

WARREN WATER DISTRICT

Chloramine Q & A

In September 2006, the District converted from chlorine to chloramines disinfection. Use of chloramines rather than chlorine for disinfection is not new technology. Chloramination is in widespread use across the U. S., including many water systems in the state of Iowa. Water disinfected with chloramines is perfectly safe for drinking, bathing, cooking, and other uses just like water disinfected with chlorine. There are, however, two groups who need to take special care with chloraminated water:

Kidney Dialysis Patients
Live Fish or Other Aquatic Animal Owners

The following Q&A is intended to address many of the questions District customers may have regarding chloramination.

1. Where does the District purchase water and what is their current drinking water disinfection method?

The District receives water from Des Moines Water Works (DMWW). DMWW uses chlorine to disinfect the water delivered to the District as required by the U.S. Environmental Protection Agency (EPA). Chlorine, added to drinking water at a controlled level, is an effective disinfectant that kills many kinds of potentially harmful bacteria. The level of chlorine in the water dissipates with time so the District adds additional chlorine and ammonia at the entry point to the North System to maintain bacterial control.

2. Why did Warren Water District switch to Chloramination?

The District is making the switch to chloramination to reduce the formation of byproducts that form when the additional chlorine is added to the drinking water at the District's entry point. These byproducts, called trihalomethanes (THMs), result when chlorine combines with trace amounts of naturally-occurring organic matter in the water. THMs are suspected carcinogens (cancer-causing substances) when present at elevated levels and consumed over a lifetime. Switching to chloramination will reduce the levels of THMs and allow the District to comply with this important drinking water regulation.

3. What is chloramination?

Chloramination is a method of disinfection that combines chlorine with ammonia in a carefully controlled ratio to form a disinfectant called chloramine. Chloramine is less reactive than chlorine but still provides protection against bacteria in drinking water. Chloramination has been used by water utilities in the U.S. since the early 1900's. Rathbun Regional Water Association and the Cedar Rapids Water Department are two examples of water utilities in the state of Iowa that use chloramination.

4. What are the benefits to using chloramine instead of chlorine?

Chloramine is less reactive than chlorine and as a result it does not form byproducts as readily. THM production is significantly reduced when water is disinfected with chloramine as compared to chlorine. This will result in THM levels safely below the EPA established maximum. The less reactive nature of chloramine also makes it more persistent in the distribution system allowing disinfectant to reach the most remote areas of the system.

5. What are the drawbacks to using chloramine instead of chlorine?

Chloramines can accelerate the aging of natural rubber products such as hoses, toilet flap valves, and gaskets as described in the answer to question #11 and they are more persistent than chlorine which requires special attention if water will be used with fish or for kidney dialysis.

6. What alternatives have been considered other than chloramination?

Other options are somewhat limited by EPA regulations which require all drinking water suppliers using surface water to control bacterial growth by maintaining a residual disinfectant concentration throughout the drinking water distribution system. Residual disinfectant is required and at this point in time chlorine and chloramine are the only two available options.

7. Will my home treatment unit remove chloramines?

Chloramine is more persistent than chlorine. Chloramine can not effectively be removed by letting the water stand or by boiling. Similar to chlorine, chloramines will not be removed by water softeners or by filters not specifically designed to remove them. Although it is not necessary to remove chloramines from drinking water from most household uses including drinking, cooking, and bathing, chloramines can be removed fairly effectively using a properly maintained granular activated carbon (GAC) filter followed by reverse osmosis (RO). This method may not be adequate for kidney dialysis patients or for water to be used in aquariums.

8. What impact does chloramines have on plants?

The effect of chloraminated water on plants is no different than the effect of chlorinated water. Chloramine like chlorine is typically neutralized by chlorine demand in the soil. Chloraminated water can safely be used to water all types of plants including house plants, lawns, trees, shrubs, flowers, and garden vegetables. Customers who practice aquaculture (growing plants in tanks or ponds) should seek advice from the plant supplier regarding the use of chloraminated water.

9. What impact does chloramines have on animals?

Chloraminated water is safe for animals that do not live in water because their digestive system will neutralize chloramine before it enters the bloodstream. Chloraminated water is not safe for fish, reptiles, and amphibians.

10. What impact does chloramines have on fish?

Chloramine like chlorine is toxic to both fresh and salt water fish and other aquatic animals. Chloramines are toxic to fish because they take the chloramine directly from the water into their blood stream through their gills. Chloramine must be removed from any water that will be used with aquatic animals including fish, lobsters, shrimp, snails, clams, frogs, turtles, etc. Chloramine is more persistent than chlorine and special care must be taken to ensure it is removed completely. Products specifically designed to remove chloramines are available at pet stores and other retail outlets. If you are already using a product to remove chlorine it may also remove chloramine, however, you must read the label to be sure. Products not specifically designed to remove chloramine may leave ammonia in the water which can also be toxic to aquatic animals.

11. What impact does chloramines have on pipes and other plumbing fixtures?

Chloramines are not harmful to pipes but in some cases they can accelerate the aging of natural rubber products such as hoses, toilet flap valves, and gaskets. When the time comes to replace these parts, replacing them with properly formulated synthetic materials can eliminate this problem.

12. What are the health implications of using chloraminated water?

Chloraminated water is safe for all normal household uses including drinking, cooking, and bathing. When chloraminated water is consumed, monochloramine, the most common form of chloramine in chloraminated drinking water, is broken down quickly and eliminated through the urine. There is no evidence that chloramines accumulate in the body and there is no evidence that chloramines absorb through the skin.

The primary health implication for both chlorinated and chloraminated drinking water is that chlorine forms byproducts when it comes in contact with trace amounts of naturally occurring organic material in the source water. These byproducts called THMs are a contaminant regulated by the EPA. Formation of THMs is dramatically reduced by the use of chloramination instead of chlorination and that is in fact the primary reason for this proposed change.

People with weakened immune systems, including those undergoing chemotherapy and persons with HIV/AIDs should consult a health care professional about using specially treated water instead of water from any normal public source.

13. Can infants, children, and pregnant women drink chloraminated water?

Chloraminated water is safe for consumption by all persons including infants, children, and pregnant women.

14. What precautions must kidney dialysis patients take?

Chloramines like chlorine are harmful if they go directly into the bloodstream. In the dialysis process, water comes into contact with blood across a permeable membrane. Chloramines in dialysis water would be toxic and therefore must be removed from water used in kidney dialysis machines.

Dialysis centers are responsible for purifying water that enters their dialysis machines. We are not aware of any centers that perform dialysis treatments in the Warren Water District service area. Customers with home dialysis equipment must contact their physicians or dialysis centers regarding chloramination and how it will affect them. Chloramines must be removed from any water that will be used in the dialysis process. Dialysis patients can also contact the manufacturer of their dialysis equipment for information.

For More Information:

Please call the Warren Water District Office at 515-962-1200/1-866-962-1200 or Des Moines Water Works Laboratory at 515-283-8787