DEPARTMENT OF HEALTH

Free Chlorine Residual Measurement Guide

NONCOMMUNITY PUBLIC WATER SUPPLY UNIT

What methods can I use for chlorine residual measurement?

Free chlorine residual measurements must be made using a DPD colorimetric or an approved amperometric method. Test strips are not allowed for compliance measurements. Both digital and visual color-comparator style instruments are allowable if the range and precision of the instrument allows for:

- Minimum measurement range of 0.1 mg/L or lower.
- Maximum measurement range of 3.0 mg/L or higher.
- Increments of 0.1 mg/L or less in the range of 0.1 mg/L - 0.5 mg/L.
- Increments of 0.5 mg/L or less in the range of 1.0 mg/L to 3.0 mg/L.

Where should I measure chlorine residual?

For systems serving less than 500 people, daily chlorine residual measurements should be taken from the first tap available after the final storage or contact tank, defined as the Entry Point. These measurements must be recorded on the monthly monitoring form that is submitted to MDH at the end of each month. In addition to the daily measurements, a single free chlorine residual measurement is required to be taken each month at the same time and location as the monthly total coliform bacteria sample. This sample should be taken from a tap on the distribution system (e.g. at a cabin or other building downstream of the treatment facility).

How can I ensure my measurements are accurate and reliable?

- Old water will rapidly lose chlorine residual. Sample at the time of peak water usage and flush the tap for at least 1 minute prior to sampling.
- Fill the sample vial to the correct level for the corresponding DPD reagent packets (usually 5 milliliter (mL) or 10 mL).
- Ensure that DPD reagent packets are not expired.
- Rinse the sample vial after usage to prevent staining. Store dry.
- When using a visual color-comparator, read the sample in good lighting. Ensure that the sample vials are not stained and that the color-comparator is not faded.
- When using a digital instrument, refer to the manual to ensure you are using the correct mode (e.g. low range or high range) and vial size for the intended measurement.

What if my chlorine residual is lower than the required value?

If the chlorine residual is lower than the required minimum value, action must be taken to restore the residual. It is a violation of the Safe Drinking Water Act for the Entry Point residual to be less than 0.2 mg/L for more than 4 hours or to be less than the required minimum in 5% or more of monthly measurements.

To troubleshoot low chlorine residuals, use the table, **Troubleshooting Low Chlorine Residual** found on the following page.

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To obtain this information in a different format, call: 651-201-4700.

Troubleshooting Low Chlorine Residual

Cause	Indications	Solution
Low water usage	The water meter reading hasn't changed. The water storage tank level hasn't changed. The feed pump hasn't been heard running. There are very few people on-site using water.	Flush system until required residual is achieved
Broken roller tube (peristaltic pumps only)	The pump runs but the chlorine level in the feed tank doesn't go down. Leaks or puddles under the pump motor.	Replace roller tube
Broken diaphragm or check valve seats (diaphragm pumps only)	The pump runs but the chlorine level in the feed tank doesn't go down. The pump won't prime.	Replace component
Broken discharge line	The pump runs and chlorine level in the feed tank goes down. Leaks or puddles under the discharge line.	Replace discharge line
Broken suction line	The pump runs but the chlorine level in the feed tank doesn't go down. Air bubbles are visible in the suction and/or discharge lines. No leaks or puddles. Other pump components are in good condition.	Replace suction line
Old bleach	The pump runs and chlorine level in the feed tank goes down. The pump speed needs to be increased or the chemical tank needs filling more frequently. The bleach is older than 3 months.	Refill chemical tank with new bleach
Clogged injection point	The pump runs and the chlorine level in the feed tank may or may not go down. Leaks or puddles under injection point.	Clean or replace injection quill
Chemical tank is low/empty	The pump runs. The level of chemical in the feed tank is at or near the bottom.	Refill chemical tank
Residual is >20 mg/L	When measuring residual, the DPD reagent flashes a dark color that quickly disappears. The pump runs and chlorine level in the feed tank goes down. You have increased the pump speed or refilled the feed tank recently. The water smells/tastes like chlorine.	Flush entire system and reset pump speed to regular level
Electrical issue	The pump does not run.	Check power to pump and pressure switch. Consult electrician.