

# Reagentless Total Chlorine Probe for Wastewater Disinfection

Comparing the Hach® CLT10 sc and Wallace & Tiernan Micro/2000®

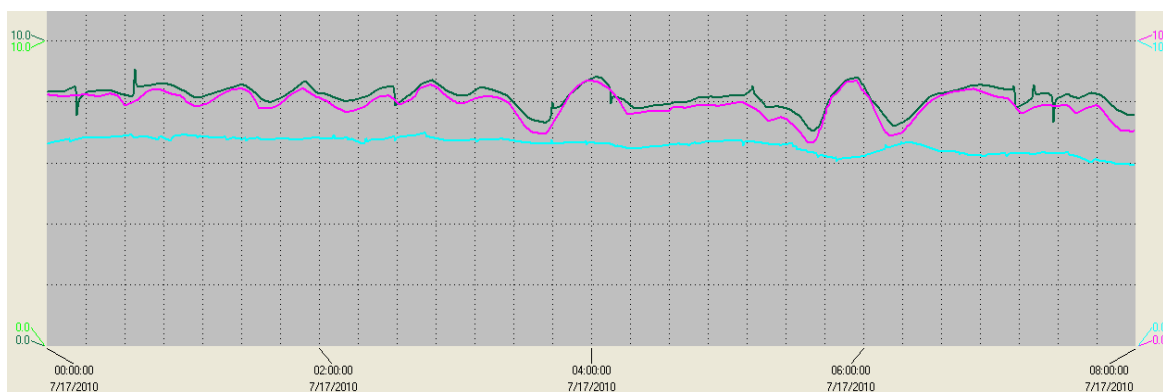
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In July 2010, the Hach CLT10 sc Total Chlorine Sensor was tested alongside a Wallace & Tiernan Micro/2000 Total Chlorine Analyzer in two applications at a wastewater treatment plant in southern California. The results demonstrate the CLT10 sc is accurate, repeatable, and reliable in wastewater disinfection applications.

The test was performed in a plant with biological nutrient removal with tertiary cloth filtration, followed by liquid chlorine disinfection and dechlorination. The first application point was the beginning of the chlorine contact chamber, shortly after chlorine injection and mixing. The second application was the end of the chlorine contact chamber before injection of sulfur dioxide for dechlorination.



## Chlorine Contact Chamber Influent



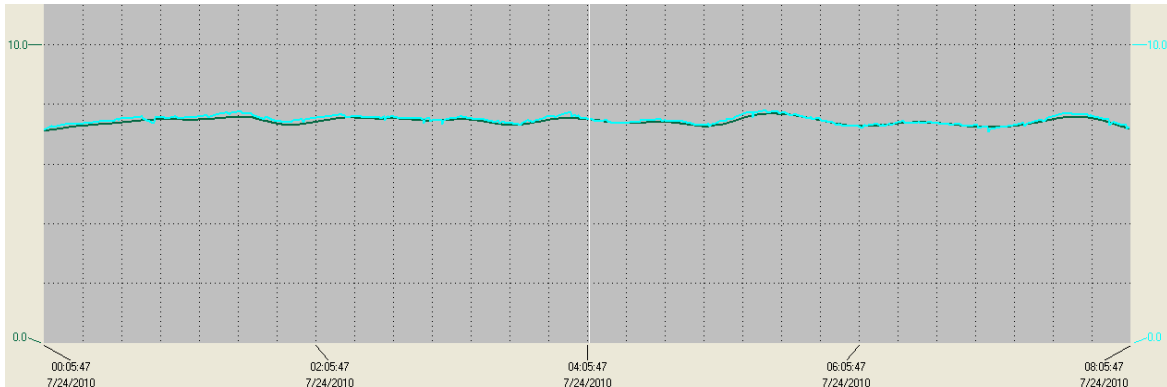
The chart above compares the CLT10 sc in dark green to the Micro/2000 in magenta at the beginning of the chlorine contact chamber. The scale is from 0.00 to 10.00 mg/L total chlorine, and both systems track the same sample around 8 mg/L.

Present in the CLT10 sc data but absent in the Micro/2000 data are small spikes, which were determined to be caused by insufficient mixing of the liquid chlorine with the wastewater to be disinfected. With the ability to take a measurement every second, the CLT10 was able to capture these spikes, whereas the two minute measurement of the Micro/2000 could not.

Improper mixing can contribute to impaired disinfection, where weaker dichloramine and nitrogen trichloride are formed instead of the desired monochloramine. To remedy this, a higher dose of chlorine is required to ensure complete disinfection, resulting in higher costs for treatment.

## Chlorine Contact Chamber Effluent

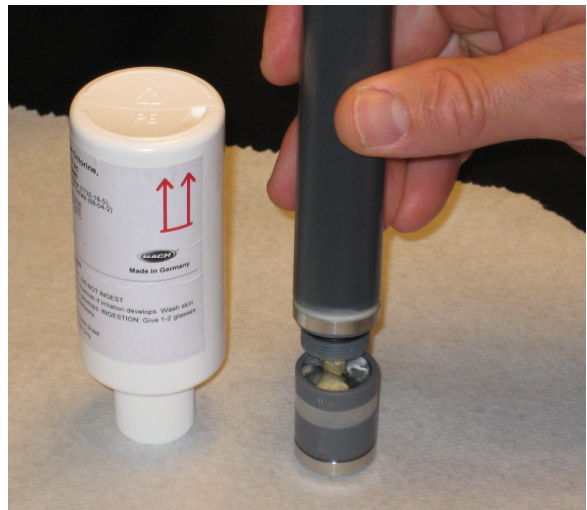
The chart below compares the CLT10 sc in dark green against the Micro/2000 in light blue at the end of the chlorine contact chamber. At this point the sample has had at least thirty minutes of contact time, and is well mixed. Similar to the chart above, the scale is between 0.00 and 10.00 mg/L total chlorine.



It is difficult to distinguish between the two lines on the chart, proving that the accuracy and repeatability of the CLT10 sc is at a minimum equal to the Micro/2000.

## Maintenance

During the 55 day test period, the only maintenance the CLT10 sc required was a periodic verification by a grab sample, which is a three minute test with a Pocket Colorimeter™ II. No fouling was observed on the membrane or any part of the system while measuring the chlorinated sample. In this application, it is expected that the electrolyte gel would be replenished every six months and the preassembled membrane cap be changed every year. This is significantly less maintenance than the Micro/2000 which requires the reagents to be replenished every three to ten weeks and the peristaltic pump tubing to be changed as needed.



## Summary

The CLT10 sc total chlorine sensor is an accurate, repeatable and reliable option for monitoring and controlling total chlorine residual in wastewater effluent. The system is completely reagent free and has the option of measuring pH in the same sample to further increase accuracy and provide additional diagnostics. More frequent measurement, better diagnostics, and minimal system maintenance make the CLT10 sc a great fit for wastewater disinfection.