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Accuracy Check for Hach LDO and LBOD probes

This letter is to address the concerns of users and regulators who are referencing the slope of the dissolved oxygen concentration as a way to measure probe performance. Although slope may be a good measure of accuracy on some probes, it is not a good measure of accuracy on our LDO and LBOD probes.

The slope on an LDO and LBOD probe is calculated by referencing the factory calibration. That is simply a reference to show how different the user calibration is from the factory calibration. The factory calibration does not necessarily provide the ideal or theoretical dissolved oxygen value, therefore a user calibration that is different than the factory calibration does not indicate an error. The slope is calculated by the mg/L reading on 100% DO from a user calibration, divided by the factory calibration curve for the mg/L DO reading on 100% DO at the same temperature and pressure. That is why user calibrations commonly result in a slope that is more than 105% or less than 95%. That is not the same as a 5% error though.

The best way to check the accuracy of a new user calibration on an LDO or LBOD probe is to use that calibration curve to take a reading on a water saturated air sample. Since that sample should be 100% at a given temperature and pressure, one can use the DO charts to look up the theoretical mg/L reading at that measured temperature and pressure. (Please note, the probe does measure both temperature and pressure, and the units displayed can be changed in the meter to match the units used in the reference chart.)

There are two ways to do that. The easiest way to is take a reading on a 100% water saturated air sample after calibration. The displayed percentage of saturation can be interpreted as the percent error, since the reading should be 100.0 % if the water saturated air sample was prepared correctly. (See instruction manual.)

A more detailed way is to reference a table of theoretical DO values. Take a reading on a 100% water saturated air sample after calibration. Record the mg/L reading from the meter. Then, use the displayed temperature and pressure to look up the theoretical saturated DO for the corresponding temperature and pressure. Dividing the meter's reading by the theoretical reading from the chart, then times 100, will give you a percent error. If the chart does not have a value for the exact temperature and pressure, feel free to use a DO calculator program at the bottom of the page on the www.boddoctor.com website. It requires pressure in mBar and temperature in degrees Centigrade. A theoretical DO chart is also available upon request.

Russ Gorham
Lab Tech Support
Hach Company
1-800-227-4224