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## **Color, Taste, and Odor: What you should know**

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From time to time the MassDEP receives consumer questions or complaints regarding the look, taste or the odor of drinking water. Listed below are common problems with drinking water and their most common causes. Please note that a particular problem in your drinking water may be the result of a cause not listed here; the only way to confirm a cause is to have a certified lab analyze the water and discuss the results with drinking water professional. If you receive water from a public drinking water system it is important to contact the Public Water Supply (PWS) before having a laboratory analyze the water. Information on private water testing is available.

Filtering or treating the water may remedy persistent problems; however MassDEP does not recommend filtering or treating your water supply if your water is supplied by a MassDEP-approved PWS. MassDEP also does not regulate or recommend specific treatment systems for private home use. If you decide to use a filtration or treatment device in your home, the Department strongly encourages you to contact National Sanitation Foundation (NSF) for a list of approved devices. If you purchase a treatment device for private home use MassDEP also strongly recommends that it is maintained and provide active maintenance according to the manufacturer's instructions. Failure to maintain the equipment properly may make treatment ineffective and/or may create the potential for contamination.

Common problems with drinking water are grouped into three categories:

- Color problems
- Taste / odor problems
- Particles in water

If the problem with your water is not described here, if you are on a public water system please contact the public water department in your city or town or the MassDEP Drinking Water Program at your nearest regional MassDEP office. If the water is from your own well, please contact your local board of health. If you are outside Massachusetts, contact the drinking water program in your state.

### **Color Problems**

#### **Brown, Red, Orange or Yellow Water**

Brown, red, orange, or yellow water is usually caused by rust. The different colors can be attributed to varying chemical oxidation states of the iron (rust) and by varying concentrations of the rust in the water. There are two major sources that can cause water to be rusty:

- The water mains, or
- The water pipes in your building.

Rusty water occurs from sediment in the pipes or rust from the inside walls of the water mains. The rust can be disturbed and temporarily suspended in water with unusual water flows from water main breaks or maintenance or by flushing of a hydrant. This discolored water is *not* a health threat. When the water is discolored it is recommended to either not wash laundry or to

use a rust stain remover or regular detergent but not chlorine bleach as it will react with the iron to form a permanent stain.

The other major cause of brown, red, orange or yellow water is rusty water pipes in your building. If old, rusty pipes are discoloring your water, consult a licensed plumbing materials or an experienced plumber. Water that is being discolored by rusty pipes is *not* a health hazard; however, it is an indication that the pipes are corroding and they can eventually leak.

The first step in solving a brown or yellow water problem is to distinguish if the problem is located in your building or if it is in your city or town water supply. The following are some common characteristics of a water main disturbance:

- The water was clear earlier but suddenly became discolored.
- Only the cold water is discolored.
- The water is discolored at all of the water faucets in your home and does not clear or improve after the water has been run for several minutes.

Some common characteristics of a corrosion problem in your building include:

- The water is discolored every morning or when first used after several hours of disuse.
- The water clears after it has run for a few minutes.
- The discoloration is only at one or several faucets, but not all of them.
- The discoloration is only in the hot water.

Iron can also occur naturally in a well supplying a public water system. The presence of iron can be confirmed through analysis of the water.

Another possible cause of brown (or black) water is manganese, the presence of which can also be confirmed through analysis.

### **Milky White or Cloudy Water**

Milky white water, also commonly described as cloudy, hazy, soapy, or foamy, is almost always caused by air in the water. To see if the white color in the water is due to air, fill a clear glass with water and set it on the counter. Observe the glass of water for 2 or 3 minutes. If the white color is due to air, the water will begin to clear at the bottom of the glass first and then gradually will clear all the way to the top. This is a natural phenomenon and is caused by dissolved air in the water that is released when the faucet is opened. When you relieve the pressure by opening the faucet and filling your glass with water, the air is now free to escape from the water, giving it a milky appearance for a few minutes. If your water is cloudy or milky white in appearance and it does not clear in a glass after 5 minutes, if you are on public water system please contact the public water department in your city or town, or the [MassDEP Drinking Water Program](#) at your nearest [regional MassDEP office](#). If the water is from your own well, please contact your local board of health. If you are outside Massachusetts, contact the drinking water program in [your state](#).

### **Green Water**

In cooler climates, the most common cause of green water is copper plumbing corrosion. If this is happening, the water will usually have a bluish-green tint and/or will leave a bluish-green stain on

porcelain if the water drips from a faucet. Copper corrosion can also be caused by your electrical system being grounded to your water pipes, especially if you have a mixture of pipe material (e.g., some copper and some galvanized steel.). Green water may also be present in homes with copper plumbing that is less than two years old. The presence of copper can be confirmed through analysis. The EPA has a [copper fact sheet](#).

Green water can also be caused by dezincification of poor-quality bronze alloys found in valves, water pumps, and water pump parts. This problem can occur in high-rise buildings and large industrial properties where the water is pumped to storage tanks. The water may also be tested for zinc.

During warm weather, green water may be caused by green algae in water supplies served by reservoirs or rivers. Algae are single-celled plants that readily grow in bodies of fresh water. Algae are *not* a health threat and reservoirs can be managed and monitored to prevent algae from growing to the point where they discolor the water. The water supplier through filtration may also remove algae.

### **Blue Water**

Having blue water is rare and the cause may be due to extreme copper plumbing corrosion. If this is happening, the water will usually have a bluish-green tint and/or will leave a bluish-green stain on porcelain if the water drips from a faucet. This copper corrosion can be caused by your electrical system being grounded to your water pipes, especially if you have a mixture of pipe material (e.g., some copper and some galvanized steel.) The presence of copper can be confirmed through analysis. The EPA has a [copper fact sheet](#).

Blue water can also be caused by dezincification of poor-quality bronze alloys found in valves, water pumps, and water pump parts. This problem can occur in high-rise buildings and large industrial properties where the water is pumped to storage tanks. The water may also be tested for zinc.

Most of the information regarding water problems has been adapted with permission from the Los Angeles Department of Water and Power, [Water Quality Office](#).

## **Taste / Odor Problems**

### **Chlorinous, Bleachy, Chemical, or Medicinal Taste/Odor**

There are two common causes for a chlorinous, bleachy, chemical, or medicinal taste or odor in the water:

- The addition of chlorine to the water by your public water supplier, or
- The interaction of that chlorine with a build-up of organic material in your plumbing system.

The first step to identifying and solving the problem is to determine if the problem exists in the public water supply or in your plumbing. If the problem occurs in only one or several - but not all - of the water faucets inside your building, the cause is somewhere in your plumbing system. If the problem is in the water supply, it will occur at every water faucet on the property. If the problem

goes away after running the water for a few minutes, the cause is somewhere in your plumbing system. If the problem is in the water supply, it will not disappear after a few minutes of running the water. If the problem appears to be in your plumbing system, then you should either flush the plumbing system or contact a licensed plumber. If the problem appears to be in the public water supply and the odor seems too strong, contact your public water department. The EPA offers additional information on [chlorine and its byproducts](#).

#### **Sulfurous, Decayed, or Sewage-like Taste/Odor**

There are two common causes of a sulfurous, decayed, or sewage-like taste or odor in the water:

- Bacteria growing in your drain, or
- Bacteria growing in your water heater.

By far, the most common cause of this type of problem is the drain. Over time, organic matter (such as hair, soap, and food waste) can accumulate on the walls of the drain and bacteria can grow on these organic deposits. The bacteria can produce a gas that smells like rotten eggs or sewage. There is nothing wrong with the water; you just need to disinfect the drain. To make sure the problem is not in the tap water, fill a narrow glass with a small amount of tap water, then step away from the sink and swirl the water around inside the glass. If the problem is in the drain, the tap water in the glass should not have an odor.

Another cause of a rotten egg or sewage smell in the water is bacteria growing in the water heater. This is most likely to occur if the hot water has been unused for a significant period of time, if the water heater has been turned off for a while, or if the thermostat on the heater is set too low. The bacteria that produce this problem are not a health threat; however, the taste and odor can be very unpleasant. A licensed plumber should be contacted to remedy this problem. If problems with the drain or water heater have been ruled out, and the odor is definitely coming from the tap water, do *not* use the water; it may contain harmful bacteria. If you use city or town water, contact your public water department or board of health or the [MassDEP Drinking Water Program](#) at your nearest [regional MassDEP office](#) immediately. If the water is from your own well, please contact your local board of health; a defective or improperly located septic system may be near your well. If you are outside Massachusetts, contact the drinking water program in [your state](#).

#### **Musty, Moldy, Earthy, Grassy or Fishy Taste/Odor**

There are two common causes of this kind of odor in the water:

- Bacteria growing in your drain, or
- Certain types of organisms growing in the public water supply.

By far, the most common cause of this type of problem is the drain. Over time, organic matter (such as hair, soap, and food waste) can accumulate on the walls of the drain and cause bacteria to grow on these organic deposits. As the bacteria grow and multiply, they produce gases that often smell like rotten eggs or sewage. To make sure the problem is not in the tap water, fill a narrow glass with a small amount of tap water, then step away from the sink and swirl the water around inside the glass. If the problem is in the drain, the tap water in the glass should not have an odor.

The other cause of this type of taste or odor in the water is much less common and results from certain types of algae, fungi, and bacteria growing in the water supply, especially during warm weather. Although these chemicals are harmless, the human senses of taste and smell are extremely sensitive to them and can detect them in the water at very low concentrations. Reservoirs can be managed and monitored to prevent these organisms from growing to levels that affect the taste and odor of the water.

#### **Petroleum, Gasoline, Turpentine, Fuel-like or Solvent-like Odor**

Although this problem is rare, it is potentially serious. It is possible that a leaking underground storage tank is near your well. Do *not* use the water. If you are on a public drinking water system, please contact your local Water Department or the [MassDEP Drinking Water Program](#) at your nearest [regional MassDEP office](#) immediately. If you are on a private well contact your Local Board of Health. If you are outside Massachusetts, contact the drinking water program in [your state](#).

#### **Metallic Taste**

A metallic taste in water is usually due to the presence of iron and/or copper, which can leach into water from pipes. Zinc and manganese are less common causes of a metallic taste. The presence of these metals can be confirmed by having the water analyzed.

#### **Salty Taste**

A salty taste in water is usually due to the presence of naturally occurring sodium, magnesium, and/or potassium, each of which can be confirmed through analysis. If you are in a coastal area and your well water has a salty taste, salt water from the ocean may be intruding into the fresh water supply. In rare cases, for private wells, a salty taste may be due to road salting practices in the vicinity of the well. If you are on a private well please contact your local board of health or if you are supplied by a public water supply, contact your local water Department or the [MassDEP Drinking Water Program](#) at your nearest [regional MassDEP office](#). If you are outside Massachusetts, contact the drinking water program in [your state](#).

### **Particles in Water**

#### **Brown or Orange Particles**

Brown or orange particles are usually small pieces of rusted steel that have broken off the inside of your water pipes or the water mains. These particles are very hard, irregular in size and shape, and can be several different colors (including black). They consist of mostly iron and are not a health hazard but they can be a nuisance if they clog your washing machine screens, shower heads, and/or the screens at the ends of your faucets (called aerators). If the water is clear with these particles in it, they probably came from the inside of your pipes. If the particles come from the water mains, the water will usually be discolored for a few hours as well. For a more detailed discussion, see the brown, red, orange or yellow water section under color problems.

Another cause of brown or orange particles in the water is a broken water softener. Inside a water softener are many small, round beads. The mechanism that keeps these beads in the tank can break, releasing them into your water. These beads vary in size and color depending on the

manufacturer; however, some commonly used beads are about the size of fish eggs and are brown or orange in color. If you see that these particles are uniform in size, shape, and color and you have a water softener; call your service agent for repairs.

### **Black Particles**

Black particles can come from four common sources:

- The inside of a steel pipe,
- A broken water filter,
- A degrading faucet washer or gasket, or
- A disintegrating, black rubber, flexible supply line hose (these same hoses are also made as flexible water heater connectors).

Particles from the inside of a steel pipe are discussed in more detail under the brown or orange particles section.

If the particles are very hard, similar in size and shape, and might be described as large coffee grounds, they are probably granular activated carbon (GAC) from the inside of a GAC water filter. To stop this problem, replace the filter cartridge or consult with the manufacturer of the unit or the salesperson who sold it to you. If the particles are small black specks that might be described as being oily or sooty in texture, they are probably from the inside of a flexible hose. Over time, the chlorine or chloramine in the water causes the rubber to break down. To stop this problem replace the hose with one of the new styles that have a water disinfection resistant lining (clearly advertised on the label) or change to a different style of hose that is not made of black rubber.

### **White or Tan Particles**

White or tan particles in the water usually come from one of three places:

- The inside of your pipes,
- Your water heater, or
- Your water softener.

White or tan particles can be a combination of calcium carbonate and magnesium carbonate; this material is often referred to as pipe scale. Calcium and magnesium carbonates are naturally occurring minerals and are found in varying concentrations in most waters around the world. These minerals are not a health threat; in fact, they are beneficial to human health. The amounts of these minerals in the water determine the hardness of the water; higher mineral concentrations make the water harder. Over time, these minerals can deposit on the inside of your pipes and then begin to flake off. If the water supplied by your city or town becomes softer or if you add a water softener to your plumbing system, the softer water can begin to re-dissolve the minerals from the pipes and pieces may begin to break loose. These are all common causes of pipe scale in the water and account for most customer complaints about white or tan particles in the water. Although pipe scale is not a health hazard, it can be a nuisance by clogging inlet screens to washing machines, shower heads, and faucet aerators (the screen that screws on to the end of the water faucet).