

A photograph of a man with a shaved head, wearing a bright yellow long-sleeved shirt and white pants, smiling warmly as he pours water from a white pitcher into a cup. A young child with curly hair, wearing a white shirt, is seen from the back, looking towards the man. They are in a kitchen setting with wooden cabinets and a window in the background. The image has a light, geometric pattern overlaid on it.

# QUALITY DRINKING WATER

WATER QUALITY SYSTEMS | COMMERCIAL GRADE WATER FILTRATION



## ACHIEVE HEALTHY, GREAT-TASTING WATER AT HOME

### TABLE OF CONTENTS

- 2 Introduction
- 3 Current State of Drinking Water
- 5 How Impurities Occur
- 6 Effects of Impurities
- 9 Types of Filtration
- 12 FAQs
- 14 Resources

# TAKE BACK YOUR TAP

Are you unhappy with your drinking water? Maybe it tastes bad or smells funny. Perhaps you are concerned about your tap water's healthfulness or are looking for a more eco-friendly alternative to bottled water.

In order to enjoy quality water, millions of Americans chose bottled water over tap, making the bottled and beverage water a nearly \$11 billion industry.

Today, consumers are more educated about what's in their water and the various alternatives to bottled water.

People are searching for a better water source that offers high-quality water without the environmental impact of bottled water. This guide is designed to show you how to "take back your tap" with water filtration systems. Join the 40% of Americans that use a water treatment system to achieve healthy, quality water at home.

## WHY FILTER YOUR WATER?



### SAVINGS

Although installing a filtration system may seem expensive initially, it would **cost 5-10 times as much to drink bottled water instead of filtered tap water.\***

*\*Based on the average family water consumption of 300 gallons of water/year.*



### ENVIRONMENTAL IMPACT

30 million water bottles are consumed daily in the US. Only 25% of those are recycled, which contributes to nearly **4 billion pounds of waste** annually.

A study by the Water Quality Association found that it takes about **17 gallons of diesel fuel to transport 1,000 gallons of bottled water**. That same study found that only 1/4 gallon of diesel is used to transport several **point-of-use systems that produce 1,000 gallons of filtered water** at your tap.



### HEALTH

Although both tap and bottled water are safe to drink, the only way to fully understand what is in your water is through a **comprehensive water analysis**. It is also important to remember that the EPA and FDA bottled water standards are established based on a healthy 154 pound individual. Children, elderly, and those with weak immune systems are potentially at a higher risk level than what those standards represent.

# WHAT IS THE CURRENT STATE OF DRINKING WATER?

## THE TAP TODAY

The US has one of the safest drinking water supplies in the world, thanks to the efforts of municipal water works professionals around the country and the Safe Drinking Water Act (SDWA) passed by the federal government in 1974. Through the SDWA, the Environmental Protection Agency (EPA) is empowered to regulate water quality.

Primary substances, which affect health, and secondary substances, which are aesthetically displeasing but not harmful, are monitored regularly by the EPA. The EPA establishes maximum contaminant levels (MCLs) for many substances in drinking water. MCLs are the highest levels allowed by law. They are measured in parts per million (PPM) or parts per billion (PPB). Even substances you cannot see, taste or smell are monitored.

A recent study of more than 22 million taps across the US found 260 regulated and unregulated substances. While more than 90% of local tap water was in compliance, there were 141 substances unregulated by the EPA that could potentially affect more than 220 million Americans\*.

The SDWA currently identifies approximately 90 substances for which the EPA is required to establish standards. The EPA is studying an additional 51 compounds found in drinking water that are thought to be toxic.

*\*Based on Environmental Working Group study*



## ONE PART PER MILLION IS EQUIVALENT TO:

- One second out of 12 days
- A 2-liter container floating in an Olympic swimming pool
- One grain of sand in a handful

# WHAT'S IN MY WATER?

**Is my water safe?** This is a question asked by millions of individuals. In most cases the answer is “Yes”. If you suspect you have a water quality problem, there are a number of things you can do to identify substances.

## WATER TESTING

Consider testing you water if:

- You have read about or suspect organic or lead impurities
- Your water source is a private well not monitored by the EPA
- You want more accurate data than what is provided by the federal water reports

If you decide to have your water tested, select a reputable laboratory. Your state water agency or local health department may be able to refer you to a good lab or search for a state certified lab. Another option is to invest in a quality drinking water system that removes a wide range of impurities.

## DID YOU KNOW?

On July 1 of every year, all public water suppliers are required to publish Consumer Confidence Reports to notify people of water quality issues.

## IS THIS ENOUGH?

- The EPA has identified around 2,000 potential drinking water substances in a random sampling, yet municipal water supplies are required to test only a handful of these.
- Substances regulated by the EPA are given permissible levels based on the risk of death or disease of one in 100,000 or one in a million.
- The EPA governs the nation’s public water supplies that have 15 or more hookups or those that serve 25 or more persons. Private wells and small systems are not monitored by the EPA.
- Water quality can vary from day to day, so test results may be erroneously alarming or reassuring.
- Water is usually tested at the plant, but some impurities may be picked up on the way to your home.

# HOW IMPURITIES OCCUR

**Water makes up 75% of the Earth's surface, so why is everyone concerned about finding enough adequate drinking water?** The truth is, less than 1% of the Earth's water is fresh water that we can drink. This 1% can become contaminated in a number of ways.

## IMPURITIES IN THE HOME



Water can become contaminated right at home. Some older homes have lead pipes or plumbing systems that use lead-based solder to join copper pipes. Both can allow lead to leach into drinking water.

## IMPURITIES BY INDUSTRY



Chemicals that are dumped onto or pumped into the ground can easily get into our water supply. There are an estimated 181,000 industrial waste sites, 13,000 active and inactive municipal landfills, and 100,000 ruptured underground gasoline storage tanks in the US that leak substances into our water supplies. Agricultural pesticides and highway de-icing are among other common practices that can also contaminate water.

## IMPURITIES IN THE DISTRIBUTION SYSTEM



Water can become contaminated during its journey from the treatment plant to home. Lead and asbestos cement pipes, prevalent in municipal water distribution systems, can allow harmful substances to leach into the water. Even chlorine and chloramines used to disinfect our water can react with naturally-occurring organic materials in water, like decaying leaves, and create Trihalomethanes (THMs), which are known to be carcinogenic to lab animals and are suspected to be carcinogenic to humans.

## LOCAL RESEARCH

### 1. Obtain recent water reports

If you live in a large community, contact your water supplier, the local health department, or the state water quality agency to request results of recent water tests. These results will show you the contaminant levels of various substances found in your water. If you get your drinking water from a private well, your local health department may have information on substance levels and should be able to do some simple testing.

### 2. Compare test results with MCLs

Compare contaminant levels found in the water with the MCLs set by the EPA to determine if any of the contaminant levels exceed the EPA limits. A current MCL list can be obtained by going to [epa.gov](https://www.epa.gov) and searching "MCL" or by calling your local EPA office.

### 3. Research the distribution system

Substance testing is usually done at the treatment plant; however, drinking water can become contaminated after it leaves the plant and makes its journey to your home.

*NOTE: Reference the Frequently Asked Questions section for additional information.*



# IMPURITIES & YOUR BODY

The effect that drinking water substances have on our health continues to be a subject of much study and speculation. The EPA recognizes thousands of toxic compounds, but since testing individual substances can take years and cost millions of dollars, little is known about their health effects. Even when effects are well known, things aren't always black and white.

The EPA always sets a Maximum Contaminant Level Goal (MCLG), which is often lower than the MCL. The MCL is based on accepted levels of risk, tempered by practical, economic factors. Actual health contaminant effects are not always certain.

- **A particular contaminant may not affect health by itself**, but may be harmful if combined with another contaminant.
- **Sensitivity to a contaminant can vary from person to person.** A substance that does not have any noticeable effect on an average adult can have an effect on an adult who is recovering from an illness, and thus is more vulnerable.
- **Some substances cause acute health problems** soon after we are exposed to them. Symptoms may include rashes, nausea, headaches and worse. Chronic health effects may not be apparent until we've been exposed to a contaminant for an extended period of time and the toxicity builds in our bodies. The outcome tends to be more serious: cancer, heart disease, nervous system damage and birth defects. Lead, benzene and vinyl chloride are all fairly well known and documented examples of these "chronic" offenders. All are identified by the EPA as serious problems that should be removed by public water suppliers.

# AESTHETIC ISSUES

**Aesthetic water quality problems, like off-tastes, odors and discoloration, vary by tap and are influenced by personal preferences.**

For example, a slight chlorine taste in drinking water might be preferred by some, while others wouldn't consider drinking it. The most common aesthetic problems include:

## **CLOUDINESS/TURBIDITY**

This results from suspended particles of dirt in water that make water appear cloudy. These particles range from larger, visible pieces to minute, invisible particles that can make water hazy. Particles can build up and eventually clog working parts of water-using appliances, such as ice makers, causing them to break down.

## **HARDNESS**

Approximately 85% of the US has hard water. Water becomes "hard" when it picks up calcium, magnesium, and other minerals, such as iron, as it travels through certain types of rock and soil. These minerals can build up in appliances and pipes, restricting water flow. Hard water also leaves a sticky film on shower tiles and inhibits the lathering ability of soaps and detergents.

## **MUSTY, EARTHY & FISHY TASTES AND ODORS**

These tastes and odors are caused by algae, molds, and bacteria that naturally live in most water sources, like lakes and rivers.

## **DISCOLORATION & STAINING**

Brown water is caused both by tea-like extracts of decaying leaves and by metals such as iron, manganese, and copper. Unpleasant tasting and looking, this water can also stain sinks and laundry.

## **ROTTEN EGG SMELL**

This is caused by hydrogen sulfide in water, produced by bacteria in deep wells and in low-use, stagnant water mains. Hydrogen sulfide is also highly corrosive.

## **RUST & METALLIC TASTES**

Excessive iron and other metals in drinking water change the taste and appearance of water. Water can taste metallic even though it appears normal at first, turning "rusty" after a few minutes of contact with air.

## **CHLORINE TASTES**

Chlorine, commonly used by municipalities to disinfect the water supply, often causes poor tasting and smelling water. Chlorine taste and odor is by far the most common aesthetic complaint.







# HEALTH ISSUES

**The most common health related impurity problems in drinking water are listed below.** Consider testing your water to find out which of these may be present in your water.

## **ASBESTOS**

Asbestos was used in cement water pipes in the early 20th century, is naturally occurring in rock, and is commonly found in water supplies. Exposure to asbestos has been linked to cancer.

## **CYSTS, BACTERIA & VIRUSES**

Cysts, such as Giardia, Entamoeba, and Cryptosporidium, are parasites that cause cramps, vomiting and diarrhea. Chlorine will not reliably kill these organisms because they are encased in a hard, protective shell. They can cause infectious diseases, such as typhoid fever and hepatitis.

## **EXOTIC TOXINS**

Exotic toxins can cause damage to the liver, kidneys and nervous system, and are linked to cancer. Arsenic is commonly found at extremely low levels in many natural materials, including food. High levels, however, are toxic. Dioxins, the most toxic substances known, are unintentional by-products of pesticide development and the burning of plastics at waste dumps and power plants.

## **VOLATILE ORGANIC CHEMICALS (VOCs)**

VOCs include components of gasoline, solvents, and industrial cleansers, which can cause many illnesses, including liver cancer and leukemia.

## **HEAVY METALS**

High levels of cadmium, mercury and lead in drinking water can cause nerve damage, brain deficiencies, birth defects, and cancer.

## **LEAD**

Lead is a heavy metal strongly regulated by the EPA. Lead poisoning can cause neurological deficiencies and birth defects.

## **SYNTHETIC ORGANIC CHEMICALS (SOCs)**

SOCs include man-made organics, like pesticides, that are carried into groundwater by rain and irrigation. Consumption of these chemicals has been linked to circulatory, respiratory, and nerve disorders and at least four types of cancer.

## **TRIHALOMETHANES (THMs)**

THMs are formed when chlorine reacts with organic matter in water, like decaying leaves. They have been linked to a higher incidence of cancer.

# WHAT TYPE OF FILTRATION IS RIGHT FOR ME?

If you have water quality concerns and choose to purchase a home drinking water system, it's important that you find a system that will solve your particular problem and fit your lifestyle. Most products fall into the following categories.



## **FILTRATION (MECHANICAL OR PARTICULATE)**

Filters do a good job of removing turbidity and particulate matter. Microfiltration can remove bacteria and cysts by mechanical means.

### **CONSIDERATIONS**

May not remove taste and odor producers, or some types of chemical substances. Filters must be changed regularly to be effective.



## **GRANULAR ACTIVATED CARBON (GAC)/ADSORPTION**

Granular Activated Carbon (GAC) has enormous surface area and is highly porous. One pound of GAC has the surface area of more than 100 acres. The GAC surface attracts and holds tiny particles and molecules; such as those that cause poor taste and odors. Better systems can also reduce TTHMs, VOCs and and heavy metals such as lead and mercury. They are relatively inexpensive and easy to use and maintain.

### **CONSIDERATIONS**

Low-priced faucet mount filters have relatively short filter life spans, requiring frequent changes. Filter cartridges must be changed as recommended, usually every 30 to 3,000 gallons, depending on the model and water quality. Coarse filter designs can lead to dumping, the sudden leakage of previously removed substances into filtered water. Select a system designed to prevent this.



## REVERSE OSMOSIS

These systems use pressure to force water molecules through a membrane, separating various substances from the water. They are the only economical system capable of solving brackish water problems common in coastal areas.

### CONSIDERATIONS

The typical system sends 70-90% of feed water to the drain, causing excessive waste for one gallon of water. It takes up to three hours to produce one gallon of treated water. May be more system than what is needed. Removes dissolved minerals.



## SOFTENING/WATER CONDITIONING

These systems exchange sodium for calcium and magnesium to “soften” water. They boost water’s cleaning ability and reduce minerals that cause appliance breakdown. They are effective for removing some metals, such as iron, manganese, and radium.

### CONSIDERATIONS

Softening systems are not effective for removing unwanted organic chemicals, tastes and odors. Added sodium may not be desired for those on a restricted sodium diet. Systems usually condition the entire home water supply, not just the 1-2% used for drinking and cooking.



# TIPS FOR SELECTING A DRINKING WATER SYSTEM

1. Have your water professionally tested or request your city's annual Consumer Confidence Report to determine what's in your water.
2. Search for a product that addresses your specific water concerns.
3. Remember, the cheapest product is not always the best buy. Inexpensive products may not effectively address your needs.
4. Pay attention to ratings from independent organizations like NSF International and Underwriters Laboratories (UL).
5. Select a system that is easy to use and maintain.
6. Purchase a system with a good warranty.
7. Buy from a reputable dealer. Ask for references.
8. Follow the dealer's advice and maintain equipment as recommended by the manufacturer.
9. Replace your filter cartridge annually with the same manufacturer's cartridge. Beware of counterfeit cartridges that claim to "fit". You risk quality and performance, as well as certification protection.

## WHAT SHOULD I ASK?

Once you identify a water treatment solution that addresses your needs, follow this checklist when shopping for a specific product:

- Will the system remove all the substances that are a concern to you?
- Have the system's claims been tested and certified by an independent agency\*?
- Is the system easy to install and service?
- Is the system designed with quick-change filter cartridges that are easily replaced without touching the surfaces that come in contact with the water?
- What is the system's micron rating?
- What is the system's rate of water flow through the filter?
- Does the system have a flow restrictor to regulate water flow assuring adequate contact time with the carbon or other treatment media? The longer the contact time, the better the filtration.
- Does the system have enough capacity to satisfy the needs of your household without frequent cartridge changes?
- Are you comfortable with the product's dealer and their service?

*\*UL and NSF International are nonprofit, third party groups. Their rigid testing certifies many types of products for aesthetic and health claims, and provides a scale to determine which products are the best. It also ensures products are made with integrity, and have accurate and honest performance claims.*



# FREQUENTLY ASKED QUESTIONS

## 1. WHAT IS A PUBLIC WATER SYSTEM?

**The Safe Drinking Water Act (SDWA) defines a public water system (PWS) as one that serves piped water to at least 25 persons or 15 service connections for at least 60 days each year.** Such systems may be publicly or privately owned. Community water systems (CWSs) are public water systems that serve people year-round in their homes. Most people in the US (268 million) get their water from a community water system. The EPA also regulates other kinds of public water systems, such as those at schools, campgrounds, factories, and restaurants. Private water supplies, such as household wells that serve one or a few homes, are not regulated by the EPA.

COMMUNITY WATER SYSTEM	NON-COMMUNITY WATER SYSTEM	
A public water system that serves the same people year round. Most residences are served by community water systems.	A public water system that does not serve the same people year round. There are two types of non-community systems:	
	NON-TRANSIENT, NON-COMMUNITY WATER SYSTEM	TRANSIENT, NON-COMMUNITY WATER SYSTEM
	A non-community water system that serves the same people more than six months of the year, but not year-round. For example, a school with its own water supply is considered a non-transient system.	A non-community water system that serves the public but not the same individuals for more than six months. For example, a rest area or a campground may be considered a transient system.

# FREQUENTLY ASKED QUESTIONS

## 2. ARE LEAD PIPES USED IN THE DISTRIBUTION SYSTEM?

Lead distribution pipes are common in some municipal water systems, or are used for service connections to homes. Water can corrode lead pipes, causing dissolved and particulate lead to leach into drinking water, creating a health hazard. Check with your state water agency or local water supplier for more information on your community's distribution system.

## 3. ARE THERE LEAD OR COPPER PIPES IN YOUR HOME PLUMBING SYSTEM?

Lead pipes and copper pipes joined with lead-based solder are often found in older homes, and can be a source of lead impurities.

## 4. ARE THERE IRON PIPES IN YOUR HOME PLUMBING SYSTEM?

Iron, rust, and the resulting particles can be unpleasant both to your eye and palate.

## 5. ARE ASBESTOS-CEMENT PIPES USED IN THE DISTRIBUTION SYSTEMS?

There are approximately 200,000 miles of asbestos-cement pipe in US water distribution systems, serving approximately 65 million people. Corrosion of these pipes can result in high levels of asbestos in drinking water. Ingesting asbestos has been linked to increased incidence of stomach cancer.

If lead and asbestos-cement pipes exist in your system, ask your water supplier about the water's pH level and corrosion index. The more corrosive the water, the more likely lead and asbestos will leach into the water.

## 6. WHAT ARE SOME QUESTIONABLE SALES TACTICS?

A few unscrupulous salespeople exist in every industry. If you feel you have encountered one, contact the Better Business Bureau or the Water Quality Association. Here are some pitfalls to be aware of:

1. Although understanding water quality is important, some salespeople may be using scare tactics to get a sale. Doing research before deciding what filtration system to buy is the best way to ensure you are informed.
2. High pressure situations insisting you sign up on the spot. As with all decisions, careful consideration will increase the likelihood of selecting the most appropriate product.
3. Door-to-door salespeople claiming to be from your local municipality. Although the local municipality is concerned with your well-being, the chance of them selling you a product is not likely.
4. "One product solves all problems" pitch. While you can purchase a filtration system that solves a variety of water quality problems, no product can solve all problems.
5. Claims that products are maintenance free. All reliable products require maintenance. Filtration systems are often designed to perform at their potential for 6 months to 1 year and then require filter cartridge changes.



# RESOURCES

## **PENTAIR WATER QUALITY SYSTEMS**

5730 North Glen Park Road  
Milwaukee, WI 53209  
(800) 279-9404  
[www.waterpurification.pentair.com](http://www.waterpurification.pentair.com)

## **BETTER BUSINESS BUREAU**

The Council of Better Business  
Bureaus, Inc.  
4200 Wilson Blvd., Suite 800  
Arlington, VA 22203-1838  
(703) 276-0100  
[www.bbb.org](http://www.bbb.org)

## **ENVIRONMENTAL PROTECTION AGENCY**

Ariel Rios Building  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20460  
(202) 272-0167  
[www.epa.gov](http://www.epa.gov)

## **UNDERWRITERS LABORATORIES**

Corporate Headquarters  
333 Pfingsten Road  
Northbrook, Illinois 60062-2096  
(877) 272-8800  
[www.ul.com](http://www.ul.com)

## **NSF INTERNATIONAL**

P.O. Box 130140  
789 N. Dixboro Road  
Ann Arbor, MI 48113-0140  
(800) NSF-MARK  
[www.nsf.org](http://www.nsf.org)

## **WATER QUALITY ASSOCIATION INTERNATIONAL HEADQUARTERS & LIBRARY**

4151 Naperville Road  
Lisle, IL 60532-1088  
(630) 505-0160  
[www.wqa.org](http://www.wqa.org)



**WATER QUALITY SYSTEMS**

5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209

P: 262.238.4400 | F: 262.238.4404

WATERPURIFICATION.PENTAIR.COM

CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

© 2015 Pentair Residential Filtration, LLC. All rights reserved.  
300065 REV D JL15