Hydrolab Luminescent DO Sensor
Air-Saturated Water Calibration

This document outlines the use of air-saturated-water to calibrate the Hydrolab Luminescent Dissolved-Oxygen (LDO) sensor. Dissolved oxygen concentration is associated with a percent saturation relative to 100% water-saturated air or air-saturated water. This calibration method is supplemental information that may be used in combination with the water-saturated-air method already described in Chapter 8 of the *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods* (RG-415).

Before Calibrating

Clean the sonde using running water to remove debris. Inspect the cap of the LDO sensor. If the cap or the sensor appears questionable, perform sensor maintenance according to accepted procedures. See the "Scheduled Maintenance" section in Chapter 8 for additional details on Hydrolab LDO probe maintenance.

Water-Saturated Air Calibration

Note: It is important to maintain temperature stability during calibration. Keep the sonde out of direct sunlight and away from any other source of heat or other energy that may influence the temperature in the cup during calibration. It is also important that the end of the LDO sensor cap and the temperature sensor are at the same temperature during calibration. If the temperature in the cup changes more than 0.5°C during calibration, recalibration is recommended.

In order to retain calibration accuracy between multiple uses, it is best to store the sensor fully immersed in water at all times. At minimum, store the sensor in a sealed container with water-saturated-air in the sealed storage cup of the sensor. Make sure the storage cap has at least 10 mL of water and is sealed to prevent evaporation.

When calibrating in water-saturated-air, the temperature sensor should be in the open air. When calibrating in air-saturated-water, the temperature sensor should be immersed in water.

To calibrate the sensor using air-saturated-water:

- Calibrate the sensor using temperature-stabilized, air-saturated water. In a laboratory environment, fill a container with water from a faucet or decanted from an opened water bottle and allow it to equilibrate for at least 12 hours. The water is air-saturated in a temperature-stabilized container using an air stone that injects air into the well-mixed water bath. Continuous use of compressed air can lead to super-saturation of oxygen in the water bath. To minimize this effect, it is recommended to turn off the air purge prior to final calibration.

To produce air-saturated water in the field:

- Take a 1 L bottle and fill 50% with water. Or, use a 4 L bottle with 500mL of water. Use water that has been at equilibrium with atmospheric pressure and the calibration environment for at least 12 hours.
- Seal the bottle and shake it very vigorously for 40 seconds.
- With the sonde positioned with sensors facing upright, pour the water into the calibration cup, fully submersing the Hach LDO sensor cap and the temperature sensor (Figure 1). Make sure the water comes close to the top of the calibration cup. Place the calibration cup cap upside down on top of the

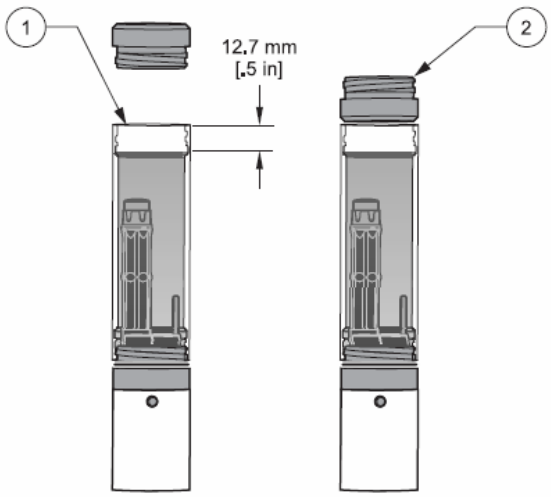
calibration cup to cover the calibration cup. This stops the exchange of air and allows the local environment to equilibrate. Do not tightly seal or otherwise raise the barometric pressure in the calibration cup. Make sure that the calibration cup is not in direct sunlight or in the presence of a heat or light source that could change the temperature in the calibration cup.

- Allow the DO and temperature readings to stabilize for approximately 3–5 minutes. Record the initial DO% saturation value, temperature, and calibration standard (100%) in the calibration log.
- Calibrate the DO sensor using LDO% Saturation. Enter the uncorrected barometric pressure (BP) stated in mm Hg. Using the four function keys under the LCD Screen, select Setup/Cal, Calibrate, and then Sonde.

Note: See the "Barometric Pressure" section in Chapter 8 for details on obtaining the correct BP.

Use air-saturated water to calibrate the sensor:

- Use the arrow keys to scroll through the Minisonde menu options. Scroll to LDO%: Sat. Press Select.
- Use the arrow keys to move the cursor left or right to enter the absolute BP. Select the appropriate number, then press Done.
- The messages Calibration Successful, Press any key should appear. Select any function key to remove the message.
- Select Go Back and confirm the reading for DO percent saturation from the display screen. The value should be at or near 100 percent.
- Record the value calibrated to in the calibration log. For Hydrolab instruments the value is 100 percent, indicating oxygen saturation referenced to the uncorrected BP input by the user.



1	Calibration cup filled with temperature-stabilized air-saturated water	2	Proper coverage using inverted cap

Figure 1. Air-Saturated Water Calibration of Hydrolab LDO Sensor