WTW dissolved oxygen validation

Overview:

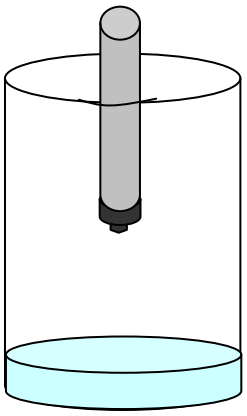
The WTW FDO sensor does not require calibration. In order to access sensor performance we will carry out a series of checks annually with the membrane change. In addition check data collected as per method 10.4 of this manual will be used to ensure reliability.

Note: This is not a calibration of the sensor; no adjustments will be made to the sensor. This is a validation of accuracy for the sensor and recorder. This process takes approximately two hours, so allow plenty of time. This will provide useful information for further data processing; *refer method 10.22* of this manual.

Pre validation checks:

Using a fully calibrated handheld meter, *refer section 14 of this manual*, test the river DO% in accordance with *method 10.4* of this manual. Fill out the WTW validation form, *10.18 appendix 1* of this manual.

Two point validation on old sensor cap:



Remove the sensor from the water, and carefully clean the sensor head in water. Place the WTW in a 100% saturated air mix in a shaded area (The WTW sensor should be about two cm above the water level, only a small amount of water is required), in a calibration chamber with a small amount of water in the bottom. . Every effort should be made to keep the sensor at a similar temperature to the river. (Keep the validation chamber in the shade.) The WTW will not show 100%, refer to the calculation at the end of this procedure.

Wait 15 minutes and record the WTW readings on the controller for both temperature and dissolved oxygen saturation, and also the logger readings. Also note the barometric pressure from the handheld meter.

After measuring the 100% saturation value, perform a zero test on the instrument by placing the sensor in a sample of water with Sodium Sulphite. Wait 15 minutes and record the WTW readings on the controller for both temperature and dissolved oxygen saturation, and also the logger readings. Also note the barometric pressure from the handheld meter.

Replace the membrane:

Unscrew the sensor cap and membrane and replace with a new sensor cap and membrane. This will load new calibration constants to the WTW.

Repeat the two point validation on the new sensor cap:

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Reinstate Sensor in the water:

Thoroughly rinse the sensor in water to wash off all traces of Sodium Sulphite. Put the sensor back in the water. Wait 30 minutes (the membrane will require this long to stabilise after being subjected to Sodium Sulphite.

Post validation checks:

Carry out a final check against the handheld meter in accordance with method 10.4 of this manual.

Calculation:

When performing the validation, the WTW will not read 100% in 100% saturated air due to the following two reasons:

1) The pressure of oxygen in air is different to the pressure of oxygen in water, so a correction factor needs applying.

2) The WTW does not correct for local atmospheric pressure.

For the purposes of the validation, we will process the logger values as this effectively checks the sensor performance against the recorded values.

Corrected Saturation = $DO\%_{\text{(logger reading WTW)}} \times 1013.25 \div \text{True barometric pressure}_{\text{(hand held)}} \times 0.99$