



Need-to-Know Criteria

Wastewater Collection

Operator Class I

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

Wastewater Collection Operator Class I Certification Exam



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of Certification

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Before You Dive In...

What is the Need-to-Know Criteria?

This Wastewater Collection Operator Class I Need-to-Know Criteria was developed to assist operators in understanding the content that will be covered in the Standardized Wastewater Collection Operator Class I exam. A methodical and comprehensive international investigation was conducted to determine the most significant job tasks performed by wastewater collection 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 Wastewater Collection Operator Class I 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 Wastewater Collection Operator Class I 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

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Exam Content Continued

 **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)

10%
of this exam include
calculation questions

NUMBER OF QUESTIONS	CONTENT AREA	COGNITIVE FORMAT OF JOB TASK EXAM CONTENT
27	Equipment Operation, Evaluation, and Maintenance	 21  06  04
27	Collection System Operation, Maintenance, and Restoration	 19  08  03
18	Lift Station Operation and Maintenance	 15  03  02
14	Collection System Monitoring, Evaluation, and Adjustment	 14  00  00
14	Security, Safety, and Administrative Procedures	 11  03  01
100	Total	 80  20  10

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

Wastewater Collection Operator Class I | *Need-to-Know Criteria*

Exam References

Each question on the standardized Wastewater Collection Class I 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 by 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
27	Equipment Operation, Evaluation, and Maintenance	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 1, 8th Edition	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition
27	Collection System Operation, Maintenance, and Restoration	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 1, 8th Edition	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition
18	Lift Station Operation and Maintenance	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 1, 8th Edition
14	Collection System Monitoring, Evaluation, and Adjustment	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition
14	Security, Safety, and Administrative Procedures	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 1, 8th Edition	CSUS - Operation and Maintenance of Wastewater Collection Systems, Volume 2, 8th Edition



21 Recall

6 Application

4 Calculation Items

Equipment Operation, Evaluation, and Maintenance

Calibrate and operate air detectors/gas meters, flow meters portable or stationary, and blowers

Clean the collection system

- Hydraulic cleaning (e.g., balling, flushing, poly pigs)
- Jet rodding
- Blockage removal
- Rodding (e.g., hand and/or continuous)

Operate the following equipment

- Computers
- Heavy equipment (e.g., backhoe, mini-excavator, combination truck, etc.)

Evaluate and maintain the operation of equipment

- Inspecting
- Measuring temperature
- Reading charts
- Reading gauges
- Reading meters
- Maintenance records/logs

Evaluate and maintain the operation of electrical equipment

- Variable frequency drives (VFD's)
- Motor control centers
- Low voltage equipment (e.g., flow meters, float switch, PID controls, pressure sensors)

Inspect system using physical inspection (e.g., CCTV, dye and smoke testing, acoustic evaluation, visual, etc.)

Rehabilitate and repair collection system

- Lift station (e.g., wet wells, fittings, and piping)
- Manholes (e.g., collar, risers, cone, barrel, invert)
- Sewer lines (e.g., pipe bursting, pipe lining, pipe repair, etc.)
- Taps (e.g., top hat, grouting, protruding laterals)
- Eliminate infiltration, inflow, and exfiltration

Inspect equipment or monitor operating conditions, meters, and gauges to determine load requirements and detect malfunctions of the lift station

Inspect the operation of equipment to determine malfunction

Perform system inspections (e.g., air release valves, inlets, manholes, outfalls, overflows, regulators, inverted siphons, sluice gates)

Perform preventative maintenance including repair, replacement, and installation of equipment

- Motors
- Pumps
- Valves
- Engines
- Generators
- Level sensing equipment



21 Recall



6 Application



4 Calculation Items

Equipment Operation, Evaluation, and Maintenance

Operate equipment and/or tools

- Backflow prevention devices
- Chain pull hoists and overhead cranes
- Pumps (e.g., fixed and portable, all types)
- Flushing unit (e.g., dumping water into the system)
- Hydrant operations
- Metal detectors and pipe locators
- High pressure jetting
- Testing equipment
- Fans (e.g., forced air, air extraction)



19 Recall



8 Application



3 Calculation Items

Collection System Operation, Maintenance, and Restoration

Clean and maintain tanks (e.g., wet wells, chemical, holding)

Collect and document data from charts, gauges, and other instrumentation

Excavate wastewater lines

Use high pressure hydraulics to clean wastewater mains and lines

Inspect structures (e.g., manholes, vaults, wet wells for damage, trench cave-ins, and debris)

Interpret blueprints, GIS, and sketches of the system showing location and configuration of collection system components

Maintain all equipment (e.g., pumps, motors, chlorinators, chemical feeds) in accordance with SOP/OEM specifications

Maintain an inventory of chemicals and materials

Operate pumping equipment during emergency bypass operations

Hydro excavation

Update GIS and/or asset management (e.g., manhole location, GPS, pictures, etc.)

Identify and respond to system failures (e.g., SSO, collapsed pipes, pump failure, etc.)

Perform maintenance and inspection through the use of

- Hydraulic cleaning (e.g., nozzle selection, pipe size, grade, type of pipe, level of flow, etc.)
- Locating and inspection (e.g., through CCTV, acoustic evaluation, visual, drone, etc.)



15 Recall



3 Application



2 Calculation Items

Ensure that electrical devices (e.g., fuses, motors, relays, starters, etc.) are functioning properly

Ensure that electronic devices (e.g., alarms, controllers, gas detection, level detection system, telemetry – RTU's, SCADA, PLC's, control devices, etc.) are functioning properly

Ensure that devices (e.g., piping, pressure relief valves - compressors, water heaters, chemical addition, pumps, valves, wet wells/ vacuum valves - force mains, air relief, seals, air exchangers/exhaust fans, bar screens, etc.) are functioning properly

Adjust equipment (e.g., SCADA, VFD, PLC, control panel, etc.) to increase or decrease pumping capacity for proper flow



14 Recall



0 Application



0 Calculation Items

Collection System Monitoring, Evaluation, and Adjustment

Perform adjustments on the following components of the collection system

- Flow monitoring
- Force mains
- Gravity sewers
- Lift stations
- Manholes/cleanouts
- Measuring and control systems (e.g., PLC, SCADA, VFD, etc.)

Calibrate and adjust

- Atmosphere testers

Identify physical and/or abnormal characteristics of the wastewater

Inspect pipe installation (e.g., grade, joints, bedding, backfill, pipe defects, pressure test)

Monitor, evaluate, and adjust electric motors, pumps, and valves

Repair and/or replace lines (e.g., force mains, combined sewer, sanitary sewer, storm drains, etc.)

Monitor flow sensors



11 Recall



3 Application



1 Calculation Item

Analyze regulatory and compliance requirements

Comply with all health and safety procedures and protocols

Conduct safety inspections

Configure traffic plans and set up signs for traffic control

Determine location of underground utilities (e.g., combined sewers, cross connections, cross bores, force mains, inlets, laterals, manholes, outfalls, sanitary sewers, laterals, etc.)

Develop safety procedures

Comply with safety standards and safety programs

Ensure compliance of discharge limits are in accordance with all applicable local, state, and federal regulations

Analyze system logs/records

Investigate various customer issues (e.g., sewer backup and/or odor complaints)

Maintain knowledge of regulatory permit requirements

Maintain records and file reports (e.g., internal, or regulatory requirements, etc.)

Maintain knowledge of current regulatory requirements

Monitor status of customer work orders to ensure good customer service

Monitor work and job site conditions to ensure the protection of workers, pedestrians, and vehicular traffic

Perform the following administrative activities: safety/security evaluation and compliance

Perform the following administrative activities

- Planning and organization of work activities
- Record-keeping and evaluation of data
- Responses to public complaints
- Report writing (e.g., federal, internal, state, etc.)

Engage in the proper safety procedures for

- Calibration of atmospheric testing devices
- Chemical spill responses
- Confined space entry
- Electrical grounding, hazards, and arc flash
- Fires (e.g., prevention, fire extinguishers)
- First aid
- Hazardous materials
- Infectious diseases/blood borne pathogen protection
- Lifting
- Lockout/tagout



11 Recall



3 Application



1 Calculation Item

Engage in the proper safety procedures for

- Personal protection equipment (e.g., respiratory protection, safety glasses, gloves, hard hats, fall protection)
- Shoring, trenching, and excavation
- Traffic control/work zone safety

Train new operators

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