

Aesthetic Water Quality Problems

There are several things in life that we take for granted. Water is very often one of them. Each of us uses this vital liquid, the most common substance on earth, everyday and rarely think twice about it.

However, the water we use for drinking, cooking, and countless domestic tasks will quickly catch our attention when there is some type of problem.

Fortunately, some of the most obvious water problems are also the easiest to solve. The problems that we will present here are aesthetic. Although they are not considered harmful to the body, they do affect the look and taste of water and may cause the water to be undrinkable by some people's standards. Therefore, it is important to address these concerns. Aesthetic water problems include taste, odor, color, and turbidity, all of which have relatively simple solutions.

In order to treat these problems, however, we must first look at their source.

Water is known as the universal solvent. Before it reaches a consumer's tap, it comes into contact with many different substances such as gases, minerals, and organic matter. Water picks up traces of these substances, and unfortunately, some of them may cause taste, odor, color, and turbidity problems.

Turbidity: Cloudy Water

At one time or another, most consumers have encountered water that appears foggy or cloudy. This characteristic is due to turbidity: the presence of finely divided solid particles in water. These particles may be inorganic mineral matter which does not dissolve or organic matter that has been picked up as the water flows over and through the ground. The particles cause the scattering and adsorption of light rays which gives the water a cloudy appearance.

Whether turbidity is due to suspended organic or inorganic matter, it can cause the staining of sinks and fixtures and the discoloring of laundered fabrics. Inorganic turbidity especially can have an abrasive effect on plumbing systems and may cause physical wear or erosion of pipes and fittings. Turbidity is most

commonly found at taps whose source is surface water from lakes, streams, and ponds.

Taste And Odor

Another set of problems that will quickly catch a consumer's attention is objectionable tastes and odors present in water. These two senses appear to work in unison which often makes it difficult to separate taste from odor.

A common characteristic of water from public systems is the chlorine taste and

“Aesthetic water problems have easily applied and proven solutions. Don't settle for unappealing water.”

odor which is often very apparent. Many public water systems treat water with chlorine to disinfect it. Although this is an important step in the treatment of water because it destroys disease-producing bacteria and other harmful organisms that may be present in water, there is no doubt that excess chlorine from the disinfection treatment step can make the water objectionable.

In other instances, water with a high mineral concentration may have an unpleasant soda or salty taste, and a metallic taste may be produced by the presence of iron or manganese in water.

Many people have also encountered water that contains hydrogen sulfide gas which creates an objectionable odor. So-called “sulfur water” not only produces the obnoxious “rotten egg” odor but is also corrosive to plumbing metals and can cause rapid tarnishing of silver. Even very low concentrations of hydrogen sulfide are detectable because of the strong odor.

Various taste and odor conditions are caused by the presence of organic matter in water. Even when the amount of organic matter is very low, unusual tastes and odors such as musty, fishy, or earthy

smells may be found.

It's important to note that tastes and odors affect drinking water as well as the foods and beverages prepared with the water.

Color

Another very noticeable water problem is unusual color, which can make the water unappealing to drink and may cause the staining of surfaces and materials touched by the water.

In some home water supplies, a yellowish coloration may be present. This color condition is organic in nature but presents no health hazard. It is caused by the presence of microscopic suspended particles.

This coloration occurs in regions where the water passes through marshlands and has percolated down through peaty soils. It is most likely to be found in the Southeast, Northwest, New England, and the Great Lakes regions of the United States and is more common in surface supplies and shallow wells than in deep wells.

Humic acids, often referred to as tannins, are the real cause of the color condition. Often the color is not highly visible in a glass of water, but can frequently be noticed when water is drawn for a bath. The white porcelain background of the tub can highlight even the slightest discoloration.

A more severe color condition may be caused by the presence of iron in the water. Depending on the type and state of the iron, the water may or may not be clear when it is first drawn. Water with dissolved iron in it may appear clear when it is first drawn but may turn a brown-red color when it stands exposed to air or when it is heated. However, water with precipitated iron may have a reddish color with red particles when it is first drawn.

The disadvantages of water that contains significant amounts of iron are obvious. It can leave brown-red stains on fixtures and dishes, as well as discolor laundry. It is also unappealing for drinking.

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Aesthetic Problems

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Standards

The U.S. Environmental Protection Agency (EPA) sets federal guidelines for contaminants that may adversely affect the aesthetic quality of drinking water. These secondary maximum contaminant levels (SMCLs) apply to any contaminant in drinking water which may adversely affect the odor or appearance of water and consequently may cause people to discontinue its use in favor of another supply or otherwise adversely affect "public welfare."

SMCLs differ from national primary (health related) maximum contaminant levels (MCLs) in that they are not federally enforceable. Instead, the SMCLs offer guidance to water quality based upon odor, aesthetics, and appearance; the primary MCLs are established by the EPA based upon potential adverse health effects.

Treatment

If the water in a consumer's home has these problems with turbidity, taste, odor, or color, what can be done? Fortunately, there are several products available that can be directly installed in the home to treat these problems. Point-of-use (POU) and point-of-entry (POE) technologies can treat water in the home and reduce these problems.

A process that is effective in reducing most of these aesthetic problems is the use of an activated carbon filter. These filters are specifically designed for the removal of solid particles from the water.

Activated carbon is a unique material known for its ability to adsorb soluble organic compounds and certain gases. This quality makes it specially suited for use in water treatment and allows it to act as a fine screen which traps solid particles but allows the water to pass through. Activated carbon filters are available in three forms: solid block, precoat, and granular.

Carbon filters may either attach directly to the faucet or may be installed under the sink, or filters for the whole house may be used for odor and staining problems.

Most taste and odor problems can be reduced with the use of an activated carbon filter. To combat the taste and odor problem of excess amounts of chlorine, for example, many consumers install a filter at the kitchen tap. The

filter adsorbs the excess amount of chlorine and produces tasty, clean water for cooking and drinking.

Turbidity may also easily be removed with an activated carbon filter or a particulate filter. The particulate filter will trap the fine particles that cause a cloudy appearance and will result in a clear, clean appearance.

The problem of hydrogen sulfide in water is a little more complex than many other odor problems. If the concentration of hydrogen sulfide is very low, then an activated carbon filter may be used. However, for greater concentrations, an iron removal filter should be effective in correcting the problem. For high concentrations of hydrogen sulfide, a chlorination system with activated carbon filtration would likely be the best solution. Chlorine is potentially harmful and should be handled carefully. Be sure to consult a professional.

Another treatment technique that is commonly used in the home is a process called reverse osmosis (RO). In this process, the water to be treated is forced against a semipermeable membrane which rejects contaminants suspended in the water. The membrane permits the new water to pass to a holding tank where it is then available for use. RO is effective in treating water that has a metallic taste as well as reducing numerous health contaminants. It is also often paired with an activated carbon filter.

Distillation is also often used for water treatment. A distillation system raises the water temperature to boiling. The water turns to vapor and leaves behind contaminants that have been dissolved in it, as well as microscopic solids, microorganisms, and organic materials. The clean water vapor then enters a condenser where it is cooled and returned to a liquid state. The process produces clean, clear water with a distinctive clarity.

To treat water that is colored as a result of the presence of humic acids, an anion exchange resin may be used. The resin will adsorb the organic bodies that cause the discoloration and will leave behind clear, sparkling water.

For color problems that are due to low or moderate amounts of dissolved iron in water, a household water softener may remove the impurity. The soluble iron is removed from the water by ion exchange, in the same way that hardness

is removed by a water softener.

If much of the iron is already precipitated or the iron concentration is too high for a water softener, an iron removal filter should be used. The filter forms a barrier that prevents the continued passage of iron in the water.

Whether a water problem involves turbidity, taste, odor, or color, the first step to its treatment is to have the water tested. This will determine the source of the problem so that the right treatment can be applied.

When the safety of the water is in question, it should be tested by a state certified, EPA certified, or other reputable laboratory. Testing for turbidity, taste, odor, and color problems may be performed in the home by a professional water treatment dealer.

Before purchasing a product, be sure to become an educated consumer. Determine what water problems the product reduces and to what level. Also check the product's performance capabilities, maintenance provisions, and warranty.

Aesthetic water problems have easily applied and proven solutions. Don't settle for unappealing water.

Please write:

Water Quality Association
Post Office Box 606
Lisle, Illinois 60532

for more information about POU water quality improvement technologies. □

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This consumer publication is published in cooperation with the Water Quality Association, 4151 Naperville Road, Lisle, IL 60532. Copyright © 1992 Water Quality Research Council

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