Healthy Drinking Waters

for

MASSACHUSETTS

Safe and healthy lives in safe and healthy communities

Questions to Ask When Purchasing Home Water Treatment Equipment

The water treatment industry is in the forefront of treating drinking water that is both a health hazard and a nuisance to the household. Home water treatment service and supply companies and products promise to deliver drinking water that is safe and contaminant free. Purchasers need to sift through advertising claims and technical data to select the appropriate treatment method.

The first step in choosing a water treatment device is to have your water tested for contaminants and characteristics you suspect are causing a problem. Most people are alerted to potential problems due to objectionable taste, odor, color, or presence of sediments and staining. Rely on independent water tests conducted by a state certified lab to identify and evaluate specific contaminants.

If the water test indicates that you have a problem, installation of a treatment system may be necessary to remedy it. Be aware that water treatment equipment has tradeoffs.

- There is routine maintenance.
- Some systems may need to be periodically back-flushed, which will increase the wastewater load to your septic system.
- The treatment may remove one contaminant, but add something else to your water. For example, an ion exchange system installed to remove iron and manganese, may add sodium to your drinking water, causing a potential problem for people with high blood pressure or on sodium-restricted diets.

Do your research and be a good consumer when shopping for water treatment equipment. The following are questions you can ask a water treatment professional or the water well contractor who installed the well to determine the type of system needed. Background information follows many of the questions. The extent to which the manufacturer or distributor is willing to provide answers can assist the consumer in making an informed choice.

1. What exactly does the water analysis performed by the treatment professional show? Are health hazards indicated? Should more testing be done?

Many water treatment companies provide free

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EPA United States Environmental Protection Agency New England

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in-home water testing as part of their services. Not all contaminants can be evaluated this way. For example, many man-made chemicals, which have been associated with serious health problems, must be analyzed in a laboratory with sophisticated equipment. The consumer must be wary of companies that claim their home analyses determine more than basic water quality constituents such as hardness, pH, iron, and sulfur. Ideally, you should verify in-home tests with a water test conducted by a state certified laboratory.

Once you've accurately determined what contaminants and characteristics your drinking water has, the level detected will dictate the type of treatment system, if any, is most effective. Factors to consider include whether the water presents a health hazard and how the levels detected compare to Federal and/or State Drinking Water Quality Standards. Refer to the fact sheets about specific contaminants or characteristics that may be present in your drinking water. Additional information can be found on Internet sites such as the Environmental Protection Agency's Office of Groundwater and Drinking Water.

2. How long has the company been in business, and is there a list of referrals the consumer can contact?

Make sure the company is reputable and established. Ask the company for referrals and contact the referrals to find out customer satisfaction.

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3. Have the product and the manufacturer been rated by NSF International or another third party organization? Was the product tested for the specific contaminant in question, and over the advertised life of the treatment device under household conditions (tap water, actual flow rates, and pressures)?

NSF, International is a non-profit organization whose function is to set performance standards for water treatment equipment and evaluate test results of treatment devices to determine if claims are realistic. Products that have been tested and certified by NSF and meet their minimum requirements are entitled to display the NSF listing mark on the products or in advertising literature. Manufacturers and models that meet the applicable standard are included in a listing published twice a year. NSF has developed standards for the following types of treatment units.

ANSI/NSF 42:	Drinking Water Treatment Units-Aesthetic Effects
ANSI/NSF 44:	Cation Exchange Water Softeners
ANSI/NSF 53:	Drinking Water Treatment Units-Health Effects
ANSI/NSF 55:	Ultraviolet Microbiological Water Treatment Systems
ANSI/NSF 58:	Reverse Osmosis Drinking Water Treatment Systems
ANSI/NSF 62:	Drinking Water Distillation Systems

Ask the sales representative which standards the product meets. Also, ask for test results showing removal of the specific contaminant(s) you need or want to remove. Tests by third party organizations (those neutral to and trusted by all interests served) should provide extra confidence.

4. Is a second opinion on treatment procedures and equipment necessary?

Consider a second opinion on recommended water treatment equipment. Check with at least one additional dealer to see what treatment procedure and equipment is recommended, and ask questions. Compare at least two brands, and consult other references.

5. How can I tell whether the dealer knows the home water treatment business?

The Water Quality Association (WQA) is an organization of manufacturers, distributors, and dealers that sets minimum acceptable levels of knowledge for water treatment businesses, sales and equipment installers. Ask if the dealer is a member of WQA and if any employees are WQA-certified water specialists, sale representatives, or installers.

WQA is a voluntary organization, so non-members are not implied to be less competent. However, persons who have attended training sessions and taken tests to demonstrate their knowledge should know their business. The Association's web page is www.wqa.org.

6. Does the water quality problem require whole-house treatment or will a single-tap device be adequate?

Depending on the type of contaminant and its concentration, you may need to treat all the water entering the house or only the water used for drinking and cooking. If the contaminant is only a problem when you drink it, such as lead, you may only need point-of-use (POU) treatment. POU treatment devices are typically installed at the kitchen faucet to treat water for drinking and cooking. However, if the contaminant is also hazardous when you get it on your skin or inhale it, for example, a volatile organic compound or radon, you will need to treat all the water entering the house, point-of-entry (POE). POE treatment devices are typically installed in the basement after the water pressure tank. Many treatment units are available in both POU and POE models, including granular activated carbon filters, reverse osmosis, and microfiltration units.

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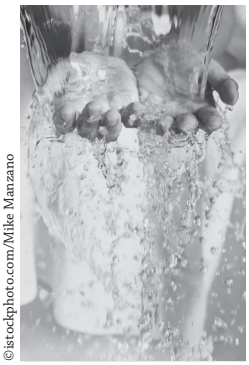
7. Will the unit produce enough treated water daily to accommodate household usage?

The consumer must be certain that enough treated water will be produced for everyday use. For example, distillation units produce 3-12 gallons of treated water daily depending on the model. In addition, the maximum flow rate of the treatment device should be sufficient for the peak home use rate. Consider installing a flow water meter to help determine what the peak home water use is.

8. What are the total purchase price and expected maintenance costs of the device? Will the company selling the device install it and service it? Will there be a fee for labor? Can the consumer perform maintenance tasks or must the water treatment professional be involved?

The consumer must watch for hidden costs such as separate installation fees, monthly maintenance fees, or equipment rental fees. Additionally, the disposal of waste materials, such as spent cartridges from activated carbon units and used filters, can add to the cost of water treatment and should be figured into the purchase price. You may be able to install some treatment devices on your own. Ask the dealer for all costs involved in the installation and maintenance of the treatment system.



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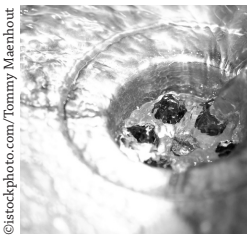

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9. What are the service intervals and the costs involved with this equipment?

Regardless of whether you or your dealer provides the service, there is a cost. Filter cartridges must be changed, materials added as needed, and the water tested regularly to be sure things are working properly. Unserviced equipment may contribute to increased levels of some contaminants. Find out what supplies and equipment are needed, and the expected costs. Determine how often a filter membrane, ultraviolet light, or media will need to be changed and who is responsible for doing this. Ask the dealer if there are any other water quality conditions, like pH or sediments that can affect the effectiveness of the treatment system.

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10. Will the unit substantially increase electrical usage in the home?

The cost of treated water in the home will vary depending upon the cost of electricity and the amount of energy required to operate the treatment unit. Ask about average monthly electrical use for the system you are interested in purchasing.

11. Is there an alarm or indicator light on the device to alert the consumer of a malfunction?

Many units have backup systems or shutoff valve functions to prevent consumption of untreated water.

12. Will the manufacturer include in the purchase price follow-up water testing to ensure the equipment is working properly after a month or two?

Testing the water a month after the equipment is installed will assure the homeowner that the unit is accomplishing the intended treatment. Have the test completed at a state certified laboratory. Additionally, water used for outside purposes should not have to be treated. This will provide you with a raw water tap, which can be periodically tested to compare the effectiveness of your treatment system. Water test results from the raw water tap will also help you to assess changes in your water quality.

13. What is the expected lifetime of the product? What is the length of the warranty period and what does the warranty cover?

The warranty may cover only certain parts of a device. The consumer should be aware of the warranty conditions.

14. What potential secondary effects will the treatment unit have on your water quality?

The consumer should be aware that some water treatment equipment works by adding something to your drinking water to remedy the problem at hand. For example, some water softening units will replace the iron removed from the water with sodium.

Quick Reference to Water Treatment Devices

These guidelines are for individuals planning to consult a water treatment industry representative. It must be emphasized that treatment can be for aesthetic as well as health factors. If drinking water poses a health risk, the consumer should consider the cost of purchasing bottled water or tying into a public water system, if available, as an alternative to treatment.

Water Treatment Devices for Common Contaminants and Undesirable Minerals

Contaminant and Minerals	Treatment Devices								
	UV Light	Ion Exchange	Mechanical Filter	Activated Carbon	Activated Alumina	Reverse Osmosis	Distillation	Aeration	Chlorination
Bacteria and Viruses	•								•
Taste and Odor				•		•	•		
Lead		•		•	•	•	•		
Nitrate		•				•	•		
Chlorine, Trihalomethanes				•					
Radon				•				•	
Hardness		•							
VOCs and other Organics				•				•	
Pesticides, PCBs				•			•		
Iron and Manganese		•				•			•
Sulfate		•				•	•		
Giardia and *Crytosporidium* Cysts			•			•	•		
Sediment, Turbidity			•						
Total Dissolved Solids						•	•		
Aluminum						•	•		
Arsenic					•	•	•		
Barium		•				•	•		
Cadmium		•				•	•		
Chloride						•	•		
Chromium						•	•		
Copper						•	•		
Fluoride					•	•	•		
Mercury						•	•		
Radium		•				•	•		
Selenium					•	•	•		
Silver						•	•		
Zinc						•	•		

Adapted from *Citizen's Guide to Home Drinking Water Treatment Devices*, Commonwealth of Pennsylvania Department of Environmental Protection, Bureau of Water Standards and Facility Regulation, P.O. Box 8467, Harrisburg, Pa 17105-8467. 10/2005

Advantages and Disadvantages of Home Water Treatment Devices

Device and Cost	Advantage	Disadvantage
Activated Carbon Filter Point-of-Use activated carbon filters cost between $100 and $500. Replacement filters cost $30 to $50. Point-of-Entry treatment devices cost between $750 and $1,500. Replacement filters cost $300 to $500.	Effective at removing a wide range of organic contaminants such as VOCs and pesticides. Carbon block and precoat designs have been validated as effective for lead reduction. Often effective for reducing taste and odor problems. Does not use electricity or generate wastewater.	Not effective at removing inorganic materials such as hardness, iron, nitrate or fluoride. Bacteria growth may occur in the carbon filter if not maintained properly. May require post-disinfection.
Reverse Osmosis Under the sink devices including a mechanical prefilter and an activated carbon post filter cost $500 to $1,500. Replacement membranes cost $50 to $150.	Can remove a wide variety of inorganic and organic contaminants including lead, nitrate and sodium. Normal household water pressure provides good performance.	Uses from three to five gallons of water for each gallon produced. Some membranes are damaged by chlorine.
Ion Exchange From $500 to $1200 depending on the resin and type of equipment. Cation exchange resins cost less than Anion exchange resins.	***Cation Exchange Units*** Effective for removing minerals such as hardness, barium, radium, nitrate, sulfate, calcium and magnesium. Effective for removing iron (if concentrations do not exceed 1 mg/L). ***Anion Exchange Units*** Effective for removing nitrates, bicarbonate, selenium and sulfate.	Removes one type of ion replacing it with another, i.e. sodium replaces with iron. Requires backwashing and regeneration (usually with sodium chloride or potassium chloride).
Microfiltration Use-device mechanical particulate filters typically cost between $50 and $200 Filter replacements cost $20 to $60.	Effective for removing suspended particles such as rust, dirt and sediment. Filters tested and approved for *Giardia* and *Cryptosporidium* cysts are available.	Not effective for removing dissolved contaminants such as lead, nitrate, VOCs, etc.
Distillation Between $150 and $700 for a countertop model.	Removes the greatest variety of contaminants.	Uses approximately three kilowatts of electricity per gallon of water. Water-cooled units waste a considerable amount of water. Will require frequent cleaning, especially where the water is hard. Removal of minerals may leave bland taste to the water. Process is slow.
Aeration Between $3,000 and $4,500.	Effective for removing radon and volatile organic chemicals.	Expensive to purchase and install. Requires secondary pumping and pressurization.
Ultraviolet Light Between $300 and $700.	Effective for destroying bacteria and *Giardia* and *Cryptosporidium* cysts.	Not effective for virus removal.
Activated Alumina Same as Activated Carbon.	Effective for removal of arsenic, fluoride and lead. Does not use electricity and does not waste water.	Will usually not remove minerals other than those listed.
Chlorination Between $800 and $1,500.	Only effective way of dealing with large amounts of iron, hydrogen sulfide and colloidal iron. It is an excellent disinfectant.	Requires handling and storage of hazardous chemicals. Requires time to insure that chemicals are mixed properly and available when needed.

Adapted from *Citizen's Guide to Home Drinking Water Treatment Devices*, Commonwealth of Pennsylvania Department of Environmental Protection, Bureau of Water Standards and Facility Regulation, P.O. Box 8467, Harrisburg, Pa 17105-8467. 10/2005

Summary

The purchase of water treatment equipment is a decision that must be carefully considered. Whether the purchase is being made to improve the aesthetic characteristics of the water or to address health considerations, many factors must be determined. You may want to keep a logbook, allowing you to keep track of all maintenance and repairs on your treatment system. The following are some key steps in selecting equipment.

1. Correctly identify the problem to be addressed using appropriate tests performed by state certified laboratories. Also, inquire about the history of the groundwater in your neighborhood to help determine if any water quality problems exists. If so, test your drinking water for these contaminants.

2. Identify options for correcting the problem.

3. Decide whether whole house (point-of-entry) or single-tap (point-of-use) treatment is needed.

4. Determine if the system will treat enough water to meet for your needs.

5. Select a reputable dealer.

6. Obtain second opinions.

7. Check to see if proposed equipment has been tested or validated by independent organizations such as NFS International or the Water Quality Association.

8. Talk with others who are using the same equipment you may purchase.

9. Be sure to know all the costs of the equipment: purchase price, installation, operating, and routine required maintenance.

10. Understand what maintenance will be required and who will be responsible for doing it.

11. Understand how to determine if the equipment is operating satisfactorily.

12. Determine the expected life of the equipment and components.

13. Understand any warranty provided with the equipment.

Resources

UMass Extension

This fact sheet is one in a series on drinking water wells, testing, protection, common contaminants, and home water treatment methods available on-line at the University of Massachusetts website: http://www.umass.edu/nrec/watershed_water_quality/watershed_online_docs.html and Cape Cod Cooperative Extension: 508-375-6699 http://www.capecodextension.org

MA Department of Environmental Protection, Division of Environmental Analysis

Offers assistance, information on testing and state certified laboratories: 617-292-5770 For a listing of MassDEP certified private laboratories in Massachusetts: http://www.mass.gov/dep/service/compliance/wespub02.htm

U.S. Environmental Protection Agency, New England Office

Information and education on where drinking water comes from; drinking water testing and national laws; and how to prevent contamination: http://www.epa.gov/ne/eco/drinkwater

US Environmental Protection Agency

For a complete list of primary and secondary drinking water standards: http://www.epa.gov/safewater

MA Department of Conservation and Recreation, Division of Water Supply Protection

Maintains listing of registered well drillers, information on well location and construction: 617-626-1409 http://www.mass.gov/dcr/waterSupply/welldril/index.htm

NSF International

The NSF International has tested and certified treatment systems since 1965. For information on water treatment systems: 800-NSF-MARK (800-673-6275) http://www.nsf.org/consumer/

Water Quality Association

The Water Quality Association is a not-for-profit international trade association representing the household, commercial, industrial, and small community water treatment industry. For information on water quality contaminants and treatment systems: http://www.wqa.org

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