TECHNICAL BULLETIN

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Sensor life is determined by several factors including frequency of use, storage conditions, nuances of certain sample matrices, and time between uses.

Average Sensor Life

Sensors are expected to last for approximately 150 runs (this includes samples, calibrations and QC checks), or for a minimum of 3-4 weeks when used consistently day after day. When analyzing higher sample concentrations, the sensor life expectancy can be shorter, ranging from 60 – 150 total measurements depending on sample strength.

In cases where the PeCOD is not being used frequently (2 weeks or more between each set of samples), the sensor's life expectancy timeline can be extended through the proper application of long-term storage recommendations. MANTECH recommends that when the PeCOD is not expected to be used for more than 2 weeks at a time, that Ports A and B should be primed with air, then the sensor be removed from the analyzer and stored in a dark, dry location with the sensor window face-down (white foam facing up). This is because moisture and light exposure are known to have a degrading effect on the sensor, reducing the lifespan of use. At the same time, the PeCOD Electrode Block should be removed and stored with DI water filling the internal liquid channels. This can be achieved by covering one of the channel outlets with laboratory tape, then use a syringe to inject DI water into the channel until it overflows out of the hole you are injecting into and then cover that hole with tape as well.

When the PeCOD is being used frequently, MANTECH recommends leaving the sensor in place with DI primed through Port A between analyses and running at least one QC check per day to keep the sensor “active” even on days that you are not expecting to run samples. This ensures the best day-to-day conditions for the sensor leading to the longest possible lifespan of use. On days where you are planning to run samples, a new calibration is recommended when the daily QC check does not fall within the +/- 20% passing range. It is always important to prime Port A and Port B x3 times with the proper reagents when going from DI water storage to the daily QC check and samples.

Samples containing harsh chemicals, interferences, or those run with the sample pH outside of the recommended range (i.e. pH 4-10) can also cause sensors to degrade more quickly.

Monitoring Sensor Life During Calibration

The calibration results obtained (i.e. M and C values) are good indicators of whether a sensor is functioning as expected. The M and C calibration values have expected ranges, which are displayed at the top of the calibration report.

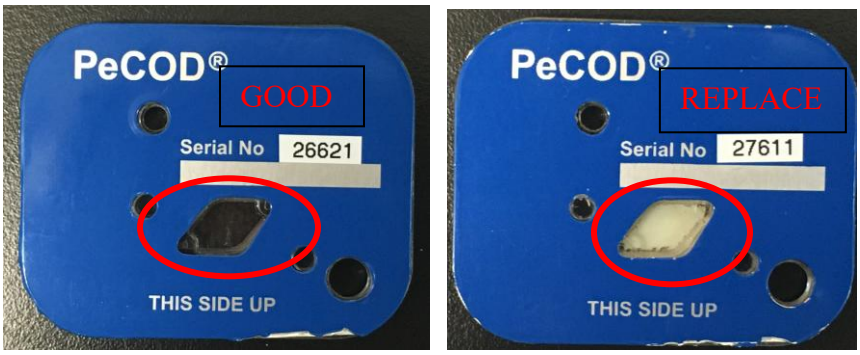
The M value should be between 0.02 - 0.08 COD/uC. As a sensor ages, the M value will increase. Once an M value greater than 0.08 is reached, the sensor should be changed.

C values are measured in uC and indicate the raw charge generated during the blank oxidation. The expected C value ranges depend on the color range you are working in (blue and green range have lower C values than yellow range), and in this case the charge starts higher and gets lower as the sensor ages. The C value is important, as it not only indicates that the sensor is functioning properly, but it also gives the user a sense about the quality of the blank solution, which in turn provides information about the quality of the electrolyte.

Visual Inspection

Additionally, sometimes a user can visually see if a sensor is viable or not. The sensor element is visible through the window and it should be grey/black in color as indicated on sensor 26621.

As a sensor ages the color will fade and a non-uniform colored surface will result. When the surface shows partial delamination as indicated on sensor 27611 shown below, this would indicate that the sensor should be replaced.



Additionally, if a sensor has lost much of its color, while it may still result in passing M and C

calibration values, it may indicate a loss in chloride tolerance. For more information about chloride protection see Technical Bulletin #2011-16.

Establishing a Standard Operating Procedure for Sensor Management

While customers may choose to monitor sensor performance and change the sensor only when needed, MANTECH recommends that a Standard Operating Procedure is put in place to replace sensors on a set schedule to always ensure sensor reliability. This timeline may be determined based on the factors outlined previously, otherwise a 3–4-week sensor change SOP is recommended.