WATER OPERATOR DESK

PURE EXAM-PREP STUDY MATERIAL · ZERO MATH DRILLS

Small Water System Operator Certification Study Guide

Operational exam prep for Colorado Class S and for WPI/ABC Very Small Water System topics. Wells, package plants, hypochlorite, pressure tanks, distribution, sampling, safety, and troubleshooting — explained the way the exam tests them.

- 12 chapters · small-system operations
- 60-question non-math mastery check
- "Exam Trap Alert" callouts
- Field-to-Exam troubleshooting tables
- Wells, package plants, tanks & safety
- Offline interactive study companion

Official Sources · Verified as of November 2026. Public pages only, cited for reference; confirm current details at the official source.

Source: Water Professionals International (WPI), *Standardized Water Treatment Operator Exams — Need-to-Know Criteria and Formula/Conversion Table* (as of November 2026). https://gowpi.org/services/abc-testing/standardized-exams/standardized-water-treatment-operator-exams/

Source: Water Professionals International (WPI), *Formula/Conversion Table — Water Treatment, Distribution & Water Laboratory Exams* (2024 edition, as of November 2026). https://gowpi.org/services/abc-testing/formula-conversion-tables/

Source: Water Professionals International (WPI), *Historical Need-to-Know Criteria (2019 standardized water treatment and distribution exams)* (as of November 2026). https://gowpi.org/services/abc-testing/need-to-know-criteria/

Source: Colorado CCWP Office, *CCWP – Need to know criteria and study resources* (as of November 2026). https://cdphe.colorado.gov/ccwp-need-to-know-criteria-and-study-resources

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CHAPTER 1 OF 12 · HOW SMALL SYSTEMS WORK

How Small Systems Are Built and How This Exam Is Organized

LEARNING OBJECTIVES

- Trace the typical small-system flow path from a well or spring through treatment, storage or a pressure tank, and into distribution.
- Recognize common small-system layouts, including disinfection-only trains and simple package-plant trains.
- Explain honestly how Colorado Class S relates to — and differs from — the WPI/ABC Very Small Water System exam, and what is outside this book.
- Use this guide's chapter pattern (scope box, tables, Exam Trap Alerts, troubleshooting, takeaways) to study efficiently.
- Describe the daily operating habits that keep a one-building or one-well system under control.

CLASS S VS VSWS OVERLAP

Class S (Colorado custom exam)
Know the hybrid nature of the exam cold: both treatment and distribution operating knowledge, built around the wells, package equipment, tanks, and small mains you actually work on. Expect layout, equipment-identification, and 'what should the operator do first' questions.

VSWS overlap (WPI/ABC operations)
The same flow-path and equipment vocabulary shows up on VSWS operating items. VSWS is a separate standardized exam; do not treat this chapter as a claim that Class S and VSWS are the same test.

1.1 What a Small System Typically Looks Like

A conventional surface-water plant is a long train: screens, rapid mix, flocculation, sedimentation, filters, a large clearwell, and a distribution grid with many pressure zones. Most small systems are not built that way. The typical path is short and compact: **source → simple treatment (or disinfection only) → contact and storage or a pressure tank → a small distribution grid.**

The source is usually a **well**, a **spring**, or occasionally a small surface intake. Treatment may be a **skid-mounted package unit** (oxidation and filtration for iron and manganese, a softener, cartridge or bag filters, or a compact aeration tower) or, on a protected well with stable water quality, **disinfection alone**. Finished water then sits in a **pressure tank**, a **small storage tank or cistern**, or both, and is pushed out to a handful of services, a camp, a school, or a short loop of main.

Typical Small-System Building Blocks

Block	What you are looking at	Why the exam asks about it
Source	Well, spring box, or small intake, with a raw sample tap before any treatment	You must know what can go wrong at the wellhead or spring before you blame the chlorinator
Well house / treatment room	Pump controls, chemical feed, filters or package skid, electrical panel, heater, floor drain	Most operating and safety questions are set in this room

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Block	What you are looking at	Why the exam asks about it
Disinfection	Usually a hypochlorite day tank and a peristaltic or diaphragm feeder; sometimes an on-site generator or, rarely, gas	Residual control is the core operating skill on almost every small system
Contact / storage	Baffled contact piping or tank, ground storage, cistern, or a hydropneumatic / bladder pressure tank	Contact time, water age, and pressure all start here
Distribution	Short mains, a few valves, blow-offs on dead ends, service lines, hose bibbs, and irrigation connections	Flushing, stagnant water, and backflow hazards live on this side of the tank
Records desk	Logbook, residual records, sample results, equipment manuals, and the written SOP binder	Exams test whether you would write it down and who you would call

Two layouts show up again and again. In a **disinfection-only** system, a sanitary well and a properly set chlorinator may be the entire treatment train — the operator's job is wellhead integrity, residual, tanks, and the mains. In a **package-plant** system, oxidation, filtration, or softening is added because the groundwater carries iron, manganese, hydrogen sulfide, hardness, or other dissolved minerals. The exam expects you to recognize which layout you are in from the equipment described in the stem.

EXAM TRAP ALERT

Do not assume every 'small system' question is about a tiny conventional plant with floc tanks and dual media filters. If the stem mentions a well, a day tank, a bladder tank, and a dead-end main, answer from that equipment — not from a large-plant textbook.

FIELD NOTE

Field Note

In mountain and rural settings the 'plant' is often a single well house at the end of a long access road. The operator may be the only person on site. That is why this guide leans on walk-through habits, residual checks, and 'what do you look at first' — not on gallery-scale equipment.

1.2 The Flow Path You Should Be Able to Trace Blind

Exams love a simple trace: start at the source and walk the water to the customer's tap, naming each unit and the sample points. Practice this until it is automatic.

1. Raw water leaves the well or spring. A **raw-water sample tap** sits on this line, before any chemical or filter, so you can see what the source is actually producing.
2. If treatment is used, water passes through the package unit or filters. A **post-treatment tap** (still ahead of, or just after, the disinfectant injection, depending on the design) lets you see what the process changed.
3. Disinfectant is fed, then water travels through **contact piping or a contact tank**. The first official **free chlorine residual** used to judge contact is measured after that contact volume, not at the injection point.
4. Finished water enters **storage, a cistern, or a pressure tank**. A finished sample tap and a pressure gauge belong here.
5. Water leaves to the **distribution system**. Operators also measure residual at distant or dead-end locations because that is where residual fades first.

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