



PRIVATE WELL WATER IN CONNECTICUT

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Publication #12: Lead in Private Well Water

Private well owners are responsible for the quality of their private well water. Homeowners with private wells are generally not required to test their water. However, the State of Connecticut Department of Public Health (CT DPH) recommends testing for lead at least once. Testing is also recommended every 3-5 years when someone in the home is planning a pregnancy, when there are children under the age of 6 years, or if your water is considered corrosive to ensure that your water is safe. Refer to [Publication #24: Private Well Testing](#) for more information regarding other testing you should consider and how often.



The State of CT has an Action Level for Lead in private wells of 15 ug/L (15ppb). Refer to the [Action Level List for Private Wells](#) for more information.



Introduction

Lead is naturally found in small amounts in the earth's outer layer as a bluish-gray metal. Lead is also found in many man-made materials such as paints, batteries, ammunition, pipes and plumbing fixtures, and solder. When lead is found in private well water it is rarely found to be coming directly from the groundwater and is more likely associated with corrosion of lead based components in your home's plumbing system.

Potential Health Effects

Consumption of lead in drinking water above the action level can cause a variety of adverse health effects such as damage to the brain, kidneys, nervous system, red blood cells and can affect blood pressure. The severity of its effects varies depending upon the concentration of lead in your body and the person's developmental stage at the time of exposure. Blood lead concentrations can be determined with a blood test.

Young children, infants and fetuses are particularly vulnerable to lead poisoning, especially when consuming baby formulas and juices made with lead contaminated water. Growing children absorb lead more readily and their developing bodies are most susceptible to lead's harmful impacts. Lead exposure may impair a child's mental and physical development.

Other potential sources of lead poisoning include lead paint chips, contaminated soil, and dust. Lead in drinking water is not usually a primary source of lead poisoning, but it can increase an individual's total lead exposure.



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Indications of Lead

Lead may not alter the taste, color, or smell of water; therefore lead concentrations at low levels may not be obvious. There are no apparent health symptoms or, when present, they may be mistaken for flu or other illnesses. Blood testing is the most reliable way to assess lead exposure in your body.

Corrosive water may dissolve lead more readily from piping and plumbing fixtures into your drinking water. Indicators of corrosive water may include bluish-green staining on copper plumbing fixtures, home plumbing corrosion, pin-hole leaks in plumbing, and a metallic or bitter taste to the water. Refer to the “Corrosivity” section below for more information.

Sources of Lead in Private Well Water Systems

The primary source of elevated lead levels in your water is from the contact between corrosive water and lead components in your plumbing system. Plumbing components that may contain lead include old lead pipes, lead-based solder, brass and bronze components in your well, well pump, faucets and valves.

Lead in Pipes

Through the early 1900’s it was common to use lead pipes for interior plumbing. Lead piping is most likely found in homes built before 1930. Copper piping replaced lead piping but, lead based solder may have been used to join copper piping in homes built before December 31, 1986.



Brass components and solder have been used universally in private well water plumbing systems. Faucets, plumbing fittings, check valves and well pumps contain brass components. Lead was used in the manufacturing of solders and plumbing components until it was banned in 1986. After 1986, ‘lead free’ in plumbing components meant that the component could not contain more than **8 percent (8%)** lead. Even at 8%, lead may leach into your water from plumbing components. On January 4, 2014 Federal Law was revised and mandated that the wetted surface of every pipe, fixture, and fitting sold for or installed in potable water applications not contain more than **0.25 percent (.25%)** lead by weight.



Solder is a fusible metal used to join metallic parts, such as copper piping. Check the labels on solder packages to ensure that you are using a lead-free product for all potable water plumbing.



Some older private wells may also contain leaded components used in the construction of the well. Examples of elements in the well itself may have included a leaded drive shoe, or, a “packer” element, which was used to seal the well above the well screen.

Corrosivity

Some groundwater is naturally more corrosive which can affect the amount of metals leached into your drinking water. Factors that may cause water to be corrosive include but are not limited to:

- Low pH (acidic water)
- Soft water (low in calcium and magnesium)
- High levels chloride (> 250 mg/L) in water
- Dissolved oxygen content
- Long standing time in pipes
- High water temperature
- Stray electrical current (from electrical grounds)
- Galvanic corrosion caused by dissimilar metals



Water testing can help determine the corrosivity of your water.

Testing for Lead in Private Well Water

To determine if lead is present in your drinking water, arrange to test your private well water at a [state certified laboratory](#). Follow the laboratory's instructions carefully to avoid contamination and to obtain good samples. To evaluate the household's highest level of lead exposure, collect a sample when water has remained stagnant in the plumbing system for at least six hours. Do not remove the aerator and immediately collect water from the **cold-water** faucet **without** running it before collecting the sample. This is a '**first-draw**' sample. First-draw samples generally contain the highest lead levels because of extended contact time with the plumbing system.



Run the water for a minimum of 3 minutes to remove stagnant water from the pipes, and collect a second sample. This is a '**flushed**' sample. The flushed sample provides a water sample that has not been in contact with the plumbing system for an extended period of time, therefore, the lead concentration in the flushed sample is often lower than the first-draw sample.

You should also consider testing your water quality for pH, alkalinity, hardness, TDS and other ions such as sulfate and chloride which can affect water corrosivity. These results may be helpful in determining future treatment options.

Home test kits for lead in your water may not provide accurate results. It is always recommended that you use a state certified laboratory to test your drinking water for accurate results.

Interpreting Test Results

Lead result is equal to or exceeds 0.015 milligrams/liter (mg/l) or 15 micrograms per liter (ug/l)

This result requires that immediate action be taken. Bottled water can be used for drinking and cooking until the source of lead is identified and corrected.

When interpreting your water test results for lead, compare the first-draw and flushed sample results. See 'Corrective Action' section below for more information.

Lead result is less than 0.015 mg/l but was detected in your drinking water

This result is below the Action Level for private wells. Collecting a confirmation sample and retesting at least every 3-5 years is recommended.

When interpreting your water test results for lead, compare the first-draw and flushed sample results. Consider implementing 'Corrective Action' flushing measures from the section below.

Lead result is not detected in your drinking water

Consider retesting your water every 3-5 years, especially if your water is corrosive and there is a source of lead in your plumbing or if you are planning a pregnancy or have children under the age of six in your home.

Corrective Action

- When the first-draw sample result is higher than the flushed sample result and, the flushed result is equal to or less than the action level of 0.015 mg/L you may consider flushing pipes before drinking and cooking with the water. Allow the **cold-water** tap to flush for at least one minute before using it for cooking or drinking. **Never** use the **hot-water** tap for cooking or drinking because hot water dissolves lead and other metals easier than cold water.
- Remove the source of lead: replace lead-based pipes, solder, fixtures, well pump or other plumbing components containing lead.

- If applicable, install a water treatment system to address the corrosive properties of the water such as low pH, soft water, low total dissolved solids, etc.
- If applicable, eliminate any stray electrical current found in the plumbing system.
- Install a Point of Use (POU) treatment system to remove lead from the water you use for drinking and cooking. Refer to the ‘Treatment Options and Bottled Water’ section.
- Use an alternative water source, such as commercially packaged bottled water.



Things to consider before taking corrective action:

- Identify piping elements and fixtures in the plumbing system that are causing the problem.
- Identify how feasible it is to replace the plumbing components causing the problem.
- Compare first-draw to flushed sample results, to determine if routine flushing is an option.

Treating for Corrosivity

If corrosive water quality characteristics have been identified, address any underlying causes for lead to leach from your plumbing. Refer to the following publications for more information:

[Publication #18: pH-Acidity of Private Well Water](#)

[Publication #37: Electrical Grounds – A Controversial Necessity](#)

[Publication #35: Corrosion of Copper Pipe and Fittings](#)

[Fact Sheet: Sodium & Chloride in Well Water](#)

Treatment Options and Bottled Water

When eliminating the source of lead in your home’s piping and flushing the pipes before use is not an effective management option, consider installing a water treatment system or using an alternative drinking water source such as bottled water.

Treatment options should be based on your specific situation, and only after exploring corrective actions listed above to eliminate the source of lead. There are several treatment methods suitable for removing lead from water including; reverse osmosis, distillation and activated carbon filters specifically designed to reduce lead levels in water. These treatment options are usually installed at a POU such as a faucet used to drink and cook with. Before purchasing any treatment device, verify with the treatment vendor or the manufacturer its effectiveness at reducing lead from water. For more information on these treatment options, refer to the following Publications:

[Publication #1: Activated Carbon Treatment of Private Well Water Systems](#)

[Publication #7: Distillation Treatment of Private Well Water Systems](#)

[Publication #21: Reverse Osmosis Treatment of Private Well Water Systems](#)

For more information regarding purchasing treatment for your home refer to [Publication #19: Questions to Ask When Purchasing Water Treatment Equipment for Your Home](#).

For More Information:

For questions regarding health based concerns of lead in your private well water contact: CT DPH, [Environmental & Occupational Health Assessment Program](#), (860) 509-7740

For all other questions (i.e., testing, corrective action, treatment, etc.) please contact: CT DPH, [Private Well Program](#), 860-509-7296.