



# Water Treatment SOLUTION GUIDE



Providing safer, softer, water for life



Problem:

# HARD WATER

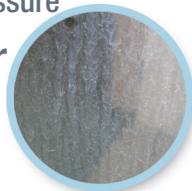
**Symptom:** Hard White Film, Scale Buildup, Haze on Fixtures, Lower Water Pressure

**Solution:** PurAwater Softener

**Description:** The hardness of water is a measure of the amount of minerals, primarily calcium and magnesium, it contains. Water softening, which removes these minerals from the water, may be desirable if:

- Large quantities of detergent are needed to produce a lather when doing laundry, or
- Scale is present on the interior of piping or water tanks, laundry sinks or cooking utensils.

Water that contains more than 1 Grain-Per-Gallon is considered to be hard and may cause plumbing and laundry staining problems. Water softening and reverse osmosis are the only ways to remove hardness. Radium, which is considered a carcinogen, is present in ground water. Certified water softeners are high quality by design, remove hardness and radium from ground water when softened. Additional benefit of a PurAwater Softener is its ability to remove radium.



**Symptom:** Rust Stains, Odor and Metallic Taste

**Solution:** PurAclear Whole Home Filter

**Description:** Iron in drinking water can be objectionable because it can give a rusty color to laundered clothes and may affect taste. Frequently found in water due to large deposits in the Earth's crust, iron can also be introduced into drinking water from iron pipes in the water distribution system. In the presence of hydrogen sulfide, iron causes a sediment to form that may give the water a blackish color. The Illinois Environmental Protection Agency (IEPA) has established a maximum concentration for iron in drinking water of 1.0 mg/L. Iron can be removed with PurAclear filters.



Problem:  
**IRON**



Problem:

# IRON BACTERIA/BACTERIA

**Symptom:** Slime in Toilet Reservoir, Iron Orange Staining, Rotten Egg Smell or Musty Smell

**Solution:** PurAclear Platinum or PurAclear

**Description:** When iron exists along with certain kinds of bacteria, a smelly biofilm can form. To survive, the bacteria use the iron, leaving behind a reddish brown or yellow slime that can clog plumbing and cause an offensive odor. This slime or sludge is noticeable in the toilet tank when the lid is removed. The organisms occur naturally in shallow soils and groundwater, and they may be introduced into a well or water system when it is constructed or repaired. This issue is common east of the Fox River.



Most disease-causing microbes exist in very small amounts and are difficult and expensive to find in water samples. “Indicator organisms” have been used for more than a century to help identify where fecal contamination has occurred and, therefore, where disease-causing microbes may be present. These organisms generally do not cause illness themselves. They do have characteristics that make them good indicators that fecal contamination has occurred and that harmful pathogens may be in the water.



**Symptom:** Glass Etching

**Solution:** PurAsure Whole House RO

**Description:** Silica is commonly found in all types of soil. As water moves through soil and rock, silica is picked up by the water and can eventually end up in the water supply. Silica in water can exist as a particulate, as a group of suspended fine particles (a colloid), or in a dissolved form. It is measured in milligrams (mg) of silica per liter (L), or mg/L. Silica in freshwater sources is found at concentrations ranging from 1 to about 100 mg/L, with groundwater concentrations typically at the higher end of that range. While silica does not pose any health risks at the levels found in drinking water, it can be a nuisance for customers. Silica may result in the appearance of a scale or film on glassware, shower doors, sinks, and faucets.



Problem:  
**SILICA**



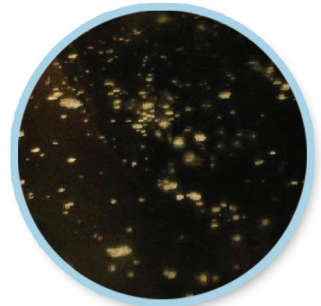
Problem:

# ORGANIC PARTICLES

**Symptom:** Particles in the Water

**Solution:** PurAclear Backwashing  
Activated Carbon Filter

**Description:** Many water treatment facilities use filtration to remove all particles from the water. Those particles include clays and silts, natural organic matter, precipitates from other treatment processes in the facility, iron and manganese, and microorganisms. Filtration clarifies water and enhances the effectiveness of disinfection.



**Symptom:** Cloudy, Milky Water

**Solution:** PurAsure Reverse Osmosis  
Drinking Water System

**Description:** The cloudy appearance of water caused by the presence of tiny particles. High levels of turbidity may interfere with proper water treatment and monitoring. Turbidity is a measure of water clarity how much the material suspended in water decreases the passage of light through the water. Suspended materials include soil particles (clay, silt, and sand), microbes, and other substances. These materials are typically in the size range of 0.004 mm (clay) to 1.0 mm (sand). Turbidity can affect the color of the water.



# Problem: TURBIDITY



Problem:

# CHLORINE

**Symptom:** Swimming Pool Smell, Dry Skin, Irritation, Color Changing Hair

**Solution:** PurAclear Backwashing Carbon Filter OR PurAwater Softener with Carbon

**Description:** Disinfection of public water supplies has dramatically reduced the incidence of waterborne illnesses and related mortality in the United States, with unquestionable public health benefit. However, chemical by products are formed when disinfectants such as chlorine react with organic matter, and long-term exposure to these chemicals may increase cancer risk.

- President's Cancer Panel 2008-2009 Annual Report [www.NIH.gov](http://www.NIH.gov)

Aqueous chlorine reacts with certain organic materials present in water sources to form trihalomethanes (THMs). Long-term exposure to these harmful by products of disinfection has been linked to an increased risk of cancer and infant birth delivery problems. It is estimated that THMs in drinking water are responsible for as many as 2-17 percent of the bladder cancers diagnosed each year in the United States.

- Water Quality Association [www.WQA.org](http://www.WQA.org)





**Symptom:** Swimming Pool Smell, Dry Skin, Irritation,  
Color Changing Hair

**Solution:** PurAclear Backwashing Activated  
Carbon Filter OR PurAwater  
Softener with Activated Carbon

**Description:** Sulfur bacteria, which eats away at the mineral  
sulfur, are the primary producers of large quantities  
of hydrogen sulfide. These bacteria

chemically change natural sulfates in water to hydrogen sulfide.

Sulfur bacteria live in oxygen sparse environments such as deep  
wells, plumbing systems, water softeners, and water heaters.

These bacteria can grow on the hot water side of a water system.

Hydrogen sulfide gas produces an offensive "rotten egg" or "sulfur  
water" odor and taste in the water. Sometimes the odor may be  
noticeable only when the water is initially turned on or when hot  
water is run. Heat forces the gas into the air, which may cause the  
odor to be offensive in a shower. Also associated with hydrogen sulfide  
includes its corrosiveness to metals such as iron, steel, copper and  
brass. It can tarnish silverware and discolor copper and brass  
utensils. Hydrogen sulfide also can cause yellow or black stains  
on kitchen and bathroom fixtures. Coffee, tea and other beverages  
made with water containing hydrogen sulfide may be discolored,  
and the appearance and taste of cooked foods can be affected.



Problem:

# CHLORAMINE

Problem:

# LOW pH

**Symptom:** Blue Green Stains

**Solution:** PurAclear pH Adjusting Filter

**Description:** Water with a low pH can be acidic and corrosive. Acidic water can leach metals from pipes and fixtures, such as copper, lead and zinc. It can also damage metal pipes and cause aesthetic problems, such as a metallic or sour taste, laundry staining or blue-green stains in sinks and drains. Water with a low pH may contain metals in addition to the before-mentioned copper, lead and zinc. Too much copper can cause permanent kidney and liver damage in infants. Adults with “Wilson’s Disease” are seriously affected by this. A good guide for well owners is to maintain a pH level of 6.5-8.5. Use a calcium carbonate neutralizing filter plus water softener or feed soda ash solution into water system with automatic chlorinator. If possible, consider replacing copper pipes with PVC pipes in the plumbing system.



**Symptom:** Musty Smell

**Solution:** PurAclear Platinum

**Description:** Many different microbes have demonstrated the ability to survive in water systems, with some possessing the ability to grow and/or produce biofilms. Some of these organisms may be primary pathogens (i.e., those that cause disease in healthy individuals), while others may be opportunistic pathogens (i.e., those that cause disease in individuals with underlying conditions that may facilitate infection). Microbes can enter distribution systems through a wide range of avenues, including treatment processes or through deficiencies of the distribution system infrastructure. Microbial presence in the distribution system can result in colonization of the distribution system infrastructure. Once biofilm development begins, subsequent material, organisms and contamination introduced to the distribution system can become entrained in the biofilm. The biofilm can protect microbes from disinfection and allow microbes injured by environmental stress and disinfectants to recover and grow. Also, biofilms may increase pipe corrosion, adversely affect pipe hydraulics and reduce the utility of total coliforms as indicator organisms. Microbial growth in biofilms may result in deterioration of water quality, generation of bad tastes and odors, and proliferation of macroinvertebrates. Contamination and material in the biofilm may subsequently be released into the flowing water under various circumstances. As a result, biofilms can act as a slow-release mechanism for persistent contamination of the water.



Problem:  
**BACTERIA**



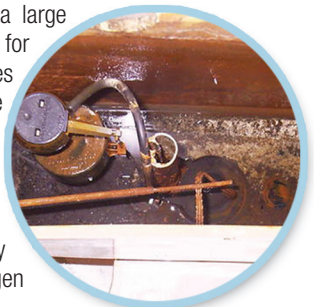
Problem:

# COLIFORM/E. COLI

**Symptom:** White Bubbles in Toilet Reservoir

**Solution:** PurAclear Platinum

**Description:** Members of two bacteria groups, coliforms and fecal streptococci, are used as indicators of possible sewage contamination because they are commonly found in human and animal feces. Although they are generally not harmful themselves, they indicate the possible presence of pathogenic (disease-causing) bacteria, viruses, and protozoans that also live in human and animal digestive systems. Therefore, their presence in streams suggests that pathogenic microorganisms might also be present and that swimming and eating shellfish might be a health risk. Since it is difficult, time-consuming, and expensive to test directly for the presence of a large variety of pathogens, water is usually tested for coliforms and fecal streptococci instead. Sources of fecal contamination to surface waters include wastewater treatment plants, on-site septic systems, domestic and wild animal manure, and storm runoff. In addition to the possible health risk associated with the presence of elevated levels of fecal bacteria, they can also cause cloudy water, unpleasant odors, and an increased oxygen demand.



Problem:

# SULFUR BACTERIA

**Symptom:** Slime with Rotten Egg Smell

**Solution:** PurAclear Platinum or  
PurAclear O3

**Description:** Sulfur bacteria, which eats away at the mineral sulfur, are the primary producers of large quantities of hydrogen sulfide. These bacteria chemically change natural sulfates in water to hydrogen sulfide. Sulfur bacteria live in oxygen sparse environments such as deep wells, plumbing systems, water softeners, and water heaters.

These bacteria can grow on the hot water side of a water system. Hydrogen sulfide gas produces an offensive “rotten egg” or “sulfur water” odor and taste in the water. Sometimes the odor may be noticeable only when the water is initially turned on or when hot water is run. Heat forces the gas into the air, which may cause the odor to be offensive in a shower.

Also associated with hydrogen sulfide includes its corrosiveness to metals such as iron, steel, copper and brass. It can tarnish silverware and discolor copper and brass utensils. Hydrogen sulfide also can cause yellow or black stains on kitchen and bathroom fixtures. Coffee, tea and other beverages made with water containing hydrogen sulfide may be discolored, and the appearance and taste of cooked foods can be affected.



Problem:

# METHANE

**Symptom:** Faucet Spitting Water, Bubbling Water

**Solution:** PurAwater Air Stripper

**Description:** Methane (CH<sub>4</sub>) is a naturally occurring hydrocarbon that is colorless, odorless & tasteless. Methane is the chief constituent of natural gas, and high concentrations of the gas can cause oxygen-deficient atmospheres, flammable situations, or explosive environments. Potential sources of methane gas, also referred to as natural gas, fire-damp, and marsh gas, include: coal seams, oil and gas formations, organic rich shale formations, and environments with decaying organic matter such as landfills and swamps. Methane gas may migrate through underground geologic formations and be transported by ground water in dissolved or pure gaseous states. Methane generally migrates from areas of high pressure to areas of lower pressure. Methane in groundwater is not explosive; however, when water containing dissolved methane comes into contact with air, the methane quickly escapes from the water into the atmosphere. If this occurs in a confined space, the methane could ignite at concentrations between 5 and 15 percent, and result in an explosion. A nearby electrical outlet, pilot light, well pump, or a match can be the source for the ignition. EColi bacteria is almost always present with methane.



**Symptom:** Bad Tasting Water

**Solution:** PurAsure R0

**Description:** Total Dissolved Solids (TDS) are dissolved solids plus suspended and settleable solids in water. A high concentration of total solids will make drinking water unpalatable and might have an adverse effect on people who are not used to drinking such water. Sources of total solids include industrial discharges, sewage, fertilizers, road runoff, and soil erosion. Total solids are measured in milligrams per liter (mg/L).



Problem:  
**ORGANIC MATTER,  
CHEMICALS, OR TDS**



Problem:

# HYDROGEN SULFIDE

**Symptom:** Rotten Egg Smell or Black Oily Particles

**Solution:** PurAclear Platinum OR  
PurAclear O3

**Description:** Hydrogen sulfide gas also occurs naturally in some groundwater. It is formed from decomposing underground deposits of organic matter, such as decaying plant material. It is found in deep or shallow wells and also can enter surface water through springs, although it quickly escapes to the atmosphere. Hydrogen sulfide often is present in wells drilled in shale or sandstone, or near coal or peat deposits or oil fields.

Blackening of water or dark slime coating the inside of toilet tanks may indicate a sulfur-oxidizing bacteria problem. Sulfur-oxidizing bacteria are less common than sulfur-reducing bacteria.

## Sources:

<http://www.idph.state.il.us/envhealth/factsheets/ironFS.htm>  
<http://www.idph.state.il.us/envhealth/factsheets/radium.htm>  
[http://water.epa.gov/lawsregs/guidance/sdwa/upload/2009\\_08\\_28\\_sdwa\\_fs\\_30ann\\_treatment\\_web.pdf](http://water.epa.gov/lawsregs/guidance/sdwa/upload/2009_08_28_sdwa_fs_30ann_treatment_web.pdf)  
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