



5 Ws of Water Testing

Quality Matters

Scientists have long understood the link between unseen contaminants in water and illnesses. And so back in the 1900s, filtration and disinfection became mainstays for municipal water treatment, and regulations for the quality of public drinking water systems were established.

Why Test Your Water

If your water is supplied by a municipality, large or small, your water supply is tested routinely, at the source. However, many of the pipes buried underneath our cities have been in place since the introduction of wide-spread water treatment. This aged and, in many cases, crumbling infrastructure now poses its own risk, which is why it's smart to test the water where you use it – at your tap.

But what if you are on a private water supply? That could be a well, lake water, or even a rainwater tank. In these cases, no one is testing your water unless you are. It's possible that your water was tested when you moved in or drilled a new well, but bacterial water quality changes over time and can be impacted by extreme weather events, land-use changes, or a nearby failing septic system. Many water contaminants cannot be seen or even tasted in water, so the only way to be sure your water supply is safe is to test. Even if the presence of a particular contaminant is readily apparent, such as the red-coloured stains on fixtures left by iron in the water, getting it tested will quantify the problem, making the best water treatment choice easier.

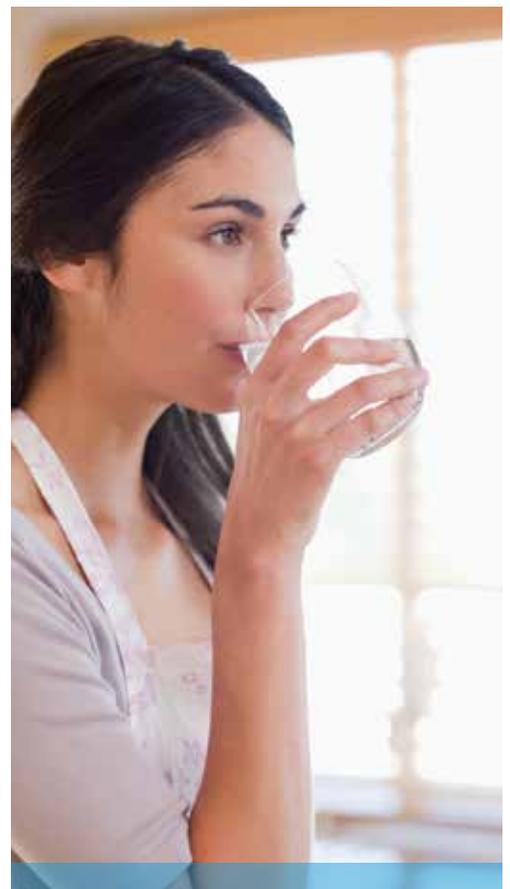
When to test your water

Well, the simple answer is, all the time. You never know when your water quality might change. But here are some key events you may want to keep in mind as a red flag to test your water:

- Change to your water's colour, taste, or odour
- If someone in your family has or develops a weak immune system from an illness or medical treatment (i.e.: the elderly or very young, cancer/chemo, on dialysis, etc.)
- A growing family
- Unexplained gastro-intestinal illness in anyone drinking your tap water
- Moving into a new home

For private well owners, basic testing for bacteria and nitrates is recommended at least once a year. Other contaminants you may only need

Private water system users are solely responsible for the quality of their water!



to test for once, such as hardness or iron, or infrequently, like radon. But this will depend on the prevalence of naturally occurring substances in the groundwater in your area.

Where to test

Where	Why	When
Wellhead	Checking your source water	At least once/year
Before Water Treatment	New well/work done on well	After well cap is closed and well is sanitized
	Suspect need for water treatment	Detected change to colour/taste/odour
	Buying a home on private well	Before closing the deal
At the tap	Determine need for water treatment	Detected change to colour/taste/odour
	Check efficacy of installed equipment	Anytime

Understanding water test results

Different labs may present the information a little differently, but one of the key results to look for is total coliform count.

Coliform bacteria are a group of bacteria that can come from many sources. You'll find them living in soil and decaying vegetation, as well as in the digestive systems of humans and animals. So while most coliform bacteria are harmless, some are not.

If your test results show that there are coliform bacteria in your water, your well may be contaminated with surface water, manure or sewage.

How serious is this? It depends on how high the number is. Table 1 gives the Environmental Protection Agency's Safe Drinking Water Standards. If your results are borderline, the lab may suggest retesting.

Table 1: Interpreting test results (based on U.S. Environmental Protection Agency safe drinking water standards)

Total coliforms	Interpretation
0 or ND (not detected)	Your water is safe for drinking.
1–5*	Your water is safe for drinking if it tests negative for fecal coliform or E. coli.
6 or higher*	Your water is not safe for drinking unless you boil it.
O/G	Your water is not safe to drink unless you boil it. Sometimes, your test results will say "O/G" or "overgrown" instead of listing the number of total coliforms. This means there are so many other types of bacteria in your water sample, the lab technicians couldn't see whether there were any coliform bacteria.

*If you see "est." or "estimate" next to your test results, it means there were coliform bacteria in your water. However, because there were so many other bacteria as well, the lab technicians couldn't accurately count the number of coliform bacteria. Your water is not safe to drink unless you boil it.

It's important to remember that shocking your well doesn't offer a long-term solution for ongoing contamination issues. It's a quick fix that needs to be paired with long-term disinfection.



Fecal coliforms or *E. coli*

As well as a total coliform count, your test results may include a fecal coliform count, or *E. coli* count. Fecal coliforms are types of coliform bacteria that live in the digestive systems of humans and animals. If your test results show any fecal coliforms, your water is contaminated with human sewage or animal manure. It is not safe to drink unless you boil it.

E. coli is an even more specific type of fecal coliform. If your test results show any *E. coli* in your water, it is not safe to drink unless you boil it.

My water isn't safe to drink — now what?

Boil your drinking water

While you're addressing the source of the problem, boil your well water before you drink it or cook with it. To make sure it's safe, bring it to a rolling boil for a full minute.

Shock your well

To remove bacteria from your well, one option is to "shock" it with a high dose of chlorine. The amount of chlorine you need depends on the depth of your well, the pH of the water and how much slime or biofilm is present. Keep in mind that chlorine is corrosive and should be handled with care. Leave the chlorine in the well for at least 12 hours and then purge the water. Highly chlorinated water is not safe to drink!

Better yet, call in a water treatment professional. An expert will know exactly how much chlorine is required and how to safely dispose of the chlorinated water once the shock treatment is complete.

Retest your water

After you've shocked your well, wait 24 hours and then retest the water. Next, wait a week or two and then test it again. Once you get two "bacteria-free" results, your water is safe to drink – for the time being.

If possible, address the source of contamination. Even once you've received an "all-clear," don't kick back and forget about drinking water safety.

If your well has been contaminated once, it may get contaminated again. By tracking down the source of the problem and fixing it, you'll reduce the risk of your well becoming contaminated in the future.

There are several common sources of contamination:

- Heavy rain or flooding
- Leaking septic systems
- Agricultural runoff that contains manure, either from livestock operations or manure that has been spread on fields as fertilizer

Remember that many wells may draw water from the same aquifer. This means if your neighbors don't maintain their wells properly, your water can become contaminated.

Check your well water regularly

Remember that the quality of your well water changes throughout the year. To protect the health of you and your family, the U.S. Environmental Protection Agency recommends testing your water at least once a year. Spring is a good time, when your well is most likely to become contaminated by spring melt, heavy rain or flooding.

You should also consider testing your water if:

- there is a change in land use nearby
- you notice a change in quality of water
- a member of your household experiences an unexplained gastrointestinal illness

Consider a water treatment system

Unfortunately, some problems can't be fixed. If you can't control the source of contamination, or if you want additional peace of mind, consider installing a water treatment system that inactivates bacteria and other microorganisms.

There are a number of options. Point-of-use (POU) systems treat the water at a specific tap. So if you install a point of use system at your kitchen sink, for example, the water from your kitchen tap is treated. However, it means the water coming out of your bathroom tap is not. Point of entry (POE) systems typically cost somewhat more than POU systems; however, they treat all the water coming into the house, so you can turn on any tap knowing the water that comes out is safe.

There are also different treatment technologies. As Table 2 shows, not all water treatment systems inactivate microorganisms — a process called disinfection. Softeners and carbon filters do not disinfect your water. And generally, reverse osmosis systems do not, either. UV, chlorination, and ozonation all disinfect your water effectively.

Each technology has different benefits and drawbacks, so talk to a water treatment professional to decide which type of system best meets your needs.



Water treatment systems

Treatment method	POU/ POE	Benefits	Drawbacks	Maintenance	Disinfects
Ultraviolet Light (UV)	POE/ POU	<ul style="list-style-type: none"> -Requires no chemicals - no disinfection by-products -Easy installation -Effective against Cryptosporidium -Does not alter the taste or odour of your water* 	<ul style="list-style-type: none"> -Usually requires pre-treatment (e.g. softeners in hard-water areas) -Some viruses require high UV dose 	<ul style="list-style-type: none"> -Yearly lamp replacements -Occasional quartz sleeve cleaning or replacement 	Yes
Chlorine	POE	<ul style="list-style-type: none"> -Reduces some disagreeable taste/ odour -Provides residual disinfection -Can help remove iron/ manganese from water 	<ul style="list-style-type: none"> -Requires storage/use of noxious chemicals -Requires ongoing monitoring of chlorine levels -Cryptosporidium and Giardia are highly resistant -Often requires contact tank -Requires professional installation -Can alter taste/odour of water -Corrosive -Can produce harmful by-products 	<ul style="list-style-type: none"> -Checking for loose, worn, missing, or broken parts -Cleaning the entire system semi-annually -Cleaning all surfaces showing corrosion -Refilling chlorine supplies -Cleaning any clogged injectors 	Yes
Filters	POU/POE	<ul style="list-style-type: none"> -Can remove some disagreeable tastes/ odours 	Not a stand-alone solution	Periodic changes	No – Filters can remove some large microbes, but do not thoroughly disinfect
Ozone	NOT PRACTICAL FOR HOME USE				
Reverse Osmosis (RO)	POU	<ul style="list-style-type: none"> -Filters many contaminants from water -No chemicals required 	<ul style="list-style-type: none"> -Can produce 2–4 gallons of waste water for every gallon of treated water -Can demineralize water -Reduces pH -Can require pre-treatment -Often requires professional installation 	<ul style="list-style-type: none"> -Filter replacement -Membrane replacement 	Maybe – Most RO units are not specified to remove microbiological contaminants. Check the manufacturer's specifications
Softeners	POE	Used as pre-treatment for hard water or other water treatment conditions	Requires professional installation	Salt replacement as required	No – Softeners are used as pre-treatment solutions for other disinfection methods

* In rare circumstances, low levels of sulphur in source water may become detectable due to the UV system.

About VIQUA

VIQUA is proud to be the world's largest supplier of residential UV water disinfection systems, providing safe water without the use of chemicals. Whether you choose a point-of-entry or a point-of-use system, your VIQUA UV system will disinfect your drinking water, keeping you and your family safe from microbiological contaminants. Our promise to you is clear: simply safe water. For more information, visit www.viqua.com.



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