

FIELD MEASUREMENTS

8.00 GENERAL

For field measurements to be acceptable, bracket results between acceptable calibration data. Refer To DEP Field Activities Manual FT 1000. FDEP categorizes the following analytes as field measurement parameters and therefore they do not require NELAC Certification.

- Prior to use, calibrate the instrument.
- In the event that the instrument fails to meet the acceptance criteria, immediately recalibrate or remove from service; send the instrument for service or repair.
- If a calibration check fails to meet acceptance criteria and it is not possible to reanalyze the sample or back up instrumentation is not readily available, report all results between the last acceptable calibration check and the failed calibration check as “estimated” and report with a “J” value.
- Include a narrative describing the problem.
- For continuous in-line monitoring equipment, bracket all data by acceptable calibration checks or qualify the data.

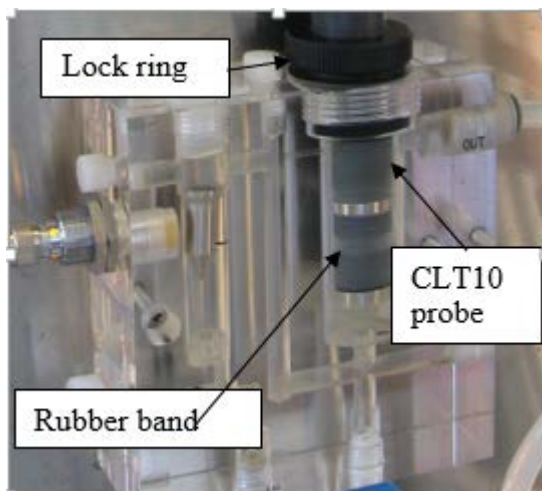
8.01 CONTINUOUS MONITORING WITH IN-LINE CHLORINE MONITOR

The city of Tavares utilizes continuous monitoring instrumentation for recording of Total Residual Chlorine in the chlorine building. The HACH CLT10 analyzer uses exclusive self-diagnostics to alert users when the process has changed or the instrument needs servicing. Diagnostic features include the Cal Watch algorithm for warning of pH and chlorine calibration deviation and a non-contacting flow sensor for notification of insufficient sample flow. Total chlorine measurement with an amperometric analyzer, such as the CLT10, does not require reagents. The system allows for real-time control of disinfection processes by providing continuous readings that indicate when treatment conditions have changed. The complete system includes a total chlorine sensor, chlorine sensor block, sc200 controller, sc Gateway, stainless steel panel, pH flow cell and pH sensor. The sc200 controller facilitates user defined operating parameters and the sc Gateway stores all of the data logged which can then be downloaded to a micro SD card for review. The lower limit of detection is 0.03mg/L with a resolution of 0.001mg/L. The chlorine range is 0-10mg/L or 0-20mg/L with a software upgrade. Operating temperature range is 0 to 45 °C (32 to 113 °F) and the system is equipped with internal automatic temperature compensation with a sample operating range of 5 to 45 °C.

Perform satisfactory initial calibration prior to use, refer to manufacturer's instructions. In the absence of the continuous monitor, analyze samples during the hours of required operator attendance ie: 6 times per day. Clean the monitor at least monthly or sooner if calibration problems arise. Perform daily verification of the monitor by sample comparison.

Maintenance of Continuous Chlorine Monitor

- Perform maintenance monthly or sooner if problems arise.
- Perform prior to daily verification of the monitor.
- Isolate the water supply to the monitor.
- Use PPE as required ie: latex gloves and safety glasses at a minimum.
- Remove the CLT10 probe from the reservoir by unscrewing the black lock ring at the top of the reservoir; be careful not to lose the gaskets housed underneath.



- Inspect the membrane for signs of damage or wear.
- If experiencing problems, remove the membrane and top up with clean electrolyte solution. Lift the rubber band covering the vent hole and remove the membrane cap. Empty the electrolyte solution and refill so that the surface of the solution is convex, taking care not to create bubbles.
- Replace the membrane cap, allowing the electrolyte solution to overflow through the vent hole.
- Wipe excess electrolyte solution and replace the rubber band. NB: failure to remove the rubber band may cause damage to the probe.
- Clean the membrane using a soft brush or cloth and lanolin free soap eg: Liquinox.
- Clean all surfaces of the monitor with a soft cloth.
- Allow the monitor to stabilize and check that chlorine readings are established.

Verification of Chlorine Monitor by Sample Comparison

- Perform daily verification of the Chlorine Monitor.
- Observe the chlorine readings on SCADA (Supervisory Control and Data Acquisition) until readings are stable. Samples taken when the chlorine levels are rising or dropping too fast may yield biased results.
- Collect a sample from the spigot and record the chlorine monitor value.
- Transport the sample to the laboratory and analyze using SM 4500-CL G immediately.
- Compare the laboratory spectrophotometer result with the continuous monitor reading and calculate the percent difference.
- The laboratory, to err on the side of caution, has set the comparison value criteria at +/- 10% even though FDEP have set the comparison value criteria at +/-20%, allowing immediate action to prevent an out of compliance occurrence.

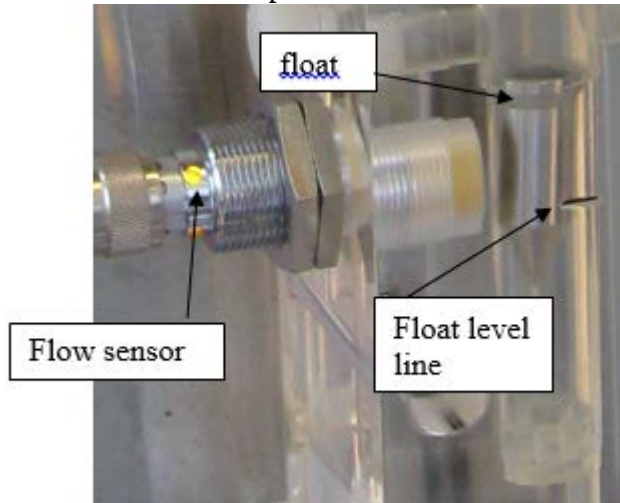
Contingencies for Unacceptable Data

When the chlorine monitor fails to meet acceptance criteria for verification, by sample comparison, take the following steps:

- If the problem is unstable readings, wait 30 minutes and repeat the verification by collecting a repeat sample.
- If the second sample fails, establish through the plant operator that no events occurring in the operations of the plant may be affecting the chlorine readings ie: chlorine tank almost depleted, air locks in the chlorine feed lines, operator having just increased or decreased the chlorine dosing or excessive flows entering the plant.
- Clean the probe membrane to ensure that there is no build up of residue causing erroneous readings. Change membrane if necessary, following steps outlined above.
- Clean the end of the sensor with the abrasive strip provided.
- Repeat the verification process by collecting another sample.
- When a third sample fails to meet the acceptance criteria, enter a correction value into the chlorine monitor by following the procedure outlined in the Instrument Manual.
- Analyze a repeat sample following application of the correction factor, to verify resolution of the problem.
- When satisfactory verification by sample comparison is unachievable, sample and analyze six manual samples daily until troubleshooting and repair of the monitor is complete.

Troubleshooting the Continuous Chlorine Monitor

- Check that the pump is running.
- Check that the flow sensor light is on to ensure adequate flow of sample through the reservoir.
- Check that the top of the float is level with, or above the float level line.



- Change the chlorine sensor electrode tip cap and/or electrolyte solution.
- Check the electrode tip and polish using the abrasive paper strip provided.
- When verification of the monitor is not achievable or when diagnostics dictate, replace the probe.