

Water Facts #18

Tips for Buying Water Treatment Equipment

Surveys have found that about 60 percent of the homes in Pennsylvania served by a private water system (well, spring, or cistern) have some type of water treatment equipment. Today, almost any water quality problem (both nuisance and health based) can be fixed by purchasing the appropriate equipment. However, homeowners with private water systems are often uninformed about water treatment processes and equipment, making them susceptible to unscrupulous businesses selling treatment equipment. The following tips will assist the homeowner with the purchase of water treatment equipment.

Understand the Water Quality Problem

If you suspect that you have a problem with your water, make sure to have it tested by a state-certified water testing laboratory. A list of state-certified water testing laboratories is available from the Pennsylvania Department of Environmental Protection at <http://www.dep.state.pa.us/labs>. Penn State also runs a state-certified water testing laboratory. Test kits can be obtained at your local Penn State Cooperative Extension office or directly from the lab at <http://www.aasl.psu.edu/>.

If test results from a certified laboratory show that your drinking water failed a primary, health-based drinking water standard, such as bacteria or lead, action should be taken to correct the problem to protect the health of you and your family. Other water tests may indicate a problem from a secondary pollutant such as iron or manganese. In this case, your health is not at risk, but you may choose to install water treatment equipment to reduce stains, tastes, or odors that these pollutants can cause.

Consult Unbiased Water Quality Experts

After receiving your test results from the certified water testing laboratory, it is a good idea to go over the results with an unbiased water quality expert. Unbiased experts may be available from the water testing laboratory or from your local Penn State Cooperative Extension office. They can help you

interpret the test results and provide advice on options available to fix any water quality problem.

Explore All Alternatives

Water treatment equipment is not always the easiest or cheapest way to eliminate a water quality problem. Other options are usually available and should be explored before a decision is made. In some cases, developing an alternate source of water such as a new well, nearby spring, or rainwater cistern may be the best solution. Connecting to a nearby public water supply may also be more economical, in the long run, than extensive treatment of a private water supply. If the source of pollution can be found, such as a malfunctioning septic system, then elimination of the pollution source is a viable solution. Simple maintenance, such as inspecting a well to make sure the cap is sealed or ensuring that a spring box is sealed from insects, can also be an effective solution for many bacterial problems in private water supplies.

Match Treatment to Problem

Once you have decided that treatment is the best solution to your problem, learn about each of the basic water treatment processes and the pollutants that they will remove. Become an educated consumer and know which treatment devices will solve your problem before you approach treatment vendors. Table 1 on the next page provides some information on the most common water treatment processes.

Research the Treatment Companies

Always seek reputable water treatment companies that will provide you with local customer references. Research the company history and look for those that have been established in the area for several years to avoid fly-by-night operations that are common in the water treatment business.

Beware of Hard Sale Techniques

Some water treatment vendors may use colorful home water tests or other methods to scare or pressure homeowners into buying water treatment equipment on the spot. Be cautious of companies

Table 1. A brief summary of common water treatment processes used in Pennsylvania.

Treatment Method	Primary Uses	Type of Unit¹	Notes
Acid neutralization	Corrosive water, copper, lead, pinhole leaks in plumbing	POE	Uses limestone chips or soda ash to increase water pH and hardness to prevent corrosion.
Activated alumina	Arsenic, fluoride	POE or POU	Water pH must be less than 8.5. Pretreatment with oxidation may be necessary to achieve good arsenic removal.
Aeration	Hydrogen sulfide, methane, volatile organics, radon	POE	Expensive and susceptible to clogging by other pollutants but very effective when multiple gases are present.
Anion exchange	Sulfate, nitrate, arsenic	POE or POU	Increases chloride concentration in treated water. May make water more corrosive.
Carbon filter	Chlorine, pesticides, herbicides, radon, miscellaneous tastes and odors, human-made volatile organics, limited removal of hydrogen sulfide odor	POE or POU	Disinfection should be used on water supplies with bacterial contamination because bacteria can multiply in filter. Carbon must be periodically replaced when exhausted.
Chlorination	Bacteria, hydrogen sulfide, iron, manganese	POE	Water must be clear for chlorine to work. Must also provide a tank for storage and contact time. pH adjustment may be necessary.
Distillation	Removes everything <i>except</i> volatile organics, pesticides, herbicides	POU	Produces small amounts of bland-tasting water. Space needed to store treated water.
Oxidizing filters	Iron, manganese, hydrogen sulfide	POE	Periodic addition of chemicals is necessary along with backwashing. Good option when two or all three pollutants are present.
Ozone	Bacteria, metals, odors, tastes	POE	Expensive to purchase and operate but very effective at removing multiple pollutants.
Reverse osmosis	Removes any dissolved pollutants from water	POU	Produces small amounts of water and produces some waste water. Will not remove most organic pollutants or bacteria.
Sediment filters	Soil, sand, other particles. Certain types can also be used to remove <i>Giardia</i> cysts	POU or POE	Must be routinely changed (POU) or backwashed (POE) to maintain water flow
Softeners	Removes hardness (scale) along with limited amounts of dissolved iron and manganese	POE	Causes increase in water sodium level. Use potassium salt or only soften hot water if on a low-sodium diet. Water may become more corrosive after softening.
Ultraviolet light	Bacterial disinfection	POE	Water must be free of sediment to kill bacteria effectively. Bulb must be changed annually.

¹ POU = point-of-use treatment device used to treat the water at one faucet or tap where the water is used. POE = point-of-entry treatment device used to treat all of the water as it enters the home.

using this strategy. Never make quick decisions. Confirm home water test results through an independent lab. Take your time and consult with other experts and other treatment vendors to get second and third opinions.

Ask About Maintenance Requirements

Purchasing water treatment equipment can be expensive. However, it can also be complicated by regular maintenance requirements on the equipment. Make sure that you fully understand the maintenance requirements of all equipment before you make the purchase. All water treatment equipment requires routine maintenance. In some cases, this maintenance is simple, such as replacement of a faucet carbon filter or ultraviolet light bulb. In other cases, maintenance is more involved, such as regeneration of oxidizing filters or replacement of membranes in reverse osmosis units. It is best to understand the details of treatment equipment maintenance before you buy. Determine what maintenance will be done by the treatment company and what your responsibility will be .

Look for NSF and WQA Certifications

Several independent associations provide testing of water treatment equipment to determine its effectiveness. Two such organizations are the National Sanitation Foundation (NSF) and the Water Quality Association (WQA). Ask water treatment vendors to provide written proof of these certifications for their equipment. Note that EPA certification does not ensure that equipment will remove certain pollutants. Vendors touting EPA certification should be avoided.

Costs of Water Treatment Equipment

The cost of water treatment equipment varies considerably depending on the type of unit, size, pretreatment requirements and installation. Small faucet or pour-through carbon or activated alumina filters often cost less than \$20. Other countertop or faucet point-of-use (POU) devices such as reverse osmosis and distillation units can cost \$300 to \$2,000, depending on the amount of water they produce per day. Most larger, whole-house point-of-entry (POE) filters, such as softeners, anion exchange units, carbon filters, oxidizing filters, and acid neutralizing filters cost \$500 to \$1,500. Ultraviolet light disinfection systems can range from \$400 for a basic unit to more than \$1,000 for one with a light intensity sensor, sleeve cleaner, and automatic shut-off. Aeration and ozonation are usually the most expensive systems costing several thousand dollars.

Final Thoughts. . . .

Approach any water treatment purchase carefully after receiving a water test report from an unbiased source. Get multiple estimates from reputable companies. Once you have made a decision, get everything in writing including a detailed warranty and maintenance agreement.

More Information

For additional information on the management of private water systems, contact your local Penn State Cooperative Extension office or consult the Water Resources Extension Web site:
<http://water.cas.psu.edu/>

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