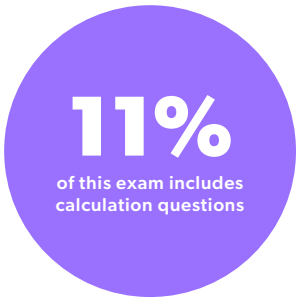
In the activated sludge process, some of the activated sludge MUST be wasted to:

A. increase digester gas production
B. prevent excessive solids build-up
C. prevent clogging of the sludge return line
D. prevent overloading of sludge return pumps

Units for Calculations – This exam requires numerical calculations. The number of calculation items is detailed in the Exam Content Outline below. WPI's standardized examinations are designed to be utilized in both the United States and Canada, therefore calculation items are presented in both US Standard units and Metric units. Each item is solvable in both units independently. The US Standard units will appear first in the question followed by the metric units in parentheses. An example of a Calculation item follows:

If a water reservoir 12 ft (4 m) in diameter has a static water level of 21 ft (7 m) what is the pressure on the bottom of the tank?

A. 6 psi (46 kPa)
B. 9 psi (69 kPa)
C. 12 psi (92 kPa)
D. 21 psi (161 kPa)



NUMBER OF QUESTIONS	CONTENT AREA	COGNITIVE FORMAT OF JOB TASK EXAM CONTENT
32	Distribution System Components	11 21 06
28	Equipment Installation, Operation, Maintenance, and Repair	12 16 03
20	Water Quality Monitoring, Evaluation, Adjustment, and Laboratory Analysis/Interpretation	11 09 01
20	Security, Safety, Administrative Procedures, and Public Interactions	06 14 01
100	Total	

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

Exam References

Each question on the standardized Water Distribution Class II Examination is referenced to widely accepted, peer reviewed publications from California State University, Office of Water Programs, American Water Works Association, or the Water Environment Federation. A complete listing of references used for the development of this exam can be found on WPI's website at: https://www.gowpi.org/services/abc-testing/exam-references/

In order to assist with exam preparation, the table below provides both primary and secondary reference materials for each content area on this examination. Please note that exam questions may be referenced to any WPI approved source, however, the following matrix identifies the two most prominent sources in each content area.

NUMBER OF QUESTIONS	CONTENT AREA	PRIMARY REFERENCE	SECONDARY REFERENCE
32	Distribution System Components	AWWA WSO Water Distribution Grade 1-2	CSUS Water Distribution System Operation & Maintenance 7th Edition
28	Equipment Installation, Operation, Maintenance, and Repair	CSUS Water Distribution System Operation & Maintenance 7th Edition	AWWA WSO Water Distribution Grade 1-2
20	Water Quality Monitoring, Evaluation, Adjustment, and Laboratory Analysis/ Interpretation	CSUS Water Distribution System Operation & Maintenance 7th Edition	AWWA WSO Water Distribution Grade 1-2
20	Security, Safety, Administrative Procedures, and Public Interactions	AWWA WSO Water Distribution Grade 1-2	CSUS Water Distribution System Operation & Maintenance 7th Edition

Distribution System Components

Aid in the design of water distribution projects

Assess water production (e.g., water restrictions and demand)

Adjust the water production to meet the demand (e.g., start pumps, adjust flow valves, etc.)

Understand backflow prevention and control devices

Understand SCADA systems components

Monitor water distribution system parameters (e.g., pressure, flow, water quality, water age, velocity, storage levels, etc.)

Determine water volume (e.g., tank, main, etc.)

Determine water flow rate (e.g., mains, pumps, services, etc.)

Understand flow characteristics (e.g., diameter, C-factor, head loss, linings, fittings, flow rate, etc.)

Maintain an up-to-date map of the distribution system (e.g., GIS, repairs, replacements, etc.)

Identify and Understand distribution system components:

- Pumps and related equipment (e.g., packing pumps, starters, and controls)
- Mains and related equipment (e.g., hydrants and valves, pressure regulating valves, air relief valves, etc.)
- Metering and related equipment (e.g., remote readers, meter replacements, etc.)
- Finished water storage and related equipment (e.g., tanks, overflow pipe, vents, access hatches, etc.)

Understand schematic diagrams

Understand wells and related equipment (e.g., measure static water levels and pumping water levels, etc.)

Perform operational analysis (e.g., analyze operational data, meet performance objectives, document operating conditions, etc.)

Equipment Installation, Operation, Maintenance, and Repair

Install water lines

- Service lines (e.g., tapping, curb stops, corporation stops, etc.)
- Water mains (e.g., valves, hydrants, thrust restraint, etc.)

Inspect new construction

Maintain pump stations and related equipment (e.g., check valves, control systems, etc.)

Monitor pump stations and related equipment (e.g., records, online monitoring equipment, etc.)

Clean and disinfect the finished water storage facilities

Inspect finished water storage facilities (e.g., observe discrepancies, drains, screens, corrosion control, structural issues, etc.)

Conduct distribution system flushing

Conduct meter reading

Maintain and repair distribution components (e.g., mains, services, meters, valves, hydrants, pumps, storage, etc.)

Disinfect components used during install/repairs

Perform underground locating, marking, and notification

Maintain well and related equipment

Maintain the sanitary condition of the well

Water Quality Monitoring, Evaluation, Adjustment, and Laboratory Analysis/Interpretation

Adjust the chemical dosage

Perform routine maintenance on the chemical feed equipment

Transport, store, and feed chemicals (e.g., chain chlorine cylinders, storage of chemicals, lock the disinfection facility, etc.)

Maintain an adequate supply of chemicals

Monitor the chemical feed equipment

Collect regulatory and informational water samples

Perform analyses to determine

- Chlorine residual
- pH

Interpret laboratory analysis for

- Chlorine residual
- Chlorine demand
- Microbiological
- Compliance with established water quality standards
- Meeting standard operating practices

Security, Safety, Administrative Procedures, and Public Interactions

Follow safety practices (e.g., traffic control, confined spaces, hazmat, lockout/tagout, excavation, etc.)

Identify opportunities to mitigate risks (e.g., vulnerability assessments, etc.)

Secure facilities to protect public safety and the water supply

Investigate system tampering

Maintain an emergency plan of operations

Maintain system records (e.g., laboratory, consumption, maintenance, repairs, etc.)

Interpret plans, maps, and system standard specifications

Participate in the budget process

Address customer public inquiry (e.g., pressure, billing, water quality, etc.)

Inform customers of planned repairs or service disruptions

Understand elements of an asset management program

Implement a cross-connection control program

Develop and implement system operating plans (e.g., routine, emergency response, temporary construction, etc.)

Develop and review Standard Operating Procedures (SOPs)

Implement a water loss control program

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