LDO Field Standard Operating Procedure

Field SOP for Use of Luminescent Dissolved Oxygen Meter

Meter description:
Hach LDO HQ30d Portable Dissolved Oxygen Meter

CCWI instrument identification #:
DOL-CCWI-2

Features
- Auto correction for barometric pressure
- No polarization time – ready to use
- No calibration needed in field
- More accurate than membrane method

Directions for Use:

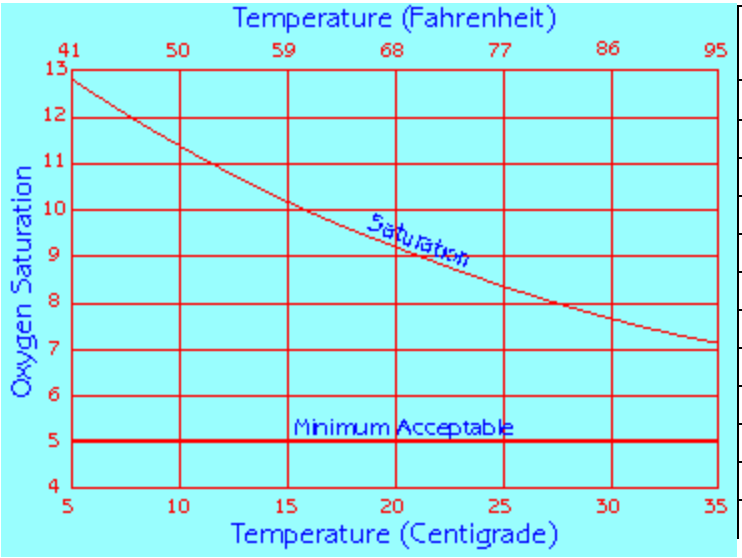
Dissolved oxygen (mg/L) will be the large number on the screen. On the right hand side you will see, from top to bottom, temperature (C), dissolved oxygen (%), barometric pressure(hPa), the time and the date.

Procedure:

1. Place probe in water, and leave it there for a minute or two to allow temp adjustment.
2. Press the ⏻ power button. Gently stir the probe for accurate temperature readings.
3. Once the numbers, (temp and the D.O.), are stabilized you can record the readings.
4. Rinse debris from the probe with water from the "rinse water" bottle.

NOTE: The meter temperature should be within around one degree of the temperature found on the bulb thermometer. Try leaving the probe in the water a little longer if there is a large discrepancy.

100% Saturation and Temperature



Dissolved Oxygen Requirements for Salmonids	
A. Embryo and larval stages	mg/L
No production impairment	11
Slight production impairment	9
Moderate production impairment	8
Severe production impairment	7
Limit to avoid acute mortality	6
B. Other life stages	
No production impairment	8
Slight production impairment	6
Moderate production impairment	5
Severe production impairment	4
Limit to avoid acute mortality	3

Sampling Considerations

Dissolved oxygen will increase in riffles and fast flowing water, and decrease in slow pools. Make sure to test in the main, well mixed part of the channel, either by wading or using an extension pole (this can be as simple as a piece of wood). Depth can also be a

variable in oxygen levels, try to place the probe about half way between the surface and bottom of the stream.

Trouble shooting

1. **Temperature:** The small silver button on the body of the probe under the shroud is the thermocouple. Make sure this portion of the probe is submerged when taking your reading. When testing, always check to see if the temperature seems accurate. You may want to check it against another thermometer. When left in the sun, the meter can get very hot, skewing your readings. Keep the meter in the shade at all times, and wait for the temperature to come down if it has been in the sun. Gently stir the probe for better temperature accuracy. At very low temperatures, the meter takes longer to stabilize. Please be patient.
2. **Batteries:** The screen shows a battery life level in the upper right hand corner.
3. **Unbelievable results:** Water can become super saturated with oxygen. At low temperatures, turbulent water or with excessive algae and plant growth, the oxygen can (rarely) be as high as 16 or more. Anything past 20 mg/L is not possible in a surface stream. Slow, warm water can cause lower oxygen levels. With excess nutrients and decay eutrophication can drop oxygen to 0.0mg/L. If you believe the number you are getting is inaccurate, you can do an accuracy check by testing 100% saturated water. Put some tap water into a cup/bucket or other container. Pour the contents into another container, and then back again, transferring the water at least 10 times. Pour from a foot or so up, to allow lots of air contact and turbulence. Immediately test this water, it should be between 95% and 105% saturation. Always record in the notes section of the data sheet any concerns about the DO meter.

Calibrating the LDO meter

*This meter does not require calibration, per the manufacturer. CCWI performs weekly accuracy checks. If the meter requires calibration, the manufacturer's (Hach) instructions are followed.

Accuracy Check: 100% water saturated air.

Use a narrow mouth container with a lid. Pour a small amount of water (an inch or so) into the bottle. Shake vigorously for several minutes. Make sure the probe is dry, then insert the probe into the bottle. Allow the reading to stabilize. Acceptable range is 95% to 105%. If the reading falls outside this range, calibrate.

Calibration: 100% water saturated air. (adapted from Hach manual)

1. Prepare the water saturated air as above.
2. Press the Blue/Left key under Calibrate.
3. Dry the probe and place it in the chamber.
4. When the reading is stable the standard value will be highlighted on the screen and the calibrated reading value will appear on the screen. Press the UP key under Done.
5. The Calibraion Summary will appear. Press the Green/Right key under Store to accept the calibration and return to the measurement mode. The calibration is recorded in the data log.
6. When the calibration is successful, the display will show OK in the upper left corner. A ? mark or "slope out of range" the calibration has failed and will need to be redone.