

Monitoring Residual with a Continuous Chlorine Analyzer

The most common chlorine analyzer in use in Kansas is the Hach CL17 analyzer. This analyzer is commonly found in both surface water treatment plants and well water systems.

The CL17 analyzer is a colorimetric meter designed to continuously monitor a sample stream for residual chlorine. Either free or combined chlorine residuals ranging from 0 – 5 mg/L can be monitored. The CL17 analyzers are commonly connected to a chart recorder or a computer SCADA system, allowing an operator to remotely monitor chlorine residuals. The analyzer is designed to capture, measure and record a residual every 2.5 minutes. A sample enters the colorimetric cell where the sample

blank is measured. Measurements of the sample blank absorbance cell allows compensation for any turbidity or natural colors in the sample and provides an automatic zero reference point. DPD reagents are added at this point to develop the magenta color, which is measured and compared to the reference. The color intensity is directly proportional to the amount of chlorine in the sample.

It is vital that operators periodically verify the lab measurements with standard solutions. Standards can be purchased from Hach to verify the instrument. This can also be done with a portable colorimeter, commonly used in water systems. The accuracy of the CL17 should be plus or minus ten percent (10%). If it does not meet that

level of accuracy, the instrument will have to be re-calibrated. The CL17 instrument manual includes directions for calibrating the unit. It can also be sent to the Hach Company for repairs.

Adequate chlorine residual measurements are the key to quality water, whether a drinking water system is using combined or free chlorine.

But like any piece of equipment, the analyzer will require some maintenance. One 500 mL bottle each of buffer and indicator solution lasts approximately one month. Old containers should be discarded with any unused contents and be replaced with new bottles. I also recommend cleaning the scale using the acid solution and Q-tips provided with the instrument.

Over time, the pump/valve module's clamping action will soften the tubing and cause it to collapse and obstruct liquid flow. This breakdown is more accelerated at high temperatures. Hach recommends that the tubing be replaced every three to six months. Replacement kits can be ordered from Hach or other providers.

When replacing the tubing, I recommend shutting the power off to the analyzer. Remove the screws securing the pinch plate to the pump/valve module, moving from one screw to the other to allow tension to be relieved evenly. Then remove the plate. Discard the old tubing assemblies, replacing one tube at a time. Precut tubing can be ordered or an operator can take this task on. Replacing the tubing is not too complicated and will ensure good function and accuracy of the instrument.



KRWA Surface Tech Lonnie Boller checks the tubing on CL17 Analyzer after installation in the new training trailer being assembled by KRWA.

Cleaning the colorimeter

Cleaning the inside walls of the measuring cell with an acid solution and a cotton swab every month is recommended. In some cases, the cell may have to be cleaned more often. During this procedure, the instrument should be set to maintenance mode. The operator will need to press the menu and then scroll down to maintenance. When "Maintenance" appears, press "Enter" and then press the down arrow key to scroll to the cleaning option. Then press "Enter" again. At this point the operator should remove the rubber plug on top of the colorimeter. Remove the magnetic stir bar with a small screwdriver or paperclip. Then wait until "Clean" flashes on the status line of the display. Next, fill the colorimeter with the acid solution provided with the instrument. Allow the acid to stand in the colorimeter for 15 minutes. Insert a Q-tip into the opening and move it up-and-down with a gentle scrubbing action. Then reinstall the stir bar and rubber plug. Press the "Enter" key to return to normal operations immediately.

KRWA also constructed an automatic flush building to help improve chlorine residuals at the far ends of water systems.

Over the years Kansas Rural Water Association has helped scores of water systems improve chlorine residuals using chlorine analyzers. In some cases where rechlorination is needed, we have added an extra analyzer to control chlorine and ammonia feed pumps. When the analyzer detects a low residual, it will automatically turn on chemical feed pumps to help increase chlorine residuals.

KRWA also constructed an automatic flush building to help improve chlorine residuals at the far ends of water systems. This building will

automatically analyze chlorine residuals and if residuals are low, it will automatically flush the system until residuals improve. The unit can also be monitored from a computer or cell phone. Not only will the flush building monitor the chlorine residuals, it will also monitor water pressures, temperatures, and rate of flow being flushed.

If any water system is having difficulty maintaining chlorine residuals, then that system is a probable candidate for continuous chlorine monitoring. Give KRWA a call or send an email to me at lonnie@krwa.net. I would be pleased to review the situation and discuss the available options.

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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