

PRIVATE DRINKING WATER IN CONNECTICUT

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Publication No. 18: pH-Acidity of Private Drinking Water Wells



The U.S. Environmental Protection Agency (EPA) does not regulate private wells. Private well owners are responsible for the quality of their drinking water. Homeowners with private wells are generally not required to test their drinking water. However, they can use the public drinking water standards as guidelines to ensure drinking water quality. Refer to Publication #23 *Drinking Water Standards* for more information.

The Secondary Maximum Contaminant Level (SMCL) for pH for public water systems in Connecticut is 6.4 to 10.0. This is to accommodate public water systems that may have to raise their pH to address corrosivity issues in their extensive distribution systems. The maximum pH as established by the EPA is 8.5. This is not an enforceable standard, but guidance.

Introduction

pH is an indicator of the acid or alkaline condition of water. The pH scale ranges from 0-14; 7 indicates the theoretical neutral point and typically is the optimum target. Water with a pH value less than 7 indicates acidity and tends to be corrosive, while water with a value greater than 7 indicates alkalinity and tends to affect the taste of the water. Generally, groundwater in Connecticut is naturally acidic due to the surrounding soils and bedrock.

Acidity or low pH of drinking water is usually a result of natural geological conditions at the site. Testing for the pH of your well water is crucial for:

- Evaluating the potential for your household plumbing to be subject to aggressive corrosion by your well water.
- Evaluating the potential for your drinking water to contain leached metals such as copper, lead, iron, cadmium, and zinc from your well pump and plumbing system.
- Determining the effects of proper home treatment on other drinking water contaminants. Depending on the pH level (how acidic or alkaline), pre-treatment may be needed to adjust the pH of your water to a more neutral range. Otherwise, home treatment systems may not work as designed.



Home treatment methods to adjust pH include neutralizing filters (calcium carbonate) and neutralizing solutions (soda ash).

Potential Health Effects

The pH of drinking water is not a health concern, however, acidic water (low pH) can leach metals (e.g.; lead, copper, zinc, etc.) from plumbing systems, which can cause health problems.



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Indications of low pH

Indications of low pH are bluish-green stains on copper plumbing fixtures, reddish stains on galvanized iron plumbing, water system corrosion problems, and plumbing leaks.

Testing for pH in Private Drinking Water Wells

To determine the pH, arrange to test your drinking water at a state certified laboratory. Follow the laboratory's instructions carefully to avoid contamination and to obtain a good sample. Home test kits may not provide accurate results.

Determining pH is often essential in evaluating the presence and effective treatment of other drinking water contaminants.



- Determination of proper chemical or other home treatment methods that may be needed for other well water quality problems
- Adequate disinfections, the lower the pH, the better the chlorination results.

Corrective Actions

Neutralizing Filter



If your water is acidic (low pH), you can use a neutralizing filter containing calcite (marble chips) or ground limestone (calcium carbonate) or magnesia (magnesium oxide) to raise the pH. Neutralizing filters must be backwashed periodically, since they serve as mechanical filters to remove solid particles from the water. They also require periodic replenishment of the neutralizing material within the filter bed. When acidic water is treated with a neutralizing filter such as ground limestone (calcium carbonate), hardness is being added to the water. This happens as a result of adding calcium and

magnesium minerals, which the water absorbs when passing through the filter. This is also why the neutralizing filter will remove solid particles from the water and can help to prolong the life of the neutralizing filter.

Arrange to test your water for hardness after installation of a neutralizing filter. Levels up to 120 milligrams per liter of calcium and magnesium are acceptable. At levels between 120 - 180 milligrams per liter, the user may prefer to soften the water, or remove some of the calcium and magnesium. If either calcium or magnesium is present in your water in substantial amounts, the water is said to be "hard," because making lather or suds for washing is "hard" (difficult) to do. Cleaning with hard water is difficult. Water containing little calcium or magnesium is called "soft" water. Ion exchange treatment can be used to treat "hard" water.

As a rule softening is not encouraged. Water softeners are also commonly used in Connecticut to remove iron and manganese in low concentrations; however, this may not be the most efficient process or removal of these elements. Check to see that the treatment system is NSF approved. Refer to Publication #10 *Ion Exchange Treatment of Drinking Water* for more information. If treatment by a water softener is determined to be necessary, we suggest only the hot water system be treated and not on the entire water supply. Connecticut regulations prohibit discharges or regeneration waste to a septic system.



Neutralizing Solutions

For high yield water systems, an alternate method of neutralizing acidic water is to feed a solution of soda ash to the water supply with a chemical feed pump. Sodium carbonate can raise the pH level to 8 or higher.

Where water contains a lot of iron, or if you need to disinfect the water, a chemical feed pump is often used since hypochlorite bleach and soda ash may be mixed in single container if needed. Like sodium, the potassium substitute should be evaluated for any possible human health effects.

When choosing a treatment method, consider both the initial cost and the operating costs. Operating costs include the energy needed to operate the system, additional water that maybe needed for flushing the system, replaceable supplies and filters, repairs, and general maintenance.



Regardless of the quality of the equipment you purchased, it will not operate properly unless maintained in accordance with the manufacturer's recommendations. Keep a logbook to record equipment maintenance and repairs. Equipment maintenance may include periodic cleaning and replacement of some components. Also consider any special installation requirements that may add to the equipment cost. See Publication #19 *Questions to Ask When Purchasing Water Treatment Equipment* for more information.

Protection of Private Drinking Water Supplies

You can protect your private well by paying careful attention to what you do in and around your home as well as your neighbor's activities near your well. Regular testing and adopting practices to prevent contamination can help ensure that your well supplies you and your family with good quality drinking water. For more information on well protection see Publication #26 *Drinking Water Wells*.

For more information please click on the following links:

EPA Office of Groundwater and Drinking Water

<http://www.epa.gov/ogwdw/>

EPA New England

<http://www.epa.gov/region01/>

Adapted from *Healthy Drinking Waters for Rhode Islanders*, University of Rhode Island Cooperative Extension, April 2003.