

YOUR COMPLETE GUIDE TO *Well Water* TESTING



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The Complete Guide to Home Well Water Testing

Our company [Clean Water Systems & Stores](#) has been providing solutions for thousands of problem water wells since 1985. Over the years, we have been helped thousands of homeowners, community water systems and businesses deal with tough problem water.

If you have any questions about the material in this guide, or want to offer us feedback please contact us!

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Perform a “Toilet Tank Inspection”

Unless your toilet tank is new or has recently been cleaned your toilet flush tank can be a wealth of useful water quality information! Simply lift the cover and look in. If you see slimy rusty deposits on the sides of the tank, and frothy bubbles in the tank water, this is a good indication of iron bacteria.



Symptom	Cause	Solution
White scale on float	Calcium hardness	Water softener
	Total dissolved solids	Reverse osmosis
Tank sides are white, but black, rust or sand is laying on the bottom	Decaying galvanized pipes	Replace pipes; correct corrosiveness of water
	Sand, rust or sediment in well water	Sediment and/or iron filter
Blue Stains	Acidic (low pH) water	Calcite neutralizer or soda ash feeder
Rust Stains	Iron	Iron filter (Birm, Pro-OX, Greensand, Pyrolox)
Furry, stringy red growths	Iron (and/or other) bacteria	Chlorination, aeration, ozone injection, hydrogen peroxide, followed by filtration
Furry, stringy gray or black growths	Sulfur (or other) bacteria	Chlorination, aeration, ozone injection, hydrogen peroxide, followed by filtration
Frothy, with bubbles	Iron bacteria	Chlorination, aeration, ozone injection, hydrogen peroxide, followed by filtration
Brown stains	Iron And/or Manganese	Iron filter that removes manganese (Pro-OX, Greensand, Pyrolox)
Black Stains	Iron And/or Manganese	Iron filter that removes manganese (Pro-OX, Greensand, Pyrolox)
	Ferric Sulfide (black rust)	Iron filter (Birm, Pro-OX, Greensand, Pyrolox)
Pink Stains	Airborne bacteria	Not water quality related; Clean with chlorine bleach

Test Your Water

If there is an odor problem with the water supply, the first step is to determine the source. If the source is from the well directly a general mineral water analysis is critical to select the correct system.

Test should include analysis for pH, iron, manganese, hardness, total dissolved solids and ORP at a minimum. Additional tests for sulfate, hydrogen sulfide and tannin is recommended as well. Take the sample as close to the well as possible.

With these results, you can identify the best type of water treatment to use, and what type of system to select, based on your water chemistry. **Avoid in-home water testing by water softener sales people during sales demonstrations.**

For health-related issues the water should be tested for total coliform and e-coli (fecal coliform). If infants and children will be drinking the water, a complete general, mineral, metals and bacteriological test is recommend.

If the source of water is a public water system and you experience problems with odor, it is important to contact a utility official to determine whether the odor is from the public system or from the home's plumbing or piping.

Check For Odors in Cold & Hot Water

Run a hose bib or tap as close to the well as possible and fill a 5-gallon bucket or other container and notice if there are odors. If you smell a "rotten-egg" odor, this is hydrogen sulfide gas. If water smells like oil or asphalt this can be from manganese. If water smells like cucumber or sewage this is usually a result of iron and/ or sulfur bacteria.

Run the water hot water from each tap and notice if there is an odor in the hot water, that is not in the cold water. This indicates a problem with the water heater. Iron and sulfur bacteria can interact with the anode rod in water heaters, resulting in hydrogen sulfide gas only in the hot water. Changing the anode rod to an aluminum rod can often solve this problem.

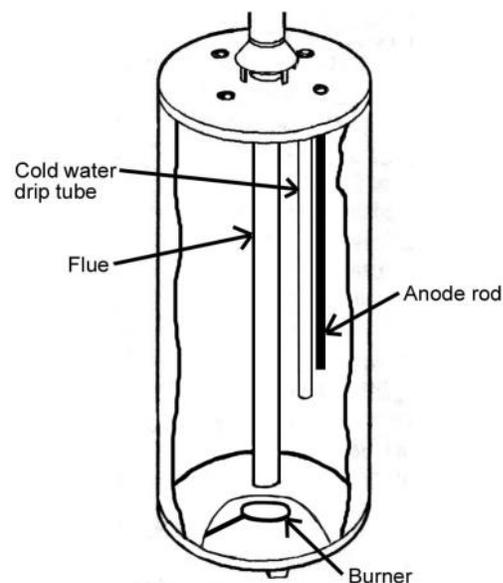
It is recommended that you drain your water heater at least once per year. This will flush out sediment that may accumulate in the bottom and give you an idea of the sediment type and color , if any, are present.



Low cost do-it-yourself test kits are available that allow you test for common tests right in your own home.



Comprehensive laboratory testing is available that can test your water for general minerals physical and chemical contaminants.



Water heaters can accumulate rust and sludge. Iron and sulfur bacteria can create sulfur odors in water heaters.

Why you need to test your well water

Do you see stains, signs of corrosion or is there an odor to the water? If you use the water in your home for bathing, washing or drinking, testing is recommended. Well water testing is critical especially if your family depends on your well for household water needs.

Private water wells should be protected from contamination because toxic substances can come from mining sites, landfills, and fertilizers and pesticides from nearby farms and gardens can find their way into groundwater supply over time. If you live near gas stations, industry, agricultural areas or a major highway you would also want to test for organic compounds, heavy metals, pesticides, and herbicides.

Responsibility over testing private well water

Municipal city water systems are required to test their water supplies regularly to ensure the water is safe to drink. However here is no requirement to test a private well except for bacteria when it is first drilled or the pump is changed. The fact is, you are responsible for making sure your water is safe.

Most private wells provide a clean, safe supply of water; however, contaminants can pollute private wells, and unfortunately, you cannot see, smell or taste most of them. Consequently, you should test your well water on a regular basis. The decision on what to test your water for should be based on the types of land uses near your well.

Sources of Well Water Contamination

Groundwater contamination can come from:

- Seepage through landfills
- Failing septic tanks
- Underground storage tanks
- Fertilizers, pesticides, and agricultural seepage
- Runoff from urban areas
- Gas stations or manufacturing

If contaminated groundwater is consumed, it could cause illness. Septic tank waste can cause hepatitis and dysentery. Toxins can poison both humans and animals. Long-term effects of prolonged exposure to polluted water include cancer and organ failure.

What Tests Should Be Done?

A general mineral analysis which includes nitrate plus coliform bacteria is a good place to start. These may include:

1. Alkalinity
2. Bacteria
3. Copper
4. Hardness
5. Hydrogen Sulfide
6. Iron
7. Manganese
8. Nitrate
9. Nitrite
10. pH
11. Sulfate
12. Total dissolved solids

If you live near gas stations, industry, agricultural areas or a major highway you would also want to test for organic compounds, heavy metals, pesticides, and herbicides as well.



Easy Well Water Test with Bacteria Test

A general mineral test will include calcium, magnesium, chloride, nitrate, potassium, and sodium along with metals such as iron and manganese. If you are experiencing stains or sediment, a general mineral analysis will tell you what is causing the problem. If the water has a funny taste or odor a general mineral analysis with bacteria will usually tell you what is causing the problem.

These tests show if the water will be corrosive to pipes, or form mineral scale in your pipes, and the levels of minerals and salts. If you are having problems with color in the water or brown staining additional tests for tannin is recommended. For accurate lab analysis done professionally, sterile sample bottles must be used and sent to lab immediately or by overnight express in a chilled container.

Bacteria

Your well water may be host to a number of species of bacteria, many of which may be completely harmless. There are, however, a few species you should certainly test for and eventually eliminate: these include sulfur and iron bacteria, and most importantly coliform and E. coli bacteria.

Sulfur and iron bacteria thrive on – you guessed it – sulfur and iron; these bacteria are responsible for foul-smelling water and the buildup of biofilm in household plumbing.

Bacterial testing that indicates presence or absence can be done at home. The EPA recommends lab testing for coliform bacteria annually. Fortunately, this is not difficult to do and samples can be sent by overnight express if a lab is not located nearby.

Coliform Bacteria

Coliform bacteria are the most common contaminants found in private water systems. Private wells should be tested at least once a year for bacteria. However, bacteria are only one of many possible contaminants. Coliform bacteria live in soil, on vegetation and in surface water. Coliform bacteria found in the intestines of warm-blooded animals and their feces are called E. coli.

E. coli can cause severe health effects like fever, bloody diarrhea, and vomiting; for this reason, well water users are advised to regularly test their water for bacteria. Some strains of coliform bacteria can survive for long periods in soil and water and can be carried into well casings by insects.

Coliform bacteria, while itself relatively harmless, often indicates recent sewage or animal waste contamination. If your water is contaminated with sewage and animal waste, there is also a good chance that it contains E. coli bacteria, one of the most dangerous waterborne bacteria.

Lead and Copper

Testing for lead and copper should be done on “first draw” water that has been stagnant in the distribution pipes for at least six hours. If lead and copper levels are high due to plumbing, they can usually be reduced to acceptable levels by flushing the faucet for a minute or two before collecting water for drinking.

Nitrates

Nitrate forms when nitrogen from fertilizers, animal wastes, septic systems, municipal sewage sludge, decaying plants and other sources combines with oxygenated water. In infants under six months of age, nitrate exposure can cause a serious condition called methemoglobinemia or “blue baby syndrome.”

Infants with this condition need immediate medical care because it can lead to coma and death. Test for nitrate if a pregnant woman or infant will be drinking the water.

If you live in an area within ¼ mile of a corn, soybean or vegetable field, you should test your water for nitrate regularly. Well owners should test for nitrate regularly if their well is located near an area where fertilizers are manufactured or handled; or an animal feed lot or manure storage area.



Pesticides and Herbicides

Pesticides are chemicals used to control weeds and insects. Some of these have entered groundwater as a result of their use on farm fields. Others have been found in groundwater following spills and improper disposal. Long-term use of drinking water that contains pesticide residues may increase your risk of developing cancer or other serious health problems. If your well is located within a short proximity to a corn, soybean or vegetable field, or is within less than a mile where pesticides are manufactured or used, you should test your well water for pesticides. Well owners who are uncertain about the use of pesticides in their area may also want to consider having their water tested at least once.

pH

The pH scale goes from 0 – 14 and measures the alkalinity of liquids: a liquid with a pH level of 7 is completely neutral (i.e. water), while a pH level of >7 indicates alkaline water, and a pH level of <7 indicates acidic water. Overly acidic water can cause staining, pinhole leaks, and corroded piping, due to its lack of buffering calcium minerals; overly alkaline water, on the other hand, can cause scale buildup and clogged fixtures.

The goal, then, is to achieve a pH level of 7 in your water. Testing can be easily done at home with pH test strips or an electronic pH meter. Once you've tested your water and determined its pH level, you can adjust it with a calcite neutralizer or a soda ash feeder.

Tannins

Tannins are formed from humic acid, a component of organic matter like soil and plants. In water supplies, tannins can cause brown discoloration and bitter tastes. Removing tannins from water is more an aesthetic choice than a health precaution, though many of our customers choose to filter tannins from their water if not only to rid themselves of unsightly, brown water.

Tannins can also be accompanied by iron and manganese, though, and as such one should test for all three contaminants when testing his or her well water. A tannin filter will often remove tannins from water, though chlorination/ozonation followed by an iron filter can do the trick when iron is also present.

There are many water tests for well water available for homeowners.

Hardness is defined as the concentration of calcium carbonate – calcium and magnesium ions – in a water supply. Water under 8-10 hardness grains per gallon can generally go untreated, while water hardness above this level usually warrants the use of a water softener or saltless water conditioner.

Otherwise, hard water can cause scale buildup, spotting of fixtures, and excessive use of soap and laundry detergent (hard water is less effective at dissolving soaps due to its chemical composition). Like alkalinity, water hardness can be determined easily at home with specially-made test strips.

Iron/Manganese

Iron and Manganese often travel together and are responsible for staining of fixtures, foul tastes, and oily, discolored water. Water containing iron and manganese often appears clear when drawn, but becomes discolored as the iron and manganese particles are oxidized to form insoluble particles.

The presence of iron can also encourage the growth of iron bacteria. There are a number of easy-to-use home test kits for both iron and manganese available. Iron and manganese can be removed with an iron filter, but it is important to conduct tests for other contaminants (such as those listed here) as filtration can be affected by other aspects of your water's composition, like pH and hardness.

Reasons For Well Water Testing

The chart below will help you identify well water quality problems. The last five problems listed are not the most immediate health concern. They can make your water taste bad, may indicate problems, and could affect your well long term.

Conditions You Notice:	Test for:
Recurring gastro-intestinal illness	Coliform bacteria
Household plumbing contains lead	pH, lead, copper
Radon in indoor air or region is radon rich	Radon
Corrosion of pipes, plumbing	Corrosion, pH, lead
Nearby areas of intensive agriculture	Nitrate, pesticides, coliform bacteria
Coal or other mining operations nearby	Metals, pH, corrosion
Gas drilling operations nearby	Chloride, sodium, barium, strontium
Dump, junkyard, landfill, factory, gas station or dry-cleaning operation nearby	Volatile organic compounds, total dissolved solids, pH, sulfate, chloride, metals
Odor of gasoline or fuel oil, and near gas station or buried fuel tanks	Volatile organic compounds
Objectionable taste or smell	Hydrogen sulfide, corrosion, metals
Stained plumbing fixtures, laundry	Stained plumbing fixtures, laundry
Salty taste and seawater, or a heavily salted roadway nearby	Chloride, total dissolved solids, sodium
Scaly residues, soaps don't lather	Hardness
Rapid wear of water treatment equipment	pH, corrosion
Rust, red, black, or brown stains on laundry or fixtures	Iron, manganese
Water appears cloudy, frothy or colored	Color, detergents



Have questions? Call us at 888-600-5427 and speak with one of our WQA Certified Master Water Specialists. Visit us online www.CleanWaterStore.com. Email us at info@cleanwaterstore.com

Other Contaminants

All owners of private wells should have their water tested for VOCs (volatile organic compounds) at least once. Test wells that are located within ¼ mile of an active or abandoned gasoline station, farm fuel tank, dry cleaner, auto repair shop, bulk storage tank, or industrial site.

They usually use solvents. These wells have about 25% chance of being contaminated with VOCs. Testing is very important because solvents, gasoline, and fuel oil are common in our environment. Paint thinners, dry cleaning

Paint thinners, dry cleaning chemicals, and industrial solvents can enter groundwater from spills and leaks. Leakage happens due to improper disposal, leaking storage tanks, and landfills.

Arsenic is another contaminant that is important to test for at least once every few years. If you live in an area where arsenic is commonly found in ground water, it is critical to know the level of the arsenic, so you can make plans or choose not to drink the water if the levels exceed 10 parts per billion (PPB).

Now that you know more about water tests for well water, you're ready to begin testing. You can browse our online store for a wide selection of test kits, from small individual tests to large, all-inclusive kits that will allow you to test for all of the contaminants mentioned here, plus dozens more.

If your tests come back and you find that your water is completely clean, congratulations! If not, have a look at our Resource pages for more information about water treatment methods and our world-class water treatment systems.

Finally, don't forget that you can write to us any time with any questions or concerns you may have: simply send an e-mail to support@cleanwaterstore.com, leave a comment on our Facebook page, or use our online contact form. Thanks for reading – we look forward to hearing from you!

It is a good idea to have your well water tested at least once every few years for bacteria and a wide range of organic and inorganic contaminants. These include metals, salts, and chemicals such as pesticides.

This type of comprehensive testing can easily cost over \$900, but now you can get 100 contaminants tested for less than \$200.

See the **Resources and Water Problems** tabs for more information what could be causing your water quality issues. We offer a variety of laboratory water quality tests at low costs.

National Testing Labs WaterCheck Test Lowers the Cost for Well Water Testing

When trying to choose the right test kit, it's important to start with a general mineral analysis and bacteria, which includes nitrate plus coliform bacteria as well as general minerals and metals such as iron and manganese.

Should I Use a Certified Lab, or Do It Myself?

You should definitely use a state certified laboratory if you need a test report for bank financing or when you first purchase your home.

If you live near an industrial area or suspect contamination by agricultural run-off, or other health-related problems, it is important to use a certified laboratory.

Once a year or at least every two years it is best to get a comprehensive test done by a licensed laboratory such as National Testing Lab's WaterCheck test.

KIT OPTIONS COMPARISON	Easy Well Water Test Kit	Easy Well Water Test Kit PRO	Easy Well Water Test Kit Pro Plus Bacteria	Easy Well Water Test Kit Pro Plus Bacteria, Lead, Pesticide
				
Tests Included				
Alkalinity	1	2	2	2
Chlorine	1	2	2	2
Copper	1	2	2	2
Hardness	1	2	2	2
Iron	1	2	2	2
Manganese	1	2	2	2
Nitrate	1	2	2	2
Nitrite	1	2	2	2
pH	1	30	30	30
Sulfate	1	2	2	2
Additional Tests:				
Total Dissolved Solids		Unlimited	Unlimited	Unlimited
Coliform Bacteria			1	1
Lead				1
Pesticide				1

- Free Tech Support if you have any questions

EASY WELL WATER TEST KIT PRO + BACTERIA

Fast, Accurate Well Water Testing.

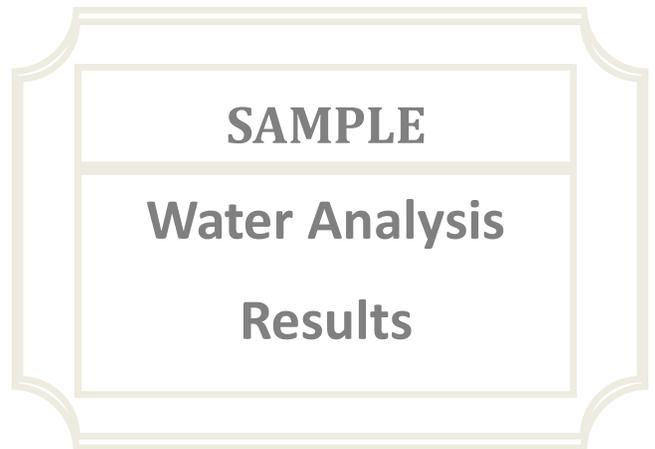


Includes Test for Total Coliform Bacteria,
Lifetime TDS Tester: Test for Temperature,
Total Dissolved Solids.
Total Coliform Test Kit (one test)

Two Tests Each for:

Alkalinity | Chlorine | Copper
Hydrogen Sulfide | Hardness
Iron | Manganese | Nitrate
Nitrite | pH (30 tests) | Sulfate

EASY WELL WATER TEST KIT PRO



National Testing Laboratories, LTD - WATERCHECK SAMPLE REPORT

DATE COLLECTED	DATE RECEIVED	DATE COMPLETED	SAMPLE CODE
 WATERCHECK / NATIONAL TESTING LABORATORIES LTD. 1688 Watson Mill Road Cleveland, OH 44133 (440) 418-2526			
DRINKING WATER ANALYSIS RESULTS			
Customer Address: Clean Water Systems & Stores Inc. 2805 C Soquel Ave. Santa Cruz, CA 95062 www.cleanwaterstore.com 831-462-8600			

NOTE: *** The MCL (Maximum Contaminant Level) or an established guideline has been exceeded for this contaminant.
 **** Bacteria results may be invalid due to lack of collection information or because the sample has exceeded the 30-hour holding time.
 "ND" This contaminant was not detected at or above our stated detection level.
 "NBS" No bacteria submitted.
 "P" = Presence "A" = Absence
 "EP" = E.coli Presence "EA" = E.coli Absence

Analysis Performed	MCL (mg/l)	Detection Level	Level Detected
Total coliform	P	P	ND
Inorganic chemicals - metals:			
Aluminum	0.2	0.1	ND
Arsenic	0.05	0.010	ND
Barium	2	0.30	ND
Cadmium	0.005	0.002	ND
Chromium	0.1	0.010	ND
Copper	1.3	0.004	ND
Iron	0.3	0.020	ND
Lead	0.015	0.002	ND
Manganese	0.05	0.004	ND
Mercury	0.002	0.001	ND
Nickel	0.1	0.02	ND
Selenium	0.05	0.020	ND
Silver	0.1	0.002	ND
Sodium	—	1.0	ND
Zinc	5	0.004	ND
Inorganic chemicals and physical factors:			
Alkalinity (Total as CaCO ₃)	—	20.0	ND
Chloride	250	5.0	ND
Fluoride	4	0.5	ND
Nitrate as N	10	0.5	ND
Nitrite as N	1	0.5	ND
Sulfate	250	5.0	ND
Hardness (suggested limit = 100)	—	10	ND
pH (Standard Units)	6.5-8.5	—	ND
Total Dissolved Solids	500	20.0	ND
Turbidity (Turbidity Units)	1.0	0.1	ND
Organic chemicals - trihalomethanes:			
Bromoform	0.080	0.004	ND
Bromodichloromethane	0.080	0.002	ND
Chloroform	0.080	0.002	ND
Dibromochloromethane	0.080	0.004	ND
Total THM's (sum of four above)	0.080	0.002	ND