



Water Treatment Options



This booklet series describes what private well owners can do to maintain clean, safe drinking water from their well to protect their health. This is booklet 4 in a series of 6.

Your Well Water series titles:

- 1 Is It Safe to Drink?
- 2 Fixing Bacterial Quality
- 3 Understanding Chemical Quality
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If you have identified a problem with your water, carefully consider what you should do to solve it. The following steps will help you make a sound decision.

1 Retest your water

All treatment options cost money and require ongoing maintenance. Before you buy a treatment system, take another sample for the parameters that exceeded the guidelines to confirm previous results.

2 Research your options

Find out if you can solve your problem by improving well construction. Find out what treatment systems are available to treat your water concerns. Check the yellow pages for well construction and water treatment companies in your area. Compare the cost of improving well construction with the cost of buying and maintaining a water treatment system. This document focuses on selecting an appropriate treatment system.

Many treatment options are available, but one system does not treat everything. Some treatment units treat only certain substances. Also, the quality of your water can affect the efficiency and ability for some treatment units to remove substances. For example, if you are using UV light to kill bacteria you may need to make the water clear. Bacteria can hide behind particles suspended in the water, making this treatment option less effective for cloudy (turbid) water.

Therefore, it is important to test your water for a variety of substances and characteristics. Then speak with a water treatment specialist before selecting a treatment option.

The table at the end of this fact sheet summarizes some common substances found in Nova Scotia water and possible treatment options. Treatment options are listed by the technology used to treat the water, not by brand name. New technologies are constantly being developed. Check with local businesses to see what may be available to improve your water quality.

Nova Scotia Environment does not recommend specific brands of drinking water devices. Rather, we strongly recommend that you look for a mark or label indicating that the drinking water treatment unit has been certified as meeting the appropriate NSF standard for the substance that you wish to remove.

3 Decide how much water to treat

This depends on many factors, including which water quality parameters exceed the guideline.

For example, the skin does not absorb arsenic during showering or bathing. Therefore, if arsenic is your main concern, a treatment device placed only at the taps used for drinking, cooking, and dental hygiene is sufficient. This is referred to as “point-of-use” treatment.

Iron and manganese can stain laundry and appliances. Therefore, if one of these is present, you may want to treat all your water. This is referred to as “point-of-entry” treatment.

Point-of-entry treatment is also the best option when certain volatile organic compounds exceed the guideline value. These compounds evaporate readily and can be inhaled or absorbed by the skin during bathing or showering.

Point-of-use Systems

Point-of-use means that the treatment unit is installed at the tap where the water is being used for drinking, cooking, and dental hygiene. Only water used from this tap is treated. Water from the remaining taps will not be treated and should not be used for potable purposes if there is a health concern with the water.

Point-of-entry Systems

Point-of-entry means that the treatment unit is installed where the water enters the home or building. All water used within the home or building will be treated, including water used for bathing, showering, and laundry. Point-of-entry systems tend to be larger and more expensive. Some treatment systems may only be available as point-of-use or point-of-entry, because of the way they work.

Carafe or pitcher style filters

Carafe and pitcher style filters are only to be used with municipally treated tap water or well water that is regularly tested to be microbiologically safe. The filters are not recommended for well water that is microbiologically unsafe or of unknown quality. They remove only what you can see, smell, and taste. They cannot kill bacteria and may, in fact, encourage bacteria to grow within the filter.

They may improve the taste of water by removing chlorine taste, musty odour, or the rotten-egg smell of sulphur compounds. They can also remove organic compounds that react with chlorine – known as trihalomethanes or THMs. If you use these filters, replace the filter cartridges as often as recommended by the manufacturer. Bacteria can grow in filters left past their replacement date.

Some carafe and pitcher style filters are certified to remove certain metals, such as lead. If you are using the device for such a purpose, look for a mark or label certifying that the device meets the appropriate NSF standard for the substance to be removed.

4 Choose a reputable company

Ask questions. Ask for references. Find out if the company has the necessary insurance and other credentials needed to conduct business. Contact your local Better Business Bureau to see if any complaints have been lodged against the company.

Be wary of sales agents who use pressure tactics such as “limited time offers” and other means to make a quick sale.

Deal only with companies that carry products that are certified to NSF standards. See below for more information about standards.

Deal only with companies that use accredited labs to test the water. The test report should include the parameters tested and the value measured. Be wary of companies that test your water without identifying where or how the testing was carried out.

Find out the system’s warranty and what kind of after-service the company will provide. The company should explain what maintenance the system needs. Find out what the company will do if the treatment system does not work as it should.

See *Your Well Water 5 – Maintaining Your Water Treatment* for information about maintaining your system.

Questions and Answers

I have purchased a water treatment system. How do I know if it is working properly?

You will need to re-test your water to know if it is working properly. Test both the treated and untreated water, and compare the results.

I have been contacted by a company interested in testing my water. What should I do?

Be aware that when a company offers to test your water for free, they are hoping to sell you a water treatment unit. Ask what parameters they will test for. Ask what procedures they will follow for sampling, testing, and analysis. Field test analyses are not as accurate as laboratory analyses and may not be able to test all parameters of concern. Before you buy a treatment unit from a company that tested your water, retest your water at an accredited laboratory to confirm the results.

If you are on a municipal water supply, you do not need your water tested. The municipality must test regularly and must follow strict rules for water safety. Contact your municipality for their latest water quality results.

Does Nova Scotia Environment licence or certify companies or individuals selling water treatment systems?

No. We do not licence or certify companies or people who sell water equipment. We do not recommend any specific drinking water treatment devices. However, we do recommend that you buy certified products. Look for a mark or label that shows the device or components meets the appropriate NSF standard.

What does it mean if a treatment unit is NSF certified?

NSF certification is an internationally recognized safety standard. NSF International is a not-for-profit, non-governmental organization that sets health and safety standards for manufacturers in 80 countries. See its website at <www.nsf.org>.

The following NSF standards help to ensure material safety and performance of products that come into contact with drinking water:

- NSF Standard 42: Drinking Water Treatment Units – Aesthetic Effects
- NSF Standard 44: Cation Exchange Water Softeners
- NSF Standard 53: Drinking Water Treatment Units – Health Effects
- NSF Standard 55: Ultraviolet (UV) Microbiological Water Treatment Systems
- NSF Standard 58: Reverse Osmosis Drinking Water Treatment Systems
- NSF Standard 61: Drinking Water System Components – Health Effects
- NSF Standard 62: Drinking Water Distillation Systems

Uranium: NSF does not certify any treatment technologies for uranium removal. However, treatment technologies exist that are capable of removing uranium. See our fact sheets on uranium at <www.gov.ns.ca/nse/water/waterquality.asp>.

Selection of Treatment Technologies for Various Water Quality Problems

- ✓ Appropriate treatment technology for the noted water quality problem.

Treatment Technology and Considerations	Arsenic	Lead	Fluoride	Nitrate ⁵	Hardness	VOCs ^{1,2}	Tannins	Hydrogen Sulphide	Iron/Manganese	Radon	Uranium	Low pH	Microbial ³
Activated Alumina <ul style="list-style-type: none"> Raw water characteristics such as pH, fluoride, and sulphates may reduce efficiency. 	✓		✓								✓		
Adsorption Media <ul style="list-style-type: none"> Specific media are designed to target certain parameters. 	✓							✓	✓				
Aeration <ul style="list-style-type: none"> For point-of-entry systems. May require additional disinfection and repressurization. Oxidizes many metallic contaminants, improving efficiency of other treatment units. 						✓		✓	✓	✓			
Anion Exchange <ul style="list-style-type: none"> Competing ions (particularly sulphates and barium) can greatly reduce efficiency. If used for arsenic removal, units must be properly maintained; otherwise accumulated arsenic may rapidly discharge into the treated water. 	✓		✓	✓			✓				✓		
Cation Exchange (Water Softener) <ul style="list-style-type: none"> Competing ions (particularly sulphates and barium) can greatly reduce efficiency. 		✓			✓				✓				

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Chlorination <ul style="list-style-type: none"> For point-of-entry systems. 								✓	✓				✓
Distillation <ul style="list-style-type: none"> For point-of-use systems. Produces water slowly in batches. May require storage. High total dissolved solids (TDS) or hardness can lead to scaling and decreased efficiency. Makes water corrosive. Some VOCs may recondense with the treated water and dissolved gases may need to be vented, therefore distillation is generally not recommended for treatment of these parameters. 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Granular Activated Carbon <ul style="list-style-type: none"> Treatment efficiencies may vary somewhat, depending upon water quality and design of the granular activated carbon treatment unit. Natural organic matter can reduce efficiency. Bacteria may grow in the units, therefore additional disinfection may be required. Often incorporated with other point-of-use treatment systems. 					✓		✓		✓				
Manganese Green Sand <ul style="list-style-type: none"> Effective for reduction of high iron and manganese concentrations. Requires periodic regeneration of media using potassium permanganate chemical solution. 							✓	✓					
Ozonation <ul style="list-style-type: none"> For point-of-entry systems. 						✓		✓					✓
pH Adjustment <ul style="list-style-type: none"> To reduce plumbing corrosion and elevated dissolved copper and lead. These systems may use passive dissolution of a replaceable media such as calcite or a more active chemical feed method. 											✓		

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Reverse Osmosis <ul style="list-style-type: none"> Some membranes are chlorine-sensitive. High hardness reduces efficiency. Storage typically required due to low production rate. Makes water corrosive – may require pH adjustment for point-of-entry systems. May require repressurization. 	✓	✓	✓	✓	✓				✓		✓		
Ultraviolet Light (UV)⁴ <ul style="list-style-type: none"> High levels of turbidity or colour limit effectiveness. Must be NSF 55 (Class A) certified. 													✓

1. Volatile organic contaminants (VOCs) include organic chemicals and solvents that vaporize at relatively low temperatures. Some typical ones include benzene, carbon tetrachloride, perchloroethylene (PCE), and trichloroethylene (TCE).
2. Point-of-use devices used for treatment at specific locations will not provide exposure protection at other untreated locations.
3. Microbial contaminants include bacteria, viruses, and protozoa.
4. Suspended solids present in water may be removed by standard particulate filtration.
5. Point-of-use devices are not recommended for nitrate treatment due to the potential for acute health effects for certain vulnerable segments of the population (e.g., hemoglobinemia or blue baby syndrome).

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This information has been prepared by Nova Scotia Environment.
For further information about protecting your well water, please contact us at

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