

Drinking Water Treatment: What You Need to Know When Selecting Water Treatment Equipment

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This guide explores household water quality and treatment options and can help consumers select a treatment system suited to a particular situation.

Homeowners are increasingly aware of and concerned about contaminants in their water supply that may affect health, cause taste and odor problems, or create staining and maintenance problems. In response, the water treatment industry focuses on improving the aesthetic quality of household water and on treating contaminants that may pose a health hazard.

People who use water from a public or municipal supply can be assured the water meets federal and state guidelines and is tested regularly. This does not mean the water is free of contaminants. It means any contaminants present are below the level allowed by regulations and believed to be safe. If contaminants exceed the Maximum Contaminant Level (MCL), suppliers must notify consumers, the water must be treated by the supplier to correct the problem, and/or another source of drinkable water must be provided. Consumer Confidence Reports (CCRs), available from local water utilities, inform consumers about the source of the water, contaminants present, the potential health effects of those contaminants, and treatment methods used by the utility. Those who get water from a private source are not bound by such regulations and are responsible for the quality of their water supply, including protection, testing, maintenance, and treatment.

Water Tests Necessary to Evaluate the Need for Treatment

Before initiating treatment, it is essential to know the contaminants, their quantities and the reasons for removing them. Public or municipal water supplies are tested regularly for nearly 100 contaminants. Users of public water supplies can contact their provider for water testing information, including contaminants present and their concentration. Users of private water supplies will need to initiate appropriate water testing. **There is no single test to determine drinking water safety.** Many contaminants can present a health risk if present in sufficient concentrations. These include biological contaminants such as bacteria or viruses; inorganic chemicals such as lead or nitrate; and organic chemicals such as pesticides, fuel, and solvents. Other contaminants, while not a health risk, can make water less desirable for domestic use. These are referred to as nuisance contaminants and include calcium, magnesium, iron, manganese, and hydrogen sulfide. It would be very costly—and in most cases unnecessary—to test private water supplies for the nearly 100 contaminants for which public water supplies are required to test.

Users of private drinking water wells must decide which contaminants to have their water tested for and must order tests accordingly. A water testing laboratory will only test for the specific contaminants for which analysis has been requested. Reports will indicate if the contaminant is present in the water and at what concentration. Information will not be provided on contaminants for which analysis was not specifically requested.

Knowledge of which contaminants may be present in the water should guide the testing since it is not economically feasible to test for all possible contaminants. The consumer must decide whether a contaminant is of concern and pursue appropriate tests. For private water supplies, an annual test for bacteria and nitrate is the minimum advised. Consideration also should be given to potential contaminants used in the vicinity of the supply or others suspected to be present in the water. The University of Nebraska– Lincoln Extension and the State of Nebraska Department of Water, Environment, and Energy can provide advice on which tests might be indicated in a given situation. Consumers can refer to Extension Circular, *Drinking Water Treatment: An Overview* (EC703) for a discussion of possible water quality problems and appropriate treatment methods. Further information can be obtained from the appropriate UNL NebGuide in the Drinking Water Treatment series including *Drinking Water: Testing for Quality* (G907) for testing information and *Drinking Water: Approved Water Testing Laboratories in Nebraska* (G1614) for information on laboratories in Nebraska that do water testing. Consumers can contact the specific laboratory to determine the tests it is certified to perform. NebGuides are available online at water.unl.edu.

What should treatment equipment remove from water?

No system will remove everything or solve every water quality problem. Each treatment system has limitations. In addition, it is not generally feasible or even necessary to try to remove everything. Triple-distilled or deionized water, which is about as pure as is commonly possible, tends to be corrosive to metal pipes and containers, and has a flat, flavorless taste. The characteristics of people in the household (e.g., age, health, size) and the contaminant (i.e., whether it poses a health risk or is just a nuisance) should guide decisions on which contaminants to strive to remove or reduce. Knowledge of which contaminants are targeted will help determine the most efficient system to use. In some cases, a combination of treatment devices may provide the best removal.

Does this water problem require whole-house or single-tap treatment?

Devices classified as Point- of- Entry (POE) treat water as it enters the household so all water used is treated. Devices classified as Point- of- Use (POU) treat water at the

point it is used, such as at a single tap, and therefore treat a smaller volume of water. Most nuisance problems such as iron, manganese, hardness, or odor suggest whole-house POE treatment. Some contaminants such as bacteria and some organic compounds require POE treatment to prevent consumption and to prevent exposure during bathing or other water uses. Other contaminants that may affect health, such as nitrate, are only a concern if consumed, so POU equipment that treats drinking and cooking water is an option.

Is a second opinion on treatment procedures and equipment necessary?

It is advisable to get a second opinion on appropriate water treatment equipment. Consumers should check with at least two dealers to compare recommendations on treatment, appropriate equipment, costs, warranties, and service.

What about ratings and certification of manufacturers and equipment?

The Environmental Protection Agency (EPA) does not test nor approve drinking water treatment devices. An EPA registration number may appear on certain types of equipment. This does not indicate EPA approval of the system. Registration is required of products containing active, controlled ingredients. An EPA registration means the device has been registered and the ingredient added to the system meets regulations. An example of this is when silver, an active, controlled ingredient, is used in activated carbon filtration systems.

Treatment systems should be tested and certified by the American National Standards Institute (ANSI), National Sanitation Foundation (NSF), Water Quality Association (WQA), or Underwriters Laboratories (UL) for contaminant removal. This testing/certification provides a level of assurance that you are purchasing an effective treatment system for your needs.

The NSF (formerly known as the National Sanitation Foundation) is a third-party non-profit organization that has established standards affecting drinking water treatment equipment and tests equipment that is voluntarily submitted by the manufacturer. Manufacturers pay thousands of dollars for this testing, the exact amount depending on the type of equipment tested. Products that meet NSF standards are entitled to display the NSF certification mark on the product or in literature. NSF then continues to monitor the manufacture and performance of the device and retests if changes are made or problems arise.

The Water Quality Association (WQA) is the trade organization of the water treatment industry. The WQA program uses the same NSF standards and provides equivalent American National Standards Institute (ANSI) accredited product certifications. WQA-certified products carry the Water Quality Association Gold Seal. WQA encourages its members to abide by the WQA Code of Ethics. Compliance with the code and membership are both voluntary. A directory of validated product models and companies is available on its website, www.wqa.org.

When comparing equipment brands and evaluating claims or test results, individuals should be sure the device has been tested

- for the specific contaminant targeted in the water,
- over the expected life of the system,
- with an adequate volume of water, and
- under household conditions (tap water, actual flow rates and water pressures).

Typical pressures from a well are around 40 lb per square inch (psi) and flow rates are typically 5 to 30 gallons per minute. Sales representatives should be asked which standards the product meets and for test results showing removal of the specific contaminant(s) to be managed.

What are other considerations regarding the manufacturer or dealer?

A reputable company will be able to provide service, repair, or replacement parts. A company that expects to be around will not mind a customer taking time to decide on proper treatment equipment and will avoid the high-pressure tactics of “today’s special.” Also, consideration should be given to manufacturers who are willing to provide retesting of equipment at no extra cost after several months of operation.

What about sales scams or misleading promotions?

Many dealers offer free drinking water testing. Unfortunately, some unscrupulous dealers may use the test as an opportunity to frighten or pressure consumers into purchasing unnecessary equipment. These tests are generally for nuisance contaminants such as hardness, pH, iron, manganese, sulfur, or total dissolved solids. Occasionally a dealer may test for nitrate. More complicated tests such as for pesticides or volatile organic chemicals are rarely pro-

vided. It is important to remember that no single test can determine if water is safe. The free tests may be adequate for selecting equipment to deal with nuisance problems, but they cannot provide all information necessary to tell if the water is safe to drink. Even in the case of nuisance problems, it is advisable to get an independent second test from a certified laboratory for verification.

Sometimes salespeople conduct demonstrations they may refer to as “tests.” These typically cause color changes or precipitates to form in the water. Though they may be dramatic, they are generally meaningless in telling how much of a contaminant is present. Such demonstrations are not adequate to make purchase decisions and confirmation by an independent source should be obtained.

The consumer also should be aware that many states do not allow false or exaggerated claims in advertising water treatment equipment, or the use of graphic representations such as a skull and crossbones over a glass of water.

Another inappropriate advertising technique is to understate the maintenance requirements of the equipment and costs of supplies. Most water treatment devices require maintenance such as replacing filters, adding chemicals, or backwashing. Ignoring these can make the equipment seem less costly and easier to use than it is. Others may try to sell maintenance contracts for equipment when the consumer can easily do routine maintenance.

These scenarios can be avoided by using common sense, getting all claims and promises in writing, and realizing that if it sounds too good to be true, there is a strong possibility it is not true. Problems with misrepresentations or fraudulent claims can be addressed to the:

Federal Trade Commission
600 and Pennsylvania Avenue, N.W.
Washington, D.C. 20580
Phone: (877)382-4357

or to

Nebraska State Attorney General
1445 K Street, Room 2115
Lincoln, NE 68508
Phone: (402) 471-2683

What is involved in operation and maintenance of the treatment equipment?

Most water treatment equipment requires maintenance and service to operate properly. Many systems require periodic removal and cleaning or replacing components,

such as filters. A consumer must evaluate how much of the maintenance requirements he or she is willing to undertake. If consumer does not want to be responsible for routine maintenance, having a service agreement as part of a purchase agreement may be beneficial. This maintenance is especially important if the device is to be used to remove a health hazard. Improper maintenance can damage the equipment and allow contaminants in drinking water. Once the equipment is installed and operating, the consumer should have a means of determining if the targeted contaminant is being removed. It is important to plan to retest the water periodically after the equipment is in use to see if the equipment is operating effectively. Sometimes testing or monitoring equipment can be obtained for that purpose. Equipment should have a Performance Indication Device (PID) which alerts the user when the device is no longer meeting treatment standards. It should be calibrated to signal you prior to the device or filter media reaching its exhaustion stage. After installation and operation of treatment system, a sample should be collected from the system and tested for the contaminant of concern at an accredited laboratory to assure that it is functioning properly.

Is renting a system a viable option?

There are some situations when purchasing equipment is not the best option. If the problem is caused by a spill near the water supply or other situation where only short-term treatment is necessary, renting equipment may be a viable option. Renting is a good way to become familiar with equipment and its operating costs and maintenance requirements. Consumers should be certain to ask who is responsible for maintenance, whether rental fees apply toward purchase, and the length of rental agreement. If a consumer does not want to be responsible for routine maintenance, having a service agreement as part of a rental agreement may be beneficial.

What about using bottled water?

Again, there are some situations when purchasing equipment is not the best option. Bottled water may be a preferable option if a temporary source of safe water is needed. It offers the advantages of having no equipment to buy, operate, and maintain, and no lengthy time commitment.

It is important to realize that bottled water is not necessarily safer than tap water. Bottled water quality is subject to Food and Drug Administration (FDA) standards, while public tap water is regulated by Environmental Protection

Agency (EPA) standards. These standards are not always the same. Also, a large portion of bottled water is simply public tap water that has been processed and packaged. Microplastic contamination has been found to be significantly more prevalent and abundant in bottled water compared to tap water. Studies have shown that bottled water can contain substantially more plastic particles per liter than tap water.

What is the expected life of the equipment and what does the warranty cover?

Before purchase, consumers should understand the warranty on the treatment system and what components are covered or excluded. If the household water has contaminants that may shorten the life of the system, does the warranty still apply? Are there certain conditions that must be met in order for the warranty to apply?

Will the system provide enough water for the daily needs of the household?

Estimated daily household need for drinking water is one-half gallon per person per day. Cooking needs are generally one to three gallons per day per household. An estimate of total daily water needs including bathing or showering, laundry, and toilets is 60 to 80 gallons per person per day. Once an estimate of daily household water needs is determined, it can be compared with the capacity of the treatment system.

Key Factors for Selecting Water Treatment Equipment

- Correctly identify the problem to be addressed using appropriate tests.
- Determine whether whole-house (POE) or single-tap (POU) treatment is needed.
- Determine which type of treatment will effectively remove or reduce the problem contaminant(s).
- Select a reputable dealer and obtain second opinions. Check with others who have used the equipment.
- If POU or POE equipment has been purchased from a home supply store or other vendor, look for a NSF, WQA, or UL certification and confirm the certification is for your water quality concerns.
- Determine whether the system has adequate capacity to meet household water needs at household pressure and flow rates.

- Consider all costs involved, including purchase price, installation, operating costs, maintenance costs, and re-testing costs.
- Understand maintenance requirements and decide if you are capable of performing routine maintenance operations. If you are not comfortable with the responsibility, check into maintenance contracts with the water quality company you are working with.
- Select equipment with a Performance Indication Device (PID) that alerts the user when the device is no longer meeting treatment standards.
- Understand how to determine if the equipment is functioning properly and targeted contaminants are being removed.
- Determine the expected life of the equipment and its components, and understand the warranty.

Acknowledgment

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