

Water Treatment

California Water Treatment T1/T2

STUDY GUIDE

A clear rule. A worked example. A reason behind every answer.

T1/T2



OCTOBER 2026 / FIRST EDITION

Independent study material. Editorial review edition.

Build understanding before speed

Independent original launch candidate. Subject-matter accuracy approval remains pending; no exam-owner affiliation or endorsement is claimed.

T1 foundations and explicit T2 extensions follow the current-linked April 2020 Expected Range of Knowledge. Higher-grade process details appear only as orientation where labeled.

This guide provides no approved education credit, operator certificate, facility authority or guaranteed result. Employer procedures, current regulatory requirements and qualified supervision govern real operations.

Original practice questions are learning exercises, not recalled examination items or validated pass predictions. Paired grade sessions are not one official 200-question examination.

The exam at a glance

Official examination. Separate T1 or T2 treatment-operator examination, 100 questions per grade.

Published categories. Source water 25; treatment 25; operations/maintenance 20; laboratory 15; regulations/administration 15.

Practice structure. Forms A and B each contain separate 100-question T1 and 100-question T2 sessions. Four sessions, 400 original questions total.

Timing and passing. The current primary documents reviewed do not establish official timing or a passing threshold. The 180-minute target per session is publisher-selected rehearsal pacing; use current candidate instructions.

Usual education route. T1: high school diploma/GED or listed alternatives. T2 adds an accepted treatment-fundamentals course of 36 hours, 3.6 CEUs or three college semester units.

Certification. Separate application after a qualifying examination pass. The published T1/T2 chart does not add higher-grade work-experience requirements; it specifies a pass within the previous three years.

Use all three kinds of practice

Start with the lessons and chapter checks. Use the flashcards to retrieve rules after a delay, and use the one-sheets to untangle similar ideas. Take each practice exam once under the stated conditions before reading its explanations. Repeatedly memorizing the same answers is not evidence that a new question is mastered.

Keep an error log

For every missed or guessed answer, record the topic, the decisive fact you missed, the rule in your own words, and a new example. Revisit the lesson, then answer the question aloud after at least one day. A practice score is a study signal, not a validated prediction or guarantee of passing.

Your study route

Week 1 / Source water and calculation foundations

- Read chapters 01-08; build a unit-conversion and source-pathway map.
- Rework each geometry, flow and well example with units visible.
- Use the first source-water cards and explain three different contamination pathways.

Week 2 / Treatment barriers and T2 extensions

- Read chapters 09-15, separating basic process knowledge from CT and backwash extensions.
- Build one active-feed-to-product-volume calculation without skipping strength or density.
- Explain how microbial protection, DBP control and corrosion considerations interact.

Week 3 / Equipment, laboratory and rules

- Read chapters 16-27 and trace a sensor-to-controller measurement chain.
- Practice dilution, pH/turbidity quality checks and microbial sample handling.
- Create a California pathway checklist using the current official program, not a study score.

Week 4 / Grade-specific timed rehearsal and repair

- Use chapter 28 to connect calculations; take Form A for the grade sought as a separate session.
- Repair every missed concept and explain why each distractor fails.
- Take the corresponding Form B session later; use the other grade only for a deliberate separate study goal.

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Exam coverage map

Match the public exam topics to the chapters below. Official weights are identified where published. Publisher-selected practice allocations are labeled in the rows or practice instructions; they are not official exam weights. Topic rows without separate weights remain part of their parent domain. This map describes coverage, not official endorsement.

SRC / Source water: hydrologic and seasonal cycles; watersheds and protection; surface-water intake depths; aquifers, wells, drawdown, yield and specific capacity; storage, units, volume, pressure, flow and velocity.

Weight: 25 questions per grade | Chapters: 02, 03, 04, 05, 06, 07, 08, 28 | Source 8

TRT / Treatment: physical barriers and basic process sequence; filtration, head loss, surface washing, backwash and production; chlorine chemistry and feed; CT and disinfectant selection; DBP/TOC, chloramines, corrosion, taste/odor, iron/manganese, adsorption, absorption and contaminant-specific treatment; pathogen barrier performance, treatment optimization and recycle-return protection.

Weight: 25 questions per grade | Chapters: 08, 09, 10, 11, 12, 13, 14, 15, 28, 25 | Source 8

OPS / Operations and maintenance: pumps, installation, motors, valves, gauges, meters and calibration; chemical feeders, process instrumentation, SCADA normal response, preventive maintenance and troubleshooting.

Weight: 20 questions per grade | Chapters: 16, 17, 18, 19, 27 | Source 8

LAB / Laboratory: representative collection and handling; sample identity; chlorine, turbidity, pH, hardness, alkalinity, color, HPC and microbial indicators; standards, reagents, dilutions and analytical quality.

Weight: 15 questions per grade | Chapters: 20, 21, 22, 23 | Source 8

REG / Regulations and administration: California eligibility and certification; contaminant and treatment standards; microbial/DBP/lead frameworks; records, notifications, public protection, chemical safety, confined spaces and energy control; California Waterworks Standards; NSF 60/61; CCR and rule-transition awareness; SWTR removal/inactivation performance; Cryptosporidium Action Plan; Filter Backwash Recycling Rule; HAZWOPER response roles.

Weight: 15 questions per grade | Chapters: 01, 24, 25, 26, 27 | Source 8

LESSON 01

01 / The California treatment pathway and operator decisions

- Separate examination eligibility from certification.
- Use the published grade objectives to plan study.
- Recognize the limits of an independent preparation book.

Two grades, one foundation

T1 and T2 are California drinking-water treatment operator grades. They are different from distribution grades D1 and D2 and from wastewater Grade I. Treatment work changes raw water into water suitable for its intended public supply; distribution work maintains delivery and water quality through a network. A person may hold more than one certificate, but one exam pass does not silently grant every credential. Start by identifying the actual classification on the application and the role required by the employer.

The State Water Board's current-linked treatment outline assigns each T1 and T2 exam 100 questions across five categories: 25 source water, 25 treatment processes, 20 operation and maintenance, 15 laboratory procedures, and 15 regulations and administrative duties. Equal category counts do not mean identical difficulty. The detailed objectives add T2 work such as CT calculations, filter backwash calculations, instrument calibration and chemical dilutions. This guide labels those extensions. Higher-grade material is included only when it explains a basic process, not as a claim that every advanced operation is tested at T1.

Eligibility is not a study score

The usual T1 entry route is a high school diploma or GED equivalency; the official chart also identifies alternatives. T2 adds an accepted specialized course covering drinking-water treatment fundamentals: 36 hours, 3.6 CEUs or three college semester units under the applicable provider criteria. Reading this guide does not create that course credit. Keep the actual completion record and confirm acceptance with the program instead of assuming that any commercial certificate qualifies.

For T1 and T2, the published chart does not add the operator-experience requirements that appear at higher treatment grades. Nevertheless, passing an exam and receiving a certificate are separate administrative steps. The chart ties certification to a qualifying pass within the previous three years. An employer may impose additional hiring, safety or training requirements. A practice examination is only a learning measurement; neither a high practice score nor purchase of a book establishes certification or permission to operate a particular facility.

Study decisions as well as vocabulary

Use a four-part reading habit for an operating problem: identify the objective, locate the measurement, test the explanation, and choose an authorized response. A low disinfectant result might reflect feed failure, increased demand, poor mixing or an analytical error. Automatically increasing a pump setting ignores those alternatives. The safe decision depends on the stated facts, plant procedures and the consequence of delaying action. Confirming an instrument does not mean continuing to distribute suspect water while an urgent barrier failure goes unaddressed.

The two practice forms contain separate T1 and T2 sessions. Do not attempt to interpret the combined 200 questions as one official examination. This edition uses a publisher-selected 180-minute rehearsal target for each grade; current primary documents reviewed did not establish an official duration or pass threshold. Follow the authorization and testing instructions for your actual appointment. Maintain an error log with the concept missed, the misleading fact, and the correction you can explain without looking at the answer.

Work it through / Choose the correct next step

A graduate has passed a publisher T2 practice test but has not completed recognized specialized training.

1. Check the State Water Board eligibility chart and accepted training requirements.
2. Complete qualifying training and retain the official record before applying on the training route.
3. Use the practice result to identify weak topics, not as evidence of course completion.

Result. The practice score supports study planning; it does not satisfy the separate education requirement.

Exam eligibility / Certification

Eligibility permits testing; certification requires the additional application and all applicable conditions.

T2 extension / T1 foundation

An extension adds specific depth without changing the five published category counts.

Keep these ideas

- Confirm the grade before selecting an exam.
- Keep recognized education records separate from study materials.
- Treat a barrier failure as an operating problem, not merely an exam vocabulary item.

Source references: 8, 9, 2, 3

Check your understanding

1. A learner buys this guide and asks for the 36-hour T2 course credit. What is the correct response?
 - A. Credit is available if the learner submits the publisher's practice score to the exam center.
 - B. The guide awards no qualifying course credit.
 - C. Credit follows from holding a distribution certificate regardless of treatment-course requirements.
 - D. Credit is available if the guide takes at least 36 hours to read.
2. Both grades allocate 25 questions to source water. What follows?
 - A. T1 and T2 must use the same source-water depth because the category counts match.
 - B. T2 can test additional source-water objectives.
 - C. T2 must double the number of source-water questions to test additional objectives.
 - D. The source-water category includes only calculations at both grades.

3. A low residual coincides with an uncertain analyzer alarm. Which study habit best supports a sound answer?

- A. Always double the feed rate.
- B. Always dismiss the first alarm.
- C. Link the measurement, possible causes and authorized response.
- D. Use only the definition of residual.

Check the reasoning

1. Answer B / REG

The recognized-course requirement is separate from independent exam preparation.

- A. Testing-center scoring does not approve an independent book as a recognized course.
- C. A separate certificate does not by itself establish the stated treatment education route.
- D. Self-reported reading time does not establish an accepted provider and course.

Source references: 9

2. Answer B / REG

The detailed outline marks grade-specific depth even when counts match.

- A. Equal counts do not establish equal depth; the detailed grade objectives differ.
- C. Additional depth can occur within the published 25-question allocation.
- D. The outline also includes source quality, protection and groundwater concepts.

Source references: 8

3. Answer C / REG

Operational reasoning requires both barrier protection and diagnosis.

- A. Blind adjustment can create other problems.
- B. An unconfirmed alarm can indicate a real failure.
- D. The decision requires application, not definition alone.

Source references: 8

LESSON 02

02 / Units, ratios and dependable calculation setup

- Carry units through every calculation.
- Convert fractions and percentages correctly.
- Rearrange one-step operator formulas.

Write what the answer must mean

Operator arithmetic begins with units. A value of 240 could describe gallons, gallons per minute, minutes, feet or pounds; those are different physical statements. Before substituting numbers, write the requested unit next to a blank answer. Then list each given quantity with its unit. If the problem asks for a daily volume and supplies a rate in gallons per minute, a time conversion is necessary. This preparation often prevents more errors than memorizing another formula.

Dimensional analysis means multiplying by ratios equal to one in the physical sense. One day equals 1,440 minutes, so multiplying gallons per minute by 1,440 minutes per day cancels minutes and produces gallons per day. Dividing that daily volume by 1,000,000 gallons per million gallons produces MGD. The word million belongs to the volume unit; it does not remove the day from the rate. Do not combine a tank volume in gallons directly with a flow in MGD without bringing their volume units into agreement.

Percentages are quantities, not decorations

Convert a percentage to a decimal before using it as a multiplier: 12 percent becomes 0.12, not 12. If a chemical product contains an active fraction of 0.12 by weight, only 0.12 pound of each pound of product is the specified active constituent. To supply an active mass, divide by that fraction. Multiplying instead would require less product than active ingredient, which is physically impossible for a diluted product.

A ratio also depends on its stated basis. A concentration expressed as mass per volume differs from percent by weight. Liquid chemical volume therefore may require product density or specific gravity as well as strength. Never silently assume that a gallon of concentrated product weighs the same as a gallon of water. In a question, use the density given. In practice, use the product documentation and approved feed calculation. If the basis is missing, identify the missing information rather than inventing a conversion.

Rearrange before calculating

For a relationship such as volume equals flow times time, solving for time gives volume divided by flow. Check the result with a verbal test: a larger tank at the same flow takes longer to fill, while a larger flow fills the same tank sooner. If your rearrangement predicts the opposite, stop. For concentration times flow times a unit factor equaling mass per day, solve for the unknown symbol before placing a string of numbers into the calculator.

Retain extra digits during intermediate steps and round once at the end to the precision requested. Early rounding can materially change a small residual, a dilution or a chemical feed result. Estimate the order of magnitude

independently: 500 gpm is about half of 1,000 gpm, so its MGD must be about half of 1.44. Calculator entry is not self-verifying. A useful final audit asks whether the unit is right, whether the magnitude is plausible, and whether the result answers the actual question rather than an intermediate step.

Work it through / Rate conversion with a check

A well operates continuously at 375 gpm. Find MGD to three decimal places.

1. $375 \text{ gal/min} \times 1,440 \text{ min/day} = 540,000 \text{ gal/day}$.
2. $540,000 \text{ gal/day} / 1,000,000 = 0.540 \text{ MGD}$.
3. Compare with 1,000 gpm = 1.44 MGD; 375 gpm should be considerably smaller.

Result. The flow is 0.540 MGD. This is a rate, not the number of gallons presently in a tank.

Percent / Decimal fraction

A 12 percent factor is 0.12; using 12 changes a result by a factor of 100.

Rate / Quantity

A rate includes time; a stored quantity does not.

Keep these ideas

- Cancel units visibly.
- Use the chemical-strength basis supplied.
- Round at the requested final step.
- Check physical direction as well as calculator arithmetic.

Source references: 10, 8

Check your understanding

1. A pump runs at 250 gpm continuously. What is its flow in MGD?
 - A. 0.360 MGD
 - B. 0.250 MGD
 - C. 3.60 MGD
 - D. 360 MGD
2. Twenty pounds of active ingredient are needed from a 25 percent-by-weight product. How much product is required?
 - A. 5 lb
 - B. 500 lb
 - C. 80 lb
 - D. 25 lb

3. A student divides a tank volume in gallons by a flow in MGD and labels the raw result days. What is missing?

- A. Remove the time unit from MGD.
- B. Convert the volume units to the same basis.
- C. Square the flow.
- D. Multiply the tank volume by pressure.

Check the reasoning

1. Answer A / SRC

$250 \times 1,440 / 1,000,000 = 0.360$.

- B. This omits the minutes-per-day conversion.
- C. This is ten times the correct conversion.
- D. This confuses thousands of gallons with millions.

Source references: 10

2. Answer C / OPS

$20 / 0.25 = 80$ lb of product.

- A. Multiplying by strength reverses the required adjustment.
- B. Using 25 instead of 0.25 creates an incorrect calculation.
- D. The percentage is not itself a product mass.

Source references: 10

3. Answer B / SRC

Gallons and million gallons must agree before division.

- A. The day is essential to deriving time.
- C. Detention time uses volume divided by flow.
- D. Pressure is not part of this detention-time relationship.

Source references: 10