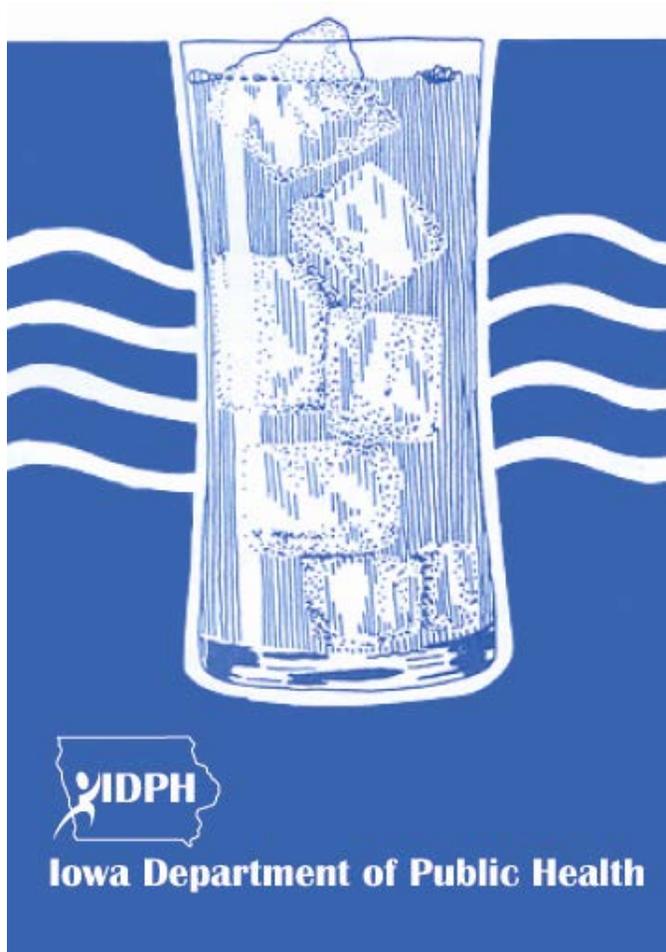


# Water Treatment Systems

A CONSUMER INFORMATION PAMPHLET



**TO THE CONSUMER**

The purpose of this pamphlet is to provide information to help you decide if you need a water treatment system and what kind, if one is needed.

**YOU SHOULD READ THE PAMPHLET BEFORE PURCHASING A WATER TREATMENT SYSTEM**

Iowa Department of Public Health  
Division of ADPER and EH  
Bureau of Environmental Services  
Lucas State Office Building  
321 E 12<sup>th</sup> Street  
Des Moines IA 50319-0075

Water Treatment System Registration Program:

<http://www.idph.iowa.gov/ehs/water-treatment>

September 2017

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## IOWA'S LAW

The Iowa Consumer Fraud Act covers water treatment systems that claim to remove harmful substances (contaminants) from water. The law covers both the sale and rental of water treatment systems. The law requires:

1. Manufacturers must test water treatment systems to show that the systems remove harmful substances. The manufacturers must use state approved procedures for this testing. The laboratories where the water treatment systems are tested must also be approved by the Iowa Department of Public Health (IDPH).
2. **The seller must give the buyer or renter a performance data sheet (PDS) before a water treatment system is sold or rented.** The PDS contains the test results and other information about the water treatment system. **The seller must also give the buyer or renter this consumer information pamphlet before a water treatment system is sold or rented.**
3. The seller and the buyer or renter must sign the performance data sheet.

The Iowa law does not cover systems that claim only to soften water or to make the water taste, smell, or look better. However, the law covers any water treatment system that claims to "purify" the water.

## REGULATING CONTAMINANTS

Four types of harmful substances are found in drinking water:

- Organisms such as bacteria, viruses, and cysts
- Inorganic chemicals such as lead and nitrate
- Organic chemicals such as pesticides, fuel, and solvents
- Radioactive chemicals such as radium and radon

Harmful substances under Iowa law are substances regulated by the US Environmental Protection Agency (EPA) in the Primary Drinking Water Regulations. The EPA regulates harmful substances in 3 ways:

1. Setting a Maximum Contaminant Level (MCL). An MCL is highest level allowed for a substance in a public drinking water system. Usually a water system must notify its customers if an MCL is exceeded. Most regulated substances have an MCL, including arsenic, nitrate, pesticides, and coliform bacteria.
2. Setting an Action Level. Lead and copper in drinking water usually come from plumbing in a house. The EPA requires water systems to test at house taps and if more than 10% of the locations have lead or copper higher than the Action Level, the water system must take steps to prevent lead and copper from coming out of the plumbing.
3. Defining a Treatment Technique. Some organisms, like *Cryptosporidium*, *Giardia* and viruses, cannot be tested for easily or economically. The EPA gives a water treatment system credit for removing some of the organisms if the water system treats the water in specific ways.



### **Health Risks**

A few harmful substances can make you ill within a short time. For example, cysts can cause disease within a few days of being consumed. Coliform bacteria do not usually cause illness, but their presence in drinking water may indicate that bacteria or viruses that do cause disease are also present. Nitrate levels over the MCL can be life-threatening to infants.

The other harmful substances on the EPA list of MCLs could cause illness if a person consumes enough over an extended period. The EPA usually sets large safety margins when regulating these substances.

The actual threat to a person's health depends upon:

- the concentration of the harmful substance
- The length of exposure
- The susceptibility of the exposed person

### **Aesthetic Conditions**

Some substances cause unappealing odor, color, or taste in water, but do not adversely affect health. For example, iron can cause water to be colored and to stain sinks, toilets, and clothes. Sulfur can cause a rotten egg odor. Hardness makes it hard to lather soap and may affect the efficiency of water heaters. Sellers are not required to put test data for these substances on the performance data sheet. The buyer should still ask to see test results to show how well the system will treat the water. Sellers must provide this information if the buyer asks for it.

### **More Information**

The EPA periodically updates the regulated substance list. To obtain current information and find out how harmful substances affect your health, go to:

<http://water.epa.gov/drink/contaminants/index.cfm>

or contact:

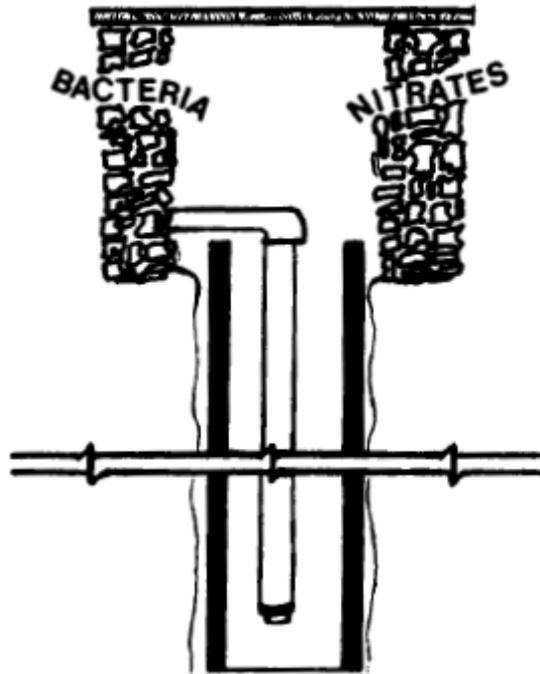
- Iowa Department of Public Health, (515) 281-5894
- Iowa Department of Natural Resources (DNR) Drinking Water Program, (515) 725-0282
- EPA Safe Drinking Water Hot Line, (800) 426-4791
- A city or county health officer

### **KEEPING HARMFUL SUBSTANCES OUT OF DRINKING WATER**

Keeping harmful substances out of the groundwater, lakes, rivers, and streams is better and cheaper than treating the water to remove harmful substances. Potential sources of harmful substances include:

- Municipal and private sewage systems
- Landfills
- Hazardous waste disposal sites
- Improperly constructed wells

The Iowa DNR sets standards for most public sources of harmful substances and for private wells and sewage systems. County sanitarians enforce the private well and sewage system standards in most parts of Iowa.



Bacteria and nitrates entering an improperly constructed well.

A well is a direct path to groundwater. Poorly built or deteriorated wells may let bacteria, fertilizer, animal waste, or pesticides flow directly into the groundwater. For more information about good well construction contact:

- Your city or county sanitarian, or
- the DNR
- or a reputable well contractor.

The DNR and Iowa State University Extension have useful publications on private wells:

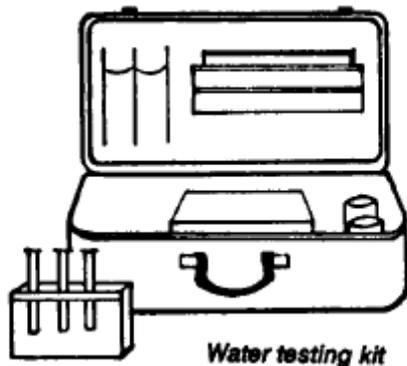
1. *Non-Public Water Wells and Water Systems*  
<http://www.iowadnr.gov/InsideDNR/RegulatoryWater/PrivateWellProgram.aspx>
2. *Coping with Contaminated Wells*  
<http://www.extension.iastate.edu/Publications/PM1329.pdf>
3. *Good Wells for Safe Water*  
<http://www.extension.iastate.edu/Publications/PM840.pdf>
4. *Shock Chlorinating Small Water Systems*  
<http://www.extension.iastate.edu/Publications/PM899.pdf>

#### **HOW SAFE IS MY DRINKING WATER? DO I NEED TO TREAT IT?**

Get as much information as you can about your water supply. This will help you decide whether you need a water treatment system.

#### **Public Water Supplies**

The Iowa DNR defines a Public Water Supply System (PWS) as a system serving at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Therefore, a PWS may be or include cities, rural water systems, homeowner's associations, mobile home parks, schools, parks, restaurants, businesses, etc. Each public water system must sample the water and have it tested for harmful substances at times directed by DNR. Each PWS must also publish a Consumer Confidence Report (CCR) once a year. The CCR gives a summary of the test results for the year and shows any MCL violations. Contact your local water department to get copies of their water test results. You can check the test results against the MCL list to see if the water is safe.



If the test results are all below the MCLs, water entering the house is safe to drink. Some pipes, valves, and faucets can leach lead and copper into the water. If you are concerned about this, you should test the water to see if it is safe. Contact a laboratory to get a sampling container and instructions. A list of certified labs can be found at <http://www.shl.uiowa.edu/labcert/idnr/index.xml> or by contacting the State Hygienic Laboratory at the University of Iowa at (800) 421-4692. If the test results are under the Action Level, your water is safe to drink. You do not need to treat the water to protect your health.

### **Private Wells**

If you obtain drinking water from a private well, you should do two things to check the water quality.

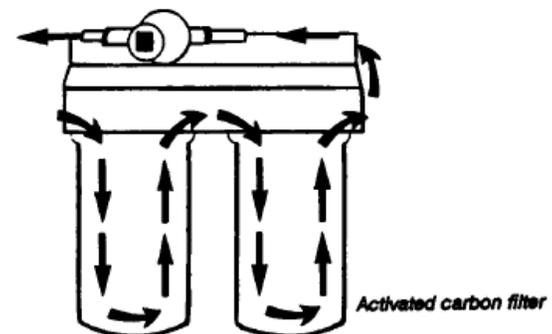
- Use the resources available on the IDNR Private Well website listed on page 6 to check your well and plumbing. Repair any problems that you find.
- Get your water tested for coliform bacteria and nitrate. Most counties now have programs to do these tests at no cost. Contact your county sanitarian for more information. A contact list can be found here: [http://www.iowadnr.gov/Portals/idnr/uploads/water/wells/co\\_sanitarians.pdf](http://www.iowadnr.gov/Portals/idnr/uploads/water/wells/co_sanitarians.pdf)

If testing shows that your water is not safe, contact your county sanitarian. The sanitarian can help you check your well for problems. In some counties, there are funds to help repair wells. After repairing the problems, disinfect the well by shock chlorinating it. Procedures for shock chlorinating a well can be found in the ISU Extension publication PM899 *Shock Chlorinating Small Water Systems* listed on page 6. Test the water every three to six months to be sure that the water is safe to drink. If further testing shows that the water is not safe to drink, consider drilling a new well or hooking to rural water.

### **DIFFERENT KINDS OF WATER TREATMENT SYSTEMS**

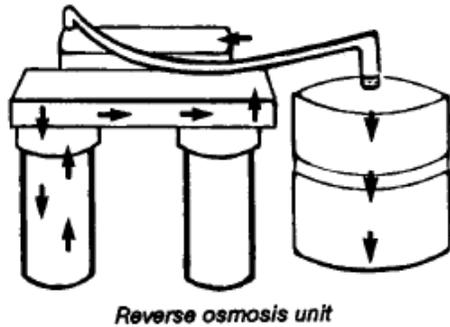
**Particulate filters** are made of fabric, fiber, ceramic, or other screening material. They are designed to remove particles such as grit, sediment, and rust. These filters may remove *Giardia lamblia* cysts, *Cryptosporidium* oocysts and asbestos fibers. Particulate filters will not remove anything dissolved in the water. New types of particulate filters use membranes (microfiltration or ultrafiltration) with holes so small that they can remove bacteria and may remove some viruses, as well as cysts and sediment.

**Activated carbon filters** will remove many chemicals that cause undesirable tastes and odors in water. Some also remove health related contaminants such as lead, trihalomethanes, and pesticides. Some compacted carbon filters (carbon blocks) are also designed to be particulate filters. Carbon filters fill up with the chemical impurities that they remove and may eventually release these impurities back into the water if the filters are not replaced.



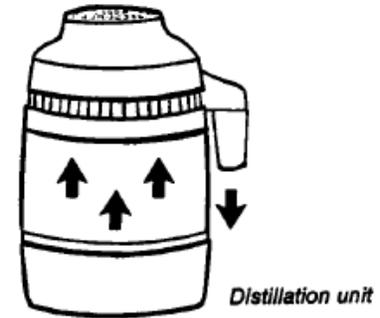
Activated carbon filters must be replaced periodically. The dealer or manufacturer can tell you how often a filter will need replacement, where a replacement filter can be bought, and the price.

**Reverse osmosis (RO) units** force water by pressure through a membrane and collect the treated water in a storage tank. These units can reduce most chemical contaminants, particles such as sediment and rust, and suspensions causing turbidity (cloudiness) from water. The water pressure must be sufficient to allow the membrane to work. The higher the water pressure, the more effective the unit will be at removing harmful substances and producing drinkable water. Conditions such as high iron or excess particles (sediment and rust) can harm the membrane. Some RO membranes are sensitive to chlorine. Almost all RO units have pre-filters and post-filters that must be changed regularly.



Typically about 10-20% of the water sent to the RO unit becomes treated water, the rest goes down the drain.

**Distillation units** remove contaminants by boiling the water and then cooling the steam back to water. Distillation removes most contaminants, including bacteria, viruses and cysts, from water.



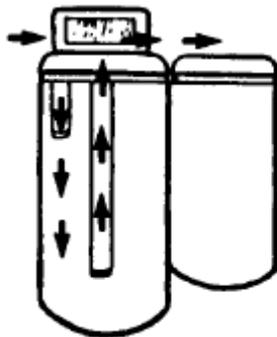
Distillation units may not remove chemical substances when the chemical boiling point is close to or below the boiling point of water. Most units include pre- and post-filters that must be changed periodically to overcome this limitation. Distillation units need routine cleaning and disinfecting

**Ultraviolet (UV) disinfection units** are chambers or channels where water is exposed to ultraviolet light (UV) to kill bacteria, viruses and cysts. UV units will not remove chemical substances from water. UV units require routine cleaning and the lamps must be replaced periodically. Ask a salesperson how often the unit should be cleaned and how often the lamps need replacement. UV units need the water to be clear to be effective, so pre-treatment to clear the water may be needed.

**Chlorinators** add a form of chlorine to water, usually as a liquid solution (bleach) or as a tablet. Bacteria and viruses are killed quickly when a moderate concentration of chlorine is applied to water. The homeowner must maintain the chlorine supply and should test the water frequently to ensure that the chlorinator is working. Chlorination may cause the water to taste and smell objectionable to some people; a carbon filter is often used at the point of use. Depending on the incoming water quality, chemical contaminants called trihalomethanes may be formed when chlorine combines with dissolved organic material.

**Ozonators** generate and inject ozone into water. Ozone is a very active form of oxygen. It destroys bacteria and viruses, and cysts under the right conditions. Ozone will break down some chemicals that cause taste and odor problems in water, and will break down some pesticides. Since there is no residual ozone left in the water, bacteria and viruses can enter the water and grow after leaving the ozonator. Ozone is produced with relatively complex equipment, and some ozonators are not designed to operate in humid conditions without a dehumidifier.

**Ion exchangers units** remove inorganic substances dissolved in water. Cationic exchangers (water softeners) remove positively charged minerals such as iron, calcium, and magnesium and replace them with sodium or hydrogen. Anionic exchangers remove negatively charged substances such as chlorides, nitrate, and sulfates. Ion exchange units will not remove organic chemicals. They may incidentally remove particles such as sediment or rust from water, but sediment or rust in water may clog the units.



*Ion exchanger or deionizer*

Ion exchange units must be regenerated frequently usually with salt. The waste water from a regeneration is very salty; some

experts think that discharging the waste to a septic tank may be damaging. Ion exchange units may not remove nitrate very well if a water supply is high in sulfates.

## **SELECTING A WATER TREATMENT SYSTEM**

**Before deciding to buy or rent a water treatment system, you should:**

- Become familiar with the types of water treatment systems.
- Know which harmful substances that each type of water treatment system can remove from water.
- Know the limitations of each type of water treatment system.

Most water treatment systems are a combination of different types of treatment. For example, most distillation systems consist of a distiller followed by a carbon filter. Most reverse osmosis systems consist of a particle pre-filter, the reverse osmosis membrane, and a final carbon filter.

**The steps in getting a water treatment system that satisfies your needs are:**

1. Have your water tested by a state-approved laboratory to find out what harmful substances are in your water.
2. Review the performance data sheet for various models.
3. Select a treatment system that removes the harmful substances you wish to control.
4. Check to see if the system is registered with IDPH.
5. Be sure the equipment is properly installed and maintained. Remember that all systems have parts that must be routinely maintained or replaced.
6. Regularly test your water to make sure the system is operating correctly.

### Items Found on the Performance Data Sheet

Use the information on the manufacturer's performance data sheet to help choose a water treatment system. The data sheet must contain the following information:

1. Test data showing what harmful substances the system removes from water
2. Capacity of the unit in gallons or the amount of time the system can be used
3. The flow rate, pressure, and temperature of the water while the system was tested
4. Where to find instructions for installing, operating, and maintaining the system
5. A warranty or information where to find the warranty

The performance data sheet may list test data for substances that are not harmful to health. Many data sheets will list these substances under "Aesthetic Effects" or "Other Substances."

### Interpreting the Performance Data Sheet

Figure 1 shows an example of information on a performance data sheet:

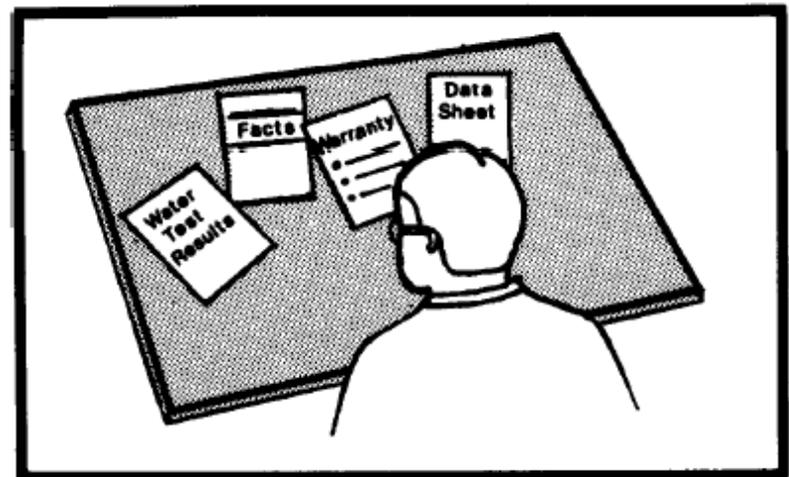
- Compare the starting test level to the level of the harmful substance in your water. If the level in your water is different, do not assume the system will reduce the level in your water by the same amount.
- Compare the ending test level to the EPA MCL. The test level should be at the EPA MCL or lower.

**Figure 1-Example of Information on a Performance Data Sheet.**

Contaminant	EPA MCL	Test Concentration	Effluent Concentration	% Reduced
Nitrate	10	28	3	89.3

- Compare the water pressure in the test to the water pressure in your home. If your water pressure is less than that in the test, you may not be able to get the same results. This is particularly true for reverse osmosis systems.
- Compare the capacity of the system in gallons to your drinking water usage in gallons per day. This will help you determine how long the system will be effective in your home.

**Remember, the seller and the buyer or renter must sign the performance data sheet before the sale is completed.**



*Consider all the facts before making a purchase*

## **MORE CONSUMER PROTECTION INFORMATION**

To protect you from false claims, the Iowa Attorney General's Office recommends that you remember the following before making any purchase:

1. Do not expect something for nothing. If it sounds too good to be true, it probably is.
2. Do not be pressured into making an immediate decision. Ask the salesperson to come back another day. This will give you time to think about your decision.
3. Find out return and refund policies before buying.
4. Ask for and check references before buying. Remember that some references may be connected to the company.
5. Check the company and company history. Call the Consumer Protection Division of the Iowa Attorney General's office toll free at (888) 777-4590 or locally in the Des Moines area (515) 281-5926. They can give you information about complaints or investigations.
6. Insist that all promises (guarantees and warranties) be put in writing.
7. Keep copies of all contracts, payment records, and complaint letters in a safe place.

## **FILING A COMPLAINT**

Contact the individual salesperson or company representative with your complaint. If you are not satisfied with their response, contact:

Office of the Attorney General of Iowa  
Consumer Protection Division  
Hoover State Office Building  
1305 E Walnut Street  
Des Moines, IA 50319  
(888) 777-4590  
(515) 281-5926  
[www.iowaattorneygeneral.gov](http://www.iowaattorneygeneral.gov)  
[consumer@iowa.gov](mailto:consumer@iowa.gov)