

Land & Water

Conserving Natural Resources in Illinois

University of Illinois Extension • College of Agricultural, Consumer and Environmental Sciences

Testing Home Drinking Water

Do You Need to Test?

The signs of drinking water contamination are not always obvious. Contaminated water does not always look, taste, or smell differently than safe drinking water. What's more, if you have a private water supply, such as a well or surface water impoundment, you are your own regulatory agency.

You are responsible for the quality of water that your family drinks.

These are all good reasons why testing the water regularly is an important consideration for people who have their own water supply.

People who get their water from a public, or municipal, supply have more protection because these supplies are governed by federal and state standards and are tested on a routine schedule based on the population size. However, that does not mean people on public water supplies never have reason to test. It is possible that corrosive water or deteriorating pipes in your home may cause certain contaminants to get into your water supply.

So how do you know whether you need to test your water? The following guidelines describe conditions in which you should consider testing your water.

Reasons to Test: Private or Public Supply

If you have either a private or public water supply, the following may be reasons to test your water:

- Water has an objectionable taste or smell.
- Your household plumbing contains lead

- pipes, brass fittings, or lead-solder joints.
- The water leaves scaly residues and soap scum, or it decreases the cleaning action of soaps and detergents.
- The pipes or fixtures show signs of corrosion—a wearing away of surface metals.
- You are considering the purchase of water-treatment equipment, such as a water softener, iron-removal system, or water filters.
- You want to check the performance of water-treatment equipment already in use.
- You have recurrent incidents of gastrointestinal illness (diarrhea, stomach cramps, nausea) that cannot be explained.

Reasons to Test: Private Supply Only

The following are additional reasons to test your water—if you have a private water supply.

- You are buying a home and wish to evaluate the safety and quality of the water supply.
- Water stains plumbing fixtures and laundry.
- The water appears cloudy, frothy, or colored.
- Water-supply equipment (pump, chlorinators, water heater) wears rapidly.
- You have naturally occurring soft water. Naturally soft water sometimes contains excessive levels of fluoride, which can cause mottling or pitting of teeth.
- You are pregnant, anticipate a pregnancy, or have an infant less than six months old.
- You have a new well and want to evaluate it.
- Your well does not meet construction codes.
- Your well is within 50 feet of a septic tank or 75 feet of a septic system's absorption field.

- Your well is within 200 feet of a livestock confinement area.
- Your well has a submersible brass pump in it—either new or old. Brass pumps have been known to leach lead.
- You have mixed or loaded pesticides near the well.
- You have had backsiphoning problems—incidents in which pesticide backs up from a sprayer through a hose and into a well.
- Your well is located near a known operational or abandoned gas station or fuel storage tank (buried or above ground). Testing is particularly crucial if the tank has been known to leak.
- Your well is close to any of the following: retail chemical facility, gravel pit, coal mine or other mining operation, oil or gas drilling operation, dump, landfill, junkyard, factory, dry-cleaning operation, road-salt storage site, or heavily salted roadway.
- You have a sand-point well, or a large-diameter dug or bored well. (These wells are more vulnerable to contamination than other wells.)
- Your well is shallow (less than 50 feet deep) and one of these conditions exist: (a) the soil is sandy, or (b) bedrock or sand and gravel is less than 10 feet from the surface.

If any of these conditions exist, consult your local department of public health, the Illinois State Water Survey, or a private testing lab to determine which tests should be performed on your water.

To locate your regional or local health department office, visit the Illinois Department of Public Health website at:

<http://www.idph.state.il.us/local/map.htm>

For contact numbers at the State Water Survey, visit their website at:

<http://www.sws.uiuc.edu/contact.asp>

How Often Should You Test?

People with private water supplies may want to test for certain contaminants annually and other contaminants less frequently.

Annual Tests. Test for coliform bacteria and nitrate once a year. It is a good idea to test for these contaminants during the spring or summer following a period of heavy rainfall.

Testing When Repairing or Installing a Well. Test for coliform bacteria whenever you repair or replace an old well or pipes, and after installing a new well or pump.

Testing Before an Infant is Born. If you are planning to have a baby, it is a good idea to test your well water for nitrate, coliform bacteria, and lead before the pregnancy. If you are already pregnant, or if you have an infant less than six months old, have the water tested as soon as possible.

If water is high in nitrate, do not use it to prepare infant formula or in any other way that could result in consumption by the baby. High nitrate levels can cause methemoglobinemia, or “blue-baby syndrome,” which can be fatal to infants under six months old. Some believe high nitrate levels can also harm an unborn baby.

Where Can You Have Water Tested?

Your local health department may do simple baseline testing for bacteria or nitrate. For more extensive testing and results, especially for pesticides and other substances, consult your state public health department, state water regulatory agency, or a laboratory certified by your state or by the U.S. Environmental Protection Agency.

To obtain a list of water-testing labs certified by the Illinois Environmental Protection Agency (IEPA), check the IEPA website at:

<http://www.epa.state.il.us/labs/combinedlist.html>

You can also locate a public or private laboratory in your area by checking the Yellow Pages of your phone book.

If you receive water from a public water system, be aware that most systems regularly test for primary contaminants, monitor levels of sodium and certain unregulated chemical contaminants, and look for corrosion in the water distribution system. Many public water suppliers will provide water-quality reports upon request.

How Are Measurements Expressed?

Water test results express the concentration of different chemicals in different ways, depending on whether they are minerals, pesticides, or other compounds.

Minerals. Water tests express the concentration of most minerals in either “parts per million” (ppm) or “milligrams per liter” (mg/L).

Don't let this confuse you; 1 part per million is the equivalent of 1 milligram per liter.

Pesticides. Pesticides are rarely found in water in concentrations as high as parts per million or milligrams per liter. Therefore, they are usually reported in "parts per billion" (ppb) or "micrograms per liter" ($\mu\text{g/L}$). A microgram is equal to 1/1000 of a milligram, and a part per billion is 1/1000 of a part per million.

Other Compounds. For compounds other than minerals or pesticides, the results of a water analysis may be expressed in different forms of measurement. For instance, water hardness may be expressed in grains per gallon, while the corrosion index simply estimates whether water is corrosive or not corrosive.

Coliform Bacteria and Nitrate

The basic test by the Illinois Department of Public Health analyzes water for the presence of coliform bacteria and nitrate concentration.

Coliform bacteria is an "indicator" organism; its presence may indicate the presence of other pathogenic (disease-causing) bacteria. Using an indicator organism is necessary because detecting all possible pathogens would be complex and costly.

If the test results for bacteria and nitrate are within allowable limits, then your water is most likely safe for drinking. But you should consult with your local health department to determine whether other tests are necessary.

How to Collect a Water Sample

General Guidelines

In many cases, you may need to collect the water sample yourself, particularly if you are sending a water sample to a private lab.

Fortunately, the job is simple and straightforward. Below are a few general guidelines on collecting a water sample, as well as additional guidelines when testing for bacteria.

The procedure can vary, depending on the contaminant being tested or the lab being used, so follow the lab's directions. Labs should tell you what kind of container to use in collecting a sample, and most will provide you with an appropriate container.

Tips for Collecting a Water Sample

- Let water flow for five minutes before sampling.
- After filling the sample bottle, mark the date and time of collection with an indelible marker on the outside of the bottle and on any lab paperwork. Then, find out from the post office whether sending the sample via priority mail will get it to the lab within 30 hours.
- If you live near the testing facility, consider hand-delivering the sample.

Additional Tips for Collecting A Water Sample to Test for Bacteria

- For the most accurate results, samples should arrive at the laboratory within 30 hours. So collect water samples as near as possible to post office "mail-out times"—perhaps early in the work week (Monday, Tuesday, or Wednesday). If a sample is more than 30 hours old, the laboratory will discard it.
- Take the sample from a nonthreaded fixture, such as a bathtub spout.
- Do not take the sample from a fire or yard hydrant. Also, avoid faucets leaking at the handle, faucets where food or beverages are dispensed or prepared, and swing-type faucets.
- If a faucet has attachments, such as a hose or aerator, either avoid the faucet or remove the attachments before collecting the sample.
- Wash your hands thoroughly with hot water and soap before collecting the sample.
- Do not touch the inside of the lid or lay the cap down while collecting the sample.
- Leave $\frac{3}{4}$ inch to 1 inch of air space at the top of the bottle.

Inorganic and Organic Compounds

Although nitrate and bacteria are the most common constituents that labs test for in water, analyzing the water for other constituents may be warranted in some instances.

Water can be analyzed for inorganic compounds, which are naturally occurring elements such as iron, manganese, sulfur, sodium, and chloride. It can also be analyzed for organic compounds, which include solvents, degreasers, pesticides, and fuel components.

The expense to test water for some of these compounds can be considerable, so ask about the cost before you send a sample to a lab. Also, water-testing labs have different procedures for collecting and handling the samples for different analyses, so follow the laboratory instructions exactly.

Not following the correct sampling procedures can make the lab results inaccurate.

Water Hardness

Water hardness is caused by dissolved minerals such as calcium and magnesium. Although there is little health risk associated with hard water, it can cause soap and scale deposits in plumbing fixtures and appliances. Hard water can also decrease the cleaning performance of soaps and detergents.

Water hardness is a common water-quality problem, and it is often necessary to test for water hardness if you intend to evaluate and treat other problems. Hard water can alter the water-treatment process.

Other Problems

Labs can also test water for a wide range of other physical and chemical problems:

Color. A visible tint in the water can be caused by iron, manganese, organic chemicals, and organic matter.

Corrosiveness. Your water may be corrosive if the pipes are pitted, the water has a metallic taste, or the fixtures are stained.

Cloudy appearance. Industrial wastes, household detergents, and other foaming agents can give water a frothy, cloudy appearance, a soapy taste, and an unpleasant odor. In addition, methane—a colorless, odorless, flammable gas—can make water appear cloudy or bubbly. Methane can reach water from underground organic deposits.

Odor. A rotten-egg, septic, musty, or chemical smell can have a variety of causes, such as dissolved gases, minerals, and chemicals; leaking underground storage tanks; landfill or septic runoff; or bacteria, algae, and organic matter.

pH. pH refers to the acidity or alkalinity of water. Acidic and alkaline water can corrode pipes and affect taste.



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