

wellcare® information for you about

CHLORINE DISINFECTANTS & THEIR BYPRODUCTS

What are Chlorine Disinfectants and Disinfectant Byproducts?

Chlorine-based disinfectants are used to kill harmful bacteria and parasites, such as *E. coli* and *giardia lamblia*, in drinking water. The common compounds are chlorine, chloramines, or chlorine dioxide.

Disinfectant byproducts are the result of chemical reactions between organic and inorganic substances and chlorine that is left over from water treatment. The most common byproduct is total trihalomethanes. Others include bromate, chlorite, and haloacetic acids.

Chlorine disinfectants are used routinely by more than 98 percent of public water systems to protect their customers from waterborne diseases. This type of treatment dates back more than 100 years.

While only a small percentage of individual wells test positive for bacteria and viruses each year, those that do will likely turn to chlorine disinfectants to treat their water. If chlorine remains in the well, it could react with organic and/or inorganic substances and create disinfectant byproducts. The concentration of these disinfectant byproducts could depend on a number of variables, including the time of year. For example, total trihalomethanes levels are generally lower in winter than in summer. This is because the amount of natural organic matter is less, and a reduced amount of chlorine is needed to disinfect water at colder temperatures.

What are the health effects of Chlorine Disinfectants and Disinfectant Byproducts?

The EPA has outlined both the health effects and the maximum allowed levels of chlorine disinfectants and their byproducts in public water supplies. The limits listed below are also a good guide for well owners.

Disinfectants

- **Chlorine:** Can cause eye and nose irritation and stomach discomfort. Limit to 4 parts per million (ppm).
- **Chloramines:** Can cause eye and nose irritation, stomach discomfort and anemia. Limit to 4 ppm.
- **Chlorine dioxide:** Can cause anemia, nervous system problems in infants and young children and similar effects on fetuses during pregnancy. Limit to 0.8 ppm.

Disinfectant Byproducts

- **Total Trihalomethanes:** Can cause liver, kidney or central nervous system problems, can increase the risk of cancer. Limit to .08 ppm.
- **Bromate:** Can increase the risk of cancer. Limit to .01 ppm.
- **Chlorite:** Can cause anemia, nervous system problems for infants and young children and similar effects on fetuses during pregnancy. Limit to 1 ppm.
- **Haloacetic Acids:** Can increase the risk of cancer. Limit to .06 ppm.

How do I test for Disinfectants and Disinfectant Byproducts?

All well owners should test their well water for a minimum of bacteria every year. Only those who are treating their water with chlorine or have nearby pools and spas need to worry about disinfection and disinfection byproducts. To test your well water, contact your state or local health department for a list of state-certified laboratories in your area or use [our interactive map](#).

What are the treatments for Disinfectants and Disinfectant Byproducts in well water?

Consider using another disinfection product, other than chlorine, to treat bacterial contamination in your well water. Other options include ultra-violet light and ozone-based systems.

Another option is to treat the water before it is disinfected, to remove the organic matter that reacts with chlorine, through systems called enhanced coagulation or enhanced softening. Or you can treat the water after disinfection, using activated carbon filters that remove chlorine and its byproducts.

Treatment systems should be certified by NSF or Water Quality Association (WQA) when available. To find treatment systems that are certified visit [NSF](#) or [WQA](#) websites. It is necessary to maintain treatment devices as specified by the manufacturer or your water treatment professional. You should also retest your water after treatment is installed and after maintenance to confirm the effectiveness of the device. Contact a certified water treatment professional for guidance. To locate a certified water treatment professional in your area, visit [WQA's](#) website.

However, if your well water is persistently plagued by bacterial contamination that requires such treatments you should have your well system inspected to make sure the construction of the well has not been compromised. To locate a licensed well contractor in your area use [our interactive map](#).

For More Information on Chlorine Disinfectants & Their Byproducts

Contact your licensed well contractor, local health department, state environmental agency, or the [wellcare®](#) Hotline.



Information to help maintain and protect your water well system:

[wellcare®](#) is a program of the [Water Systems Council \(WSC\)](#). WSC is the only national organization solely focused on protecting the health and water supply of an estimated 23 million households nationwide who depend on private wells (according to the U.S. EPA).

This publication is one of more than 100 [wellcare®](#) information sheets available FREE at www.watersystemscouncil.org.

Well owners and others with questions about wells and well water can contact the [wellcare®](#) Hotline at 1-888-395-1033 or visit www.wellcarehotline.org to fill out a contact form or chat with us live!

JOIN THE WELLCARE® WELL OWNERS NETWORK!

By joining the FREE [wellcare®](#) Well Owners Network, you will receive regular information on how to maintain your well and protect your well water.

Contact us at 1-888-395-1033 or visit www.wellcarehotline.org to join!