

The Importance of Monitoring Chlorine Residuals

Many water systems in Kansas presently use the Hach CL17 Chlorine Analyzer. This is a very reliable tool as long as it is routinely maintained. One of the most important aspects of operating any water system is having good chlorine residuals. Good residuals helps ensure that the water is safe to drink. Many water systems, large and small, have chosen to use online chlorine analyzers, and as mentioned, the Hach CL17 is very common.

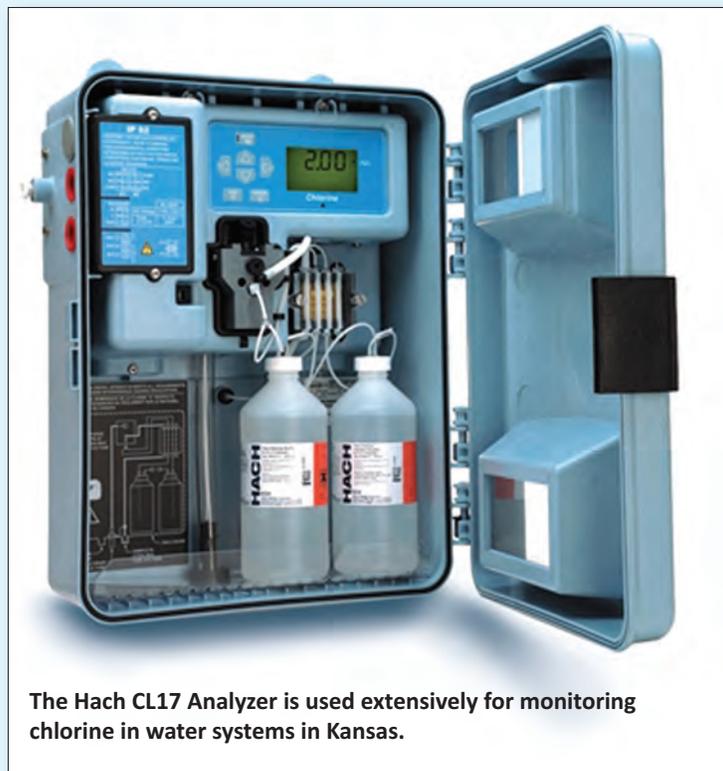
The CL17 Analyzer is a microprocessor-controlled, process analyzer designed to monitor a sample stream continuously for chlorine content. Either free or total chlorine, in the range of 0 to 5 mg/l, can be monitored.

The CL17 Analyzer can be connected to a chart recorder or computer system so the operator can better monitor chlorine residuals. The analyzer is designed to capture and analyze a portion of the water sample every 2.5 minutes. The sample portion is captured in the colorimeter measuring cell where the blank absorbance is measured. Measurement of sample blank absorbance allows compensation for any turbidity or natural color in the sample, and provides an automatic zero reference point. Reagents are added at this point to develop the magenta color, which is measured and compared to the reference.

One of the main problems I see with water systems is that this instrument is not cleaned or properly maintained. When I receive calls because the analyzer isn't working properly, it is because it has sediment buildup or a film growth on the inside walls. Maintenance issues usually involve tubing that needs to be replaced. Over a period of time, the clamping action of the pump valve module will soften the tubing and cause it to collapse, which will then obstruct the flow of reagents. Either issue will cause the chlorine analyzer to not function accurately.

Analyzers should be cleaned monthly

Cleaning analyzers should be performed on a monthly basis. When the reagents are changed, the colorimeter measuring cell should also be cleaned thoroughly.



The Hach CL17 Analyzer is used extensively for monitoring chlorine in water systems in Kansas.

Depending on the sampling conditions, it may be necessary to clean the unit even more often than once a month. The colorimeter cell cleaning procedures are listed in the Hach operational manual which comes with the analyzer. It is important to have this manual available. Those steps are listed as follows:

1. Press the MENU key, then press the down ARROW key until the MAINT menu appears. Press ENTER.
2. Press the down ARROW key to scroll to the CLEAN option. Press ENTER.
3. Locate the colorimeter.
4. Remove the rubber plug on top of the colorimeter assembly.
5. Remove the magnetic stir bar which can be done by using a paper clip to retrieve.
6. When CLEAN flashes on the status line of the display, fill the colorimeter with 19.2 N Sulfuric Acid Standard Solution.
7. Allow the sulfuric acid to stand in the colorimeter for 15 minutes.
8. Use a cotton tipped swab with a wooden handle to scrub the interior surfaces of the colorimeter cell and the stir bar.

9. Replace the stir bar.
10. Put the rubber plug back in place on top of the assembly. Be sure that the cover is on the viewing port.
11. Press the EXIT key which will immediately return to normal operation. If not, the colorimeter will resume normal operation automatically after a period of 60 minutes.

Routine maintenance on the instrument should be addressed every six months. This will include replacing tubing that breaks down due to clamping of the pump valve module and/or high operating temperatures. The reagent tubes may darken before the scheduled maintenance time but that will not affect performance of the analyzer.

Tube replacement procedures can also be found in the Hach operating manual. They are as follows:

1. Shut off the sample flow to the analyzer by setting the POWER switch to OFF.
2. Remove screws which secure the pinch plate to the pump/valve module. Do this in small increments so that tension is relieved evenly and remove the plate.
3. Disconnect the tubes from the inlet and outlet fittings and throw away the tube assemblies.
4. Cut four 2-inch lengths of 1/16 inch ID tubing (white). Install one 1/16 to 1/8 barb elbow fittings in one of the 1/16 inch ID tubes and 1/16 inch barb union fittings in the three remaining tubes. Even though one of the pump tubes isn't used for fluid flow, it has to be

included so that there is even compression on all four tubes.

5. Reinstall the pinch plate to the pump/valve module. Again, tighten the screws in small increments. Don't over tighten.
6. Set the POWER to ON and restore flow through the analyzer. It will need to run for about one hour in order to fill the reagent lines.

Maintenance kits can be purchased from either Hach or suppliers. The kits can be purchased assembled or unassembled. The assembled kits have pre-cut lengths of tubing.

I recommend that water systems that do not have online analyzers to consider purchase of them because they provide valuable data to better determine the amount of chlorine in the system. This allows the operator to know whether to increase or decrease chlorine feed rates. Proper cleaning and maintenance of analyzers already in use will help your system operate more smoothly and with the confidence of water quality being monitored.

Lonnie Boller is a Technical Assistant at KRWA. He has been employed by KRWA since 2001.

Lonnie is a Class II certified operator; he previously was Water Plant Supervisor for the City of Horton. He has also attended and completed training at the University of Kansas Law Enforcement Training Center.



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