



Proper Chlorine Monitoring and Testing Essential to Verifying Water Quality

Many water systems have been using the Pocket Colorimeter II™ to test chlorine residuals. The Pocket Colorimeter II is factory programmed for one or two of more than 30 possible parameters. However, the user needs to know what chlorine is being tested for – Free or Total – and also high or low range. When someone is testing in low range, he/she should be using the glass bottle and one DPD packet. When the operator is testing in high range, he/she should use the plastic bottle with two DPD packets. Many operators have been having trouble with these tests. If the wrong bottle is used, the testing will not provide accurate results. For example, if the operator uses the plastic bottle on low range, the reading will appear twice as high as the residual actually is. Look at the plastic bottle; the plastic bottle is much thinner on the bottom than the glass bottle. On high range, using the DPD method, add two packets, Free or Total, depending on which chlorine is being tested for. Cap the cell and shake gently for twenty seconds. Place the prepared sample in the cell-holder and cover with the instrument cap. Wait three to six minutes after adding the DPD Total pillows. If the test is for Free Chlorine, cap one minute after adding the

pillows, then proceed immediately reading the results. When using this instrument, consult with the instrumentation manual and be sure to use the correct bottles for the sample.

Some water systems are still using the old colormeter wheel. I've looked through some daily chlorine logs by operators who use the color wheel and it seems that the same results were always indicated. I recommend any

water treatment facility in Kansas invest in a digital chlorine test kit.

Some systems have continuous chlorine monitoring equipment. Such equipment can help an operator better control the chlorine residual to ensure that adequate disinfection has occurred and meets the regulations. There are numerous companies that manufacture this type of equipment. The most common in Kansas is the CL17



The Hach CL17 Analyzer is a microprocessor-based analyzer designed to monitor a sample stream continuously for chlorine content.

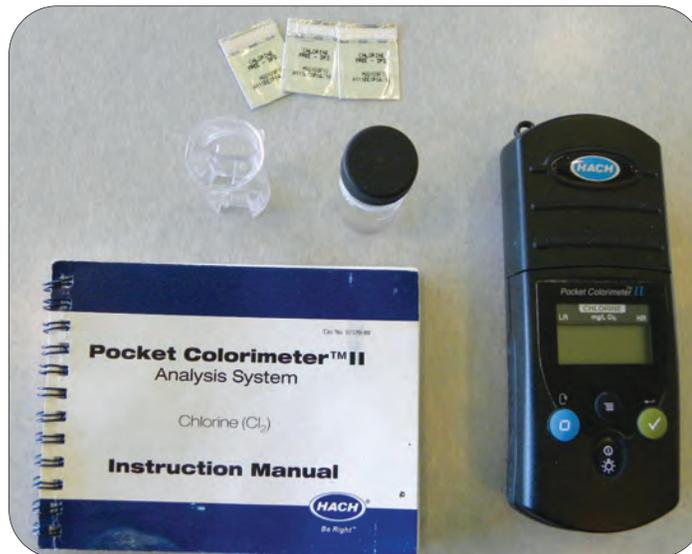
Chlorine Analyzer, which cannot only analyze chlorine residual, it also can assist with process controls. The CL17 Analyzer is a microprocessor-based analyzer designed to monitor a sample stream continuously for chlorine content. Either Free or Total Chlorine, in the range of 0 to 5 mg/L, can be monitored. The unit is manufactured by Hach.

The instrument uses a DPD Colorimetric Method, which includes a N, N-Diethyl-p-phenylenediamine (DPD) indicator and a buffer; the indicator and buffer are introduced into the sample, causing a red color to form with intensity proportional to the chlorine concentration. The chlorine concentration, measured photometrically, is displayed on the front panel, three-digit, LCD readout in mg/L Cl₂.

A recorder output (4-20) is available. Recorders span minimum and maximum values in mg/L. The CL2 is programmed by the operator using the analyzer keyboard.

Programmable alarm circuits provide relay closure, both normally open and normally closed, for two selectable chlorine level set points. Set points can be programmed by the operator anywhere within the overall range. System warning and system alarm features provide automatic, self-testing diagnostics that detect a number of possible malfunctions, and provide alarm relay closures indicating a need for operator attention.

The analyzer is designed to capture and analyze a portion of the sample every 2.5 minutes. The sample portion is captured in the colorimeter measuring cell where the blank absorbance is measure. 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



This photo shows the Hach digital Colorimeter II.

to develop the magenta color, which is measure and compared to the reference.

There are many chlorine analyzers on the market. I am only providing examples of a couple of them. The Regal Chlorine Analyzer tests amperometrically. The advanced amperometric technology combined with intuitive setup and control features make it an easy transition for both new and experienced operators. Unlike the CL17, which uses reagents

Some systems have continuous chlorine monitoring equipment. Such equipment can help an operator better control the chlorine residual to ensure that adequate disinfection has occurred and meets the regulations.

and buffers, the Regal Analyzer uses food grade white vinegar as its buffing agent. When sampling for Total, potassium iodine crystals are added to a pre-mixed buffing solution. A continuous sample of water is delivered into a reservoir in the

analyzer where it is gravity fed at a constant flow rate into the amperometric measuring cell. A thermistor located in the water sample compensates for temperature variations. A pH-buffering agent is simultaneously injected into the cell by means of a peristaltic pump to lower the pH level in the cell to a fixed value. A small current is generated as the sample water flows between two fixed electrodes.

This analyzer can also be used with a smart valve to help control the chlorine residual.

KRWA staff are experienced in dealing with chlorine residuals, monitoring and other water quality concerns. If your system has any questions on these or other topics, I encourage you to contact me at lonnie@krwa.net or other staff or call the KRWA office at 785-336-3760. KRWA receives funding to provide assistance to systems with water quality and other operating and maintenance issues through a contract administered by the Kansas Department of Health and Environment (KDHE) under the State Revolving Loan Fund Set-Aside, the Kansas Water Office and also through the National Rural Water Association with funding coming from US EPA and USDA Rural Development. KRWA is here to help.

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.