

For More Information

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Measuring Free Chlorine

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Operators with water systems that provide chlorine disinfection must test for free chlorine to ensure effective treatment. The U.S. Environmental Protection Agency (EPA) approved test methods for this purpose. Although these test methods are simple and reliable, operators can get poor results if they don't use proper techniques.

Small water systems usually use the DPD colorimetric and ITS test strip methods. These test methods use an indicator chemical that develops a color when added to chlorinated water. The color turns darker with higher chlorine residuals. Users compare this color to a color scale to read the chlorine residual in milligrams per liter (mg/L). If there is no color change, there is no chlorine in the water. If you have color blindness, you may have difficulty reading the true color.

Free chlorine is a stronger disinfectant than other types of chlorine. Systems that disinfect must maintain detectable chlorine residual in the distribution system. A free chlorine residual of 0.2 mg/L meets this requirement. Systems with a contact time (CT) requirement must also maintain a free chlorine level at the point of entry and/or in the distribution system.



ITS Test Strip Method

ITS Test Strip Method

Limitations	Prevent ITS Test Strip Errors
<ul style="list-style-type: none"> • Use only EPA-approved ITS free chlorine SenSafe™ test strips, not hot tub or pool test strips. • This method is approved to measure chlorine residuals between 0.1 and 6.0 mg/L. • Residuals less than 0.2 mg/L cause a color change, but the color may be too light to measure accurately. • The test strip method also measures other oxidants such as permanganate, bromine and iodine. • Test strips are temperature sensitive. Base the test strip dip time on the water temperature. 	<ul style="list-style-type: none"> • Dip the test strip in a 50 ml water sample and adjust dip time according to the temperature compensation chart. • Remove the test strips and shake once to remove excess water and read results in 20 seconds. • Match the colors in a well-lighted area. Do not match colors in strong, direct light. • Do not touch the reactive pad. This may contaminate the pad and affect results. • Store the strips at room temperature and keep away from excessive humidity. • Use a different method if any oxidants, such as permanganate, bromine or iodine are present.

DPD Colorimetric Method

Limitations	Prevent DPD free chlorine test errors
<ul style="list-style-type: none"> • Use this method to measure chlorine residuals between 0.2 and 3.5 mg/L. • Chlorine residuals less than 0.2 mg/L cause a color change; but the color may be too light to measure accurately. • Manganese can make the reading higher than it should be by reacting with the DPD indicator chemical. • Discolored or cloudy water can change the color and produce inaccurate results. • The free chlorine DPD test may measure combined chlorine if you don't follow the manufacturer's directions. • The DPD method also measures other oxidants such as permanganate and ozone. • High levels of combined chlorine in the water can cause false free chlorine residual results. If the color darkens over several minutes, the results may not be accurate. 	<ul style="list-style-type: none"> • Use the free (not total) chlorine indicator. • Read the results within 1 minute after you add the indicator chemical. After 3 minutes, the test shows total chlorine not free chlorine residual. • Use the stopper not your finger when mixing the indicator chemical in the viewing tube. • Store the color disc out of direct sunlight to prevent fading. • Fill the sample tube to the level specified in the instructions, usually 5 milliliters (about 1 teaspoon). • The indicator chemical does not have to dissolve completely for accurate readings. • Very high chlorine residuals cause the pink color to fade quickly away. • Read your results in a well-lighted area with no interfering background colors. • Take care when reading color wheel results below 0.5 mg/L.



DPD Colorimetric Method

For any test field kit, be sure to read and follow the manufacturer's instructions. Also check the expiration date for the chemicals prior to use. If it's expired, don't use it.

Tips for Sample Collection

- Keep the sample containers clean and scratch-free. Replace discolored or damaged containers.
- Take samples only from cold-water taps.
- Collect samples in the distribution system from actively used connections.
- Let the water run for a while before collecting the water sample.
- Fill the sample container directly from the sample tap.