



EOCP

Environmental Operators
Certification Program

Need-to-Know Criteria

Building Water Systems Operator

*A Need-to-Know Guide when preparing for the
EOCP Building Water Systems Operator Certification Exam*

The Building Water Systems operator exam will test you on essential job tasks. These job tasks have been categorized into the Content Areas detailed on 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 Building Water Systems operator job duties vary in their complexity, so will the questions you are asked on the exam. Some will be simpler 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.

Number of Questions	Content Area	Job Task Complexity Levels
15	Water System Basics	
15	Building Water Systems Operation	
15	Water Chemistry, Microbiology, and Analysis	
5	Security, Safety, Compliance, and Administrative Procedures	
50	TOTAL	

Water System Basics

Source Water Supply

1. Public utility sources (surface water and groundwater)
2. Alternate water sources (rainwater, storm water, greywater, etc.)
3. Potable vs. Non-potable
4. Public vs. Private

Water Quality*

1. Water Quality Parameters – Guidelines for Canadian Drinking Water Quality
2. Health Implications/Vulnerable Persons
3. Microbes in water
4. Pathogens
5. Indicator Bacteria
6. Turbidity
7. pH
8. Temperature
9. Aesthetics
10. Equipment impacts

Water Treatment*

11. Pre-treatment (including filtration)
12. Disinfection/ Disinfectant Demand/ Residual/ Dosage
13. Chlorination
14. Chloramine
15. Ultraviolet
16. Ozone
17. Chlorine dioxide, hydrogen peroxide, and copper-silver ionization
18. Proprietary biocides
19. Point of Entry treatment
20. Point of Use treatment

Water Distribution Network*

21. Supply Network
22. Supply Disruptions
23. Supplier Communications/Bulletins
24. Drinking Water Advisories

*Thorough coverage of this topic is crucial

Building Water Systems Operation

General Operation and Maintenance*

1. Personal Safety
2. Flow rates and stagnation – ‘Water Age’ or ‘Dead Legs’
3. Importance of Temperature
4. Sources of Contaminants
5. Biofilms
6. Backflow and Backflow Prevention Programs
7. Impacts of building renovations
8. Alternate Non-potable Water Systems (e.g., rainwater harvesting)
9. System start-up and shut-down procedures
10. Flushing
11. Inspections
12. Remedial actions

Operations

13. Piping and identification markings*
14. Instrumentation/ Reading Instruments*
15. Meters*
16. Gauges*
17. Valves (all types) and bypass
18. Backflow Prevention Devices and Service Requirements*
19. Pumps, Blowers and Compressors
20. Chemical feeders/ use and maintenance
21. Water heaters/ Temperature Control
22. Expansion tanks
23. Recirculation loops
24. Unintended consequences: scalding and sustainability initiatives*

Secondary Water Processes

1. Conditioning
2. Reverse osmosis
3. Softeners
4. Sterilizers
5. Bio-dispersants, anti-scaling, and anti-corrosion additives*

*Thorough coverage of this topic is crucial

Legionella and Building Water Systems*

1. Environmental Sources and Growth requirements
2. Means of Transmission to Vulnerable Persons
3. Legionellosis – Signs and Symptoms
4. Identifying Potential Amplification Sites In-house
5. Aerosol-generating equipment and Practices
6. Decorative Water Features i.e. Open Water Systems
7. Cooling Towers, Evaporative Condensers, and Hybrid Systems (evaporative heat rejection systems)
8. Chillers
9. Ice makers
10. Fixtures (Shower heads, faucets, eyewash stations)

Water Chemistry, Microbiology Analysis, and Actions

Water Quality Analysis – Chemical and Physical*

1. Disinfectant residual analysis – Free and Total chlorine
2. Alkalinity analysis
3. pH analysis
4. Turbidity analysis
5. Hardness analysis
6. UV transmittance analysis

Water Quality Analysis – Microbial*

7. Personal Safety when sampling
8. Proper collection technique
9. Laboratory process and responsibilities
10. Sample handling and shipping
11. Sample paperwork (chain of custody)
12. Microbiological sampling - Legionella and E. coli
13. Sampling Site Choice - Legionella and E. coli
14. Interpreting test results – Legionella and E. coli
15. Actions Based on Test Results – Legionella and E. coli
16. Actions by Persons-Designated – Legionella and E. coli
17. Record Keeping
18. Waterborne disease investigation – Additional Analyses

*Thorough coverage of this topic is crucial

Compliance and Administrative Procedures*

1. Persons Responsible for Building Water Systems and Operations
2. Designated Persons to make adjustments
3. Water Management Plans - Development
4. Water Management Plans - Components
5. Reading water system schematics
6. Regular inspection and documentation requirements

Safety and Regulatory Context and Compliance*

7. Local Plumbing and Building Codes - New and Altered Systems
8. Mandatory notification requirements and procedures
9. BC - WorkSafe BC
 - a. WHMIS
 - b. Personal protective equipment (PPE)
 - c. Working at height safety
 - d. Confined space awareness
 - e. Work alone procedures
10. Federal Properties
11. BC - Public Health Act and Drinking Water Protection Act
12. BCCDC Legionella Guidelines

*Thorough coverage of this topic is crucial