

Water Testing: Strips, Labs & Field Methods

The Water & Food chapter's Water Testing Kits item names test strips for pH, chlorine, and bacteria in one breath, but they don't work the same way. This guide separates the three real tiers, strips, a mail-in lab, and field-expedient bacteria testing, and covers what each one honestly can and can't tell you.

Three tiers, not one test

Tier	What it tells you	Turnaround	Best for
Color-match strips	pH, chlorine residual, hardness, lead, nitrate, present/not-present rather than a precise value	Seconds to minutes	A fast field screen, or confirming a treatment step (like chlorination) actually worked
Mail-in lab panel	Precise, quantified results across a full contaminant panel, the most accurate option that exists	Days, and requires a working postal or courier system	An annual private-well test, or any time real precision matters and normal shipping is running
Field-expedient bacteria test	Presence/absence (or a quantified estimate) of fecal-indicator bacteria, with no lab or mail required	24-48 hours, incubated at a warm temperature	Exactly the situation this manual plans around: mail-in isn't an option, but you still need to know if a source is fecally contaminated

Reading a strip correctly, not just dipping it

A strip's own reagent pads are sensitive enough that sloppy technique gives a genuinely wrong answer, not just an imprecise one. Handle the strip by its non-reactive end, dip the pads in the water for about one second, don't leave it soaking, and shake off the excess without blotting it on anything. Wait the exact time printed on the bottle, typically 15 seconds to a minute depending on the product, before comparing colors, reading too early or too late both distort the result. Hold the strip flat and level rather than tilted, since colors from adjacent pads can bleed into each other at an angle, and compare against the chart in natural daylight rather than under artificial light, which shifts how colors read. Never touch the pads themselves with your fingers, oils transfer easily and throw off the reaction.

Your annual baseline: what to actually test for on a private well

Test annually for total coliform bacteria, nitrate, total dissolved solids, and pH, the EPA's standing recommendation for any household on a private well, not just a Tier 3/4 household. Test the full chemical panel every 3-5 years, and retest immediately after a flood, a well repair, a new baby in the house, or any change in taste, smell, or appearance. This baseline matters regardless of whether an emergency ever happens; most private wells are never tested at all otherwise.

Find a certified lab through your state health department's environmental lab directory or a national mail-in service like Tap Score or National Testing Laboratories, both ship a sterile sample kit to you first. Collect a bacteria sample with real sterile technique: use only the sterile bottle the lab sent (discard it if the seal was already broken), remove any aerator screen from the faucet, run the water for 2-3 minutes to clear the line, and fill the bottle without letting the faucet touch the bottle or your fingers touch the inside of the bottle or cap. Ship it back the same day if possible; most labs want a bacteria sample analyzed within 24-30 hours of collection.

Field-expedient bacteria testing: no lab, no mail, real methods

Two real, well-documented methods exist for exactly the situation where a mail-in lab isn't reachable. Both only detect fecal-indicator bacteria, see the warning below, but both are genuine, not improvised.

Method	How it works	Where to get it
H2S test	A WHO/UNICEF-recommended paper-strip or bottle method built specifically for low-resource and disaster settings with no institutional lab access. The sample culture turns black within 24-48 hours if hydrogen-sulfide-producing (fecal indicator) bacteria are present. Costs roughly \$1-1.50 per test to produce.	Sold pre-made in the U.S. as part of Aquagenx's CBT product line, available on Amazon and directly from Aquagenx, explicitly marketed for disaster and emergency use
Coliscan Easygel / compartment bag tests	A self-contained culture medium; add the water sample directly, no filtration or transfer step, and incubate 24-48 hours at a warm temperature. Coliform colonies turn pink, E. coli colonies turn purple.	Micrology Labs sells Coliscan Easygel directly; Aquagenx's Define/CBT II kits do the same job and are sold on Amazon, both explicitly designed for on-site field use with no lab required

You don't need a real incubator

Both methods need a warm, stable temperature (roughly 90-98°F) for 24-48 hours, not a lab incubator specifically. A warm windowsill in summer, a spot near a wood stove, or even body heat (carried in an inner jacket pocket) can hold a sample at an adequate temperature in a real off-grid situation.

WARNING

A clean result is not the same as safe water

Both the H2S test and Coliscan-style tests detect fecal-indicator bacteria only. Neither detects viruses, protozoa like Giardia or Cryptosporidium, heavy metals, or chemical contamination. A clean result means the water isn't fecally contaminated by this test's sensitivity, not that it's safe to drink untreated. Use these tests to screen a source or catch a clear red flag, and still run any questionable water through the Water Purification guide's treatment steps rather than treating a clean bacteria test as a green light to skip treatment.

Sources

- Strip test types and what each contaminant test covers: Fresh Water Systems; Water Filter Guru
- EPA private well testing recommendations: EPA; CDC
- H2S test method, WHO/UNICEF recommendation, and field use: World Health Organization; post-earthquake Haiti field study, PMC
- Coliscan Easygel mechanism and incubation: Micrology Labs; King Conservation District
- Aquagenx CBT/Define kits, U.S. retail availability and disaster/field-use design: Aquagenx
- Test strip dip time, reading window, and technique: Outdoor Fixes; ScienceInsights
- Sterile bacteria sample collection procedure: Missouri Department of Natural Resources; RMBEL