



Did you know . . .

Performance capabilities can vary widely from one system to the next. When selecting a system, be sure to research the quality of your incoming water supply first, and then look for systems that are NSF certified to address the contaminants of most concern in your area.



Understanding Disinfection Byproducts in Drinking Water

Most public water utilities use some form of disinfection to protect customers against the potential presence of bacteria in the drinking water supply. Chlorine, ozone, chloramines and chlorine dioxide are some of the more common disinfection techniques used at water treatment facilities today.

Over the years scientists have discovered that byproducts can develop when disinfectants are used to treat source water containing certain compounds. To protect public health, state and federal agencies have set monitoring requirements as well as maximum contaminant levels for many byproducts, including trihalomethanes, haloacetic acids, bromate and chlorite.

Chlorination Byproducts

Chlorine is one of the most widely used forms of disinfection in the U.S. today. When used to disinfect water supplies containing high levels of organic matter, however, chlorine can combine with organic matter in the water to form total trihalomethanes (TTHMs) as well as haloacetic acids (HAAs or HAA5).

- TTHMs are made up of a group of four chemicals: chloroform, bromoform, bromodichloromethane and dibromochloromethane. The U.S. EPA has set a maximum annual average for all four chemicals combined at 80 ug/L.
- The HAAs/HAA5 group consists of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid. The current maximum annual average of HAAs/HAA5 permitted under U.S. EPA regulations is 60 ug/L.

Long-term exposure to TTHMs above 80 ug/L could lead to liver, kidney or nervous system problems and increased risk of cancer, while exposure to HAAs/HAA5 in excess of 60 ug/L for long periods is believed to increase the risk of cancer.

Ozonation Byproducts

Ozone has also been used for many years to disinfect drinking water. This type of disinfection super oxygenates the water, which kills many forms of bacteria and parasites. Because ozone does not leave a protective residual in water, water utilities may combine the use of ozone with a form of chemical disinfection like chlorine to help maintain the microbiological quality of the water as it travels through the utility's water distribution system.

If bromide is present in the source water and ozone is used for disinfection, a disinfection byproduct known as bromate can develop. Long-term exposure to bromate is suspected to affect kidney function in some people. Water utilities that use ozone are required to monitor for bromate, and the annual average detected cannot exceed 10 ug/L.

Chlorite

Chlorite is a byproduct that develops when chlorine dioxide gas is used to disinfect drinking water. The U.S. EPA advises that some infants and young children who drink water containing excess levels of chlorite could experience nervous system effects, while other people may experience anemia. Water utilities that use chlorine dioxide are required to monitor the water for chlorite several times a month to ensure their monthly average does not exceed 1 mg/L.

The only disinfection byproduct that can be effectively reduced by home water treatment systems today would be TTHMs; a list of units certified to treat TTHMs is available on the [NSF consumer site](#). If using a filtration system, be sure to change the filter at the interval recommended by the manufacturer, and always use the correct manufacturer's replacement cartridge intended for your specific system.

If your water quality report shows that any of the other byproducts are present at high levels, you may want to consider using [certified bottled water](#) for drinking and cooking.