



Water Treatment for Well Owners

Understand which undesirable elements are present in your water and which ones you want to remove before you buy a system.

Proper care and regular maintenance of your well is important to protect your well and water supply. But if you rely on your well for drinking water, depending on your situation, you may also want to further treat the water prior to drinking. The proper water treatment devices can remove harmful bacteria, chemicals or impurities in your drinking water.

Before you purchase a water treatment system, ask yourself:

Is my water safe to drink? The best way to know is to test your well water. Over time, land use changes or structural degradation of an aging well can affect water quality. Drinking groundwater that is contaminated with bacteria, viruses, disease-causing organisms, or other substances can cause illness. Testing regularly ensures you know your water remains safe to drink. If you have reason to believe your drinking water is unsafe, test your well water and review your lab test results before assuming the water is safe to drink.

Do I need a water treatment system? If regular maintenance and shock chlorination of your well does not adequately provide you with good quality water, you may need to consider installing a water treatment system. However, it is important to identify which health-related or aesthetic parameters you need to remove before you invest in expensive treatment equipment. Be aware that no single piece of equipment is capable of resolving all water quality problems. Sometimes more than one device may be needed to effectively treat the water.

What substances do I want to remove? A Public Health Inspector can help you interpret the results of your water tests (both bacteriological and chemical analyses), identify substances of concern and discuss treatment options, if needed. For a list of Community Health Centres visit: <http://www.albertahealthservices.ca/services.asp?pid=service&rid=1052212>

Does my well supply enough water for the treatment process? Some devices, such as water softeners and iron filters, require large quantities of water for operation.

How much will the system cost? You need to consider the cost to purchase and install, as well as the cost of operation (power, replacement filters, chemical supplies), service and maintenance.

What level of skill is required to operate the system? Is it user-friendly? Some equipment will have alarms, warning lights or timers that assist in making the system easier to use.

What kind of monitoring is required to keep the system working effectively? Treatment system manufacturers often recommend routine monitoring for residual levels of treatment chemicals using test strips or home test kits.

Do I have enough physical space to accommodate the system? Sometimes multiple devices or components may be required and can take up large amounts of space. Other systems may be small enough to fit under the kitchen sink.

What water treatment options are available?

Point-of-Entry (POE) systems are used to treat water before it is distributed through the household. They include:

Ion exchange: Water softeners are the most common ion exchange system used to reduce water hardness by exchanging hard minerals (calcium and magnesium) for softer minerals (sodium or potassium). Softeners require routine backwashing to restore the exchange capability of the system. It is necessary to purchase and add water-softening salts on a regular basis. Care should be taken to avoid overloading your septic system with backwash water.

Iron removal systems: Using a manganese greensand filter, iron is oxidized by a coating

on the surface of manganese greensand bead media and precipitated. The greensand must be regenerated periodically with potassium permanganate to replenish the oxidant on the surface of the manganese greensand. An air injection system injects air into the water, causing precipitation of iron that can then be filtered out.

Filtration: Sediment filters remove fine materials and precipitated minerals from water, and are often used as pre-treatment to more expensive or sensitive treatment devices. They may also be used in combination with other systems like aeration. Filters will need to be backwashed or cartridges replaced.

Activated carbon filters: remove nuisance impurities associated with taste and odour such as residual chlorine and organic substances. The biggest concern with these filters is that the carbon can become fouled with organics, either naturally occurring or caused by contamination. This build-up may allow the rapid growth of bacteria, so regular maintenance (e.g. cartridge replacement, media regeneration and/or backwashing) is important.

Aeration systems: are used to dissipate gas or precipitate iron. They involve water being sprayed or aerated into a storage tank. If gas is present in the water, the system will require venting to the outside atmosphere.

**WORKING
WELL**

Clean water.
Well protected.



Continuous disinfection systems: use an oxidizing agent (e.g. chlorine, hydrogen peroxide or ozone) that is continuously mixed with the water and allowed sufficient contact time to kill bacteria and viruses. A positive displacement chemical feed pump and storage tank are integral parts of this system. Routine monitoring using test strips or home test kits to maintain chemical residual is required to ensure system effectiveness. Pellet chlorinators, placed directly over the wellhead, are not considered appropriate continuous disinfection systems as they can cause irreparable damage to the well and pumping equipment.

Point-of-Use (POU) Systems treat water that is used at a single tap, usually intended for drinking and cooking, while the rest of the water in the house remains untreated. These devices include:

Filtration: Small water filters are relatively inexpensive and are intended for use at a single water outlet (e.g. taps, refrigerator water dispensers, etc.) to remove contaminants like sediment or precipitated iron. They usually consist of a housing containing a disposable, cartridge type filter. The filters can be a combination of activated carbon or sediment filters. They only address aesthetic concerns and improve taste and odour of the water. Cartridges need to be replaced every 3-6 months as the carbon adsorption effectiveness declines and to avoid contamination from bacterial growth.

Reverse osmosis (RO): RO systems remove dissolved minerals like nitrates, sodium and arsenic by forcing pressurized water through an extremely fine, semi-permeable membrane. Purified water passes through the membrane and collects in a storage container and the unwanted minerals are left behind. These units are often small and can fit into tight spaces. Pre-treatment may be required to avoid fouling the membrane with iron, sediment or bacteria. Small household systems flush from three to twenty litres of water to waste for every litre of treated water.

Ultraviolet (UV) technologies: UV devices use light to kill disease-causing bacteria and viruses, and are particularly effective at killing protozoa (*Cryptosporidium parvum* and *Giardia lamblia*). They are relatively low maintenance systems but do require routine monitoring and cleaning so the light can effectively penetrate the organism cell walls. Many systems have automatic cleaning options, warnings or alarms to make maintenance easier.

Distillation: This system can remove over 95 per cent of minerals including sodium, sulfate, nitrate and arsenic, and most metals, organic chemicals and microorganisms from water. Distillers are generally only used for treating small amounts of water for drinking and cooking due to the cost of operation (high power usage), maintenance, scaling issues and the length of time it takes to produce distilled water.

Where can I buy water treatment systems?

Some POE devices are available through your local hardware stores. Check your local business or phone directory under “water treatment equipment, service and supplies.” Although some systems may be available locally and appear to be simple to use, it is recommended you have them professionally installed. Carbon and sediment filters should be installed by your plumber but you can purchase and replace the required cartridges yourself.

Be an educated consumer

Be wary of water treatment installers who may try to sell you more equipment than you actually need. Research treatment products and systems before purchasing. Be sure what you are buying will in fact remove the unwanted substances in your water. Verify the terms of warranty claims on both equipment and installation. Be sure to get the technical manuals for your system and set up a regular maintenance schedule with your installer, including follow-up and annual visits.



In Alberta, water treatment devices must be certified. Be sure to confirm that any device you purchase has certification. See the Canadian Water Quality Association website for a list of acceptable certifications.

FOR MORE INFORMATION:

Working Well
www.workingwell.alberta.ca

Water Wells that Last
[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/wwg404](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/wwg404)

Health Canada
<http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

Canadian Water Quality Association
www.cwqa.com

Rural Water Quality Information Tool
<http://www.agric.gov.ab.ca/app84/rwqit>

Farm Water Analysis and Treatment Resources
<http://www.agriculture.alberta.ca/app21/infopage?cat1=Ag%20Engineering&cat2=Farm%20Water>

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