

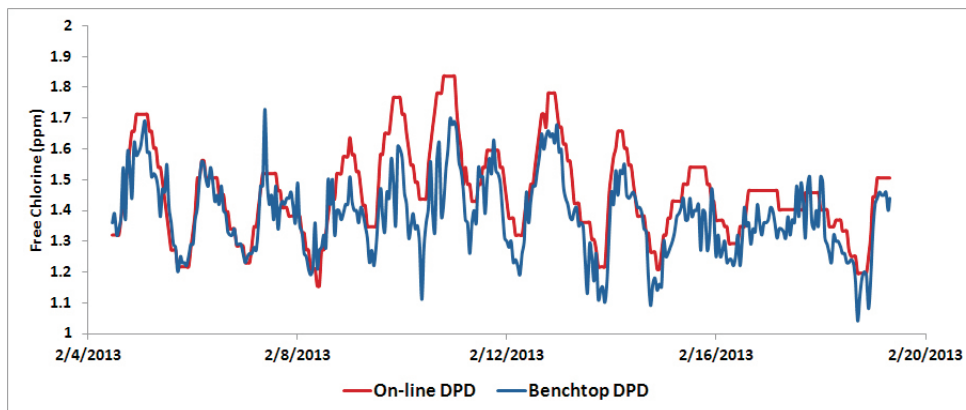
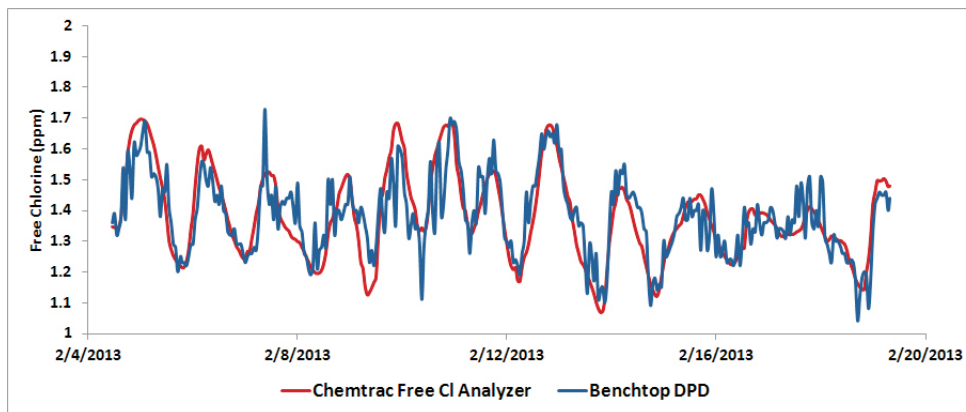
A COMPARISON OF ON-LINE CHLORINE ANALYZERS

EPA Method 334 establishes the requirements for on-line chlorine analyzers, and has opened the door for the evaluation of new online measurement approaches that can be used for reporting purposes, provided they meet the stated performance criteria. One such instrument is Chemtrac's Free Chlorine Analyzer. Their amperometric chlorine probe has a three-electrode design for improved zero-point accuracy, and an enhanced electrolyte solution with built-in pH buffering capability. Combining their HydroACT series of analyzers, with their free chlorine probes, Chemtrac provides a reliable, and cost-effective solution for on-line chlorine measurement.

In order to better understand the performance of Chemtrac's free chlorine analyzer, versus online DPD analyzers, several side-by-side evaluations were conducted. The following summarizes the results from those studies:

- As seen in the below graphs, on-line DPD analyzers did not always correlate better to benchtop spectrophotometer DPD readings than the Chemtrac free chlorine analyzer did.
- Chemtrac's amperometric probe, with its enhanced electrolyte solution, was proven to handle pH fluctuations better than typical amperometric probes.
- Plant operators repeatedly commented on the quick set-up, easy calibration and low maintenance requirements of the Chemtrac free chlorine probe. Most importantly, the probe proved it was capable of maintaining its accuracy.
- Maintenance and reagent costs, and disposal issues associated with DPD analyzers, are significant factors for most municipal budgets. It was shown those costs can be greatly reduced with Chemtrac's free chlorine analyzer, which requires less than \$300 each year to maintain.
- The expandable inputs of the HydroACT analyzers help justify and reduce overall capital cost by allowing multiple chlorine probes on one analyzer, and by allowing for other measurements such as pH, TSS, and temperature.
- Chemtrac's flow through design, with an unadulterated sample at the drain, was a great benefit for convenient Method 334 test procedure sampling.

Comparison to the Benchtop Spectrophotometer

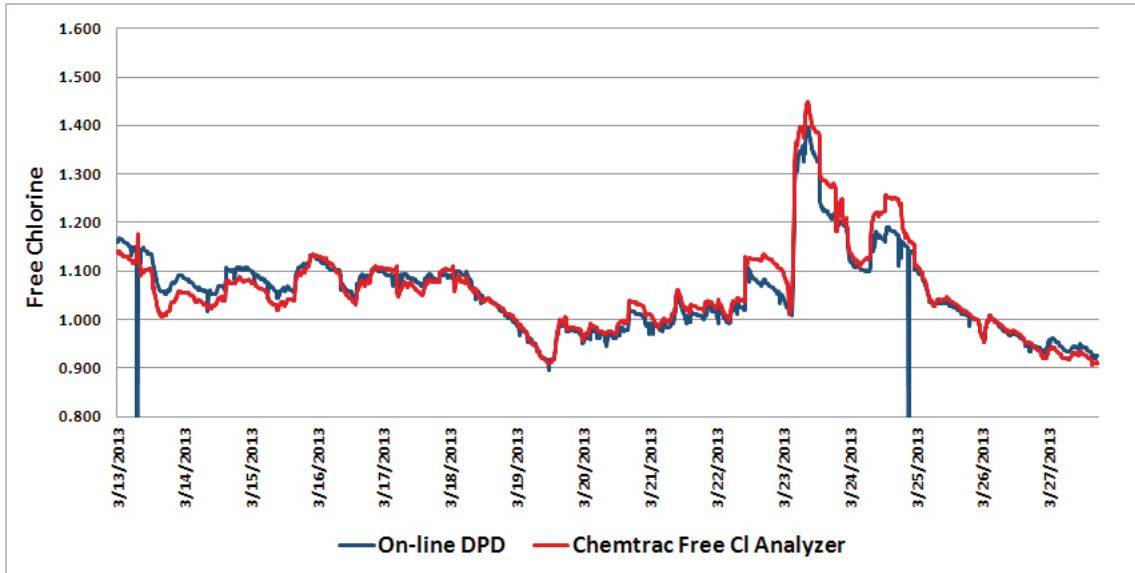


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A 14 day grab sample comparison is part of Method 334 criteria for on-line certification. The following chart was a head-to-head comparison after both instruments passed the 14 day requirement.

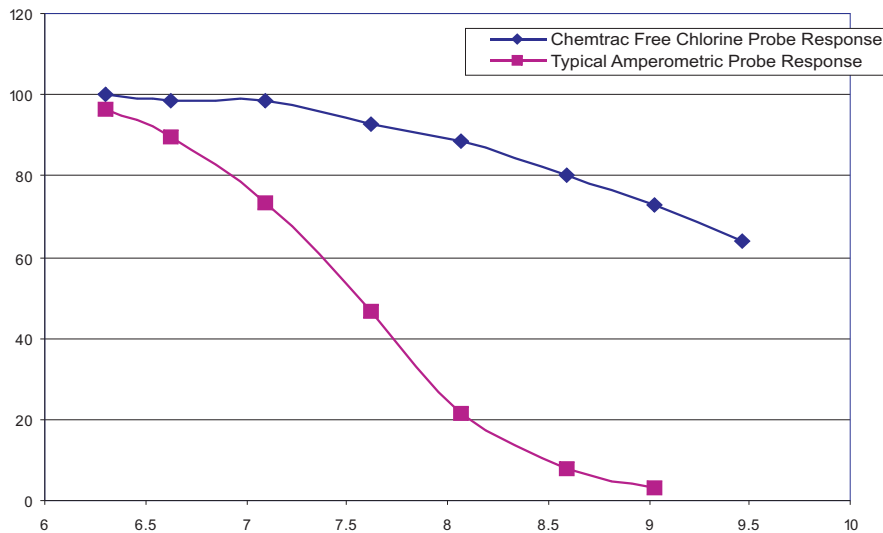
Comparison Head to Head



- Both units qualified under the requirements of EPA 334
- Reagent replenishments and tubing replacements were cumbersome for operators using the DPD analyzer
- The amperometric probe only requires electrolyte additions every 3 to 6 months, and a membrane cap replacement annually

Chemtrac's Amperometric Free Chlorine vs. Typical Amperometric Probes

Typical Probe Response to pH (Unbuffered)



The electrolyte solution used in the Chemtrac probe has a built-in buffering capability, which greatly reduces the impact of the probe's signal strength when the pH changes. This results in a significantly improved stability and accuracy as compared to most other amperometric probes.

In the pH range of most surface water treatment plants, the Chemtrac Free Chlorine probe does not require pH compensation. In those rare chlorine measurement situations where pH fluctuations are large enough to require pH correction, this feature is available on the HydroACT analyzer. (Note: pH correction is more reliable with Chemtrac's probe due to the fact that the pH correction factor is much smaller compared to what would be needed for most other amperometric probes. As correction factors become larger, so do the combined errors from both the chlorine and pH measurements.)

If you or your facility would like to participate in a comparison, please contact Chemtrac, Inc @ 770-449-6233.