

Volatiles Sensor Standard Operating Procedure

I. Objective

To establish guidelines for proper water activity measurement procedures using the Volatiles Sensor in AquaLab Series 3 models.

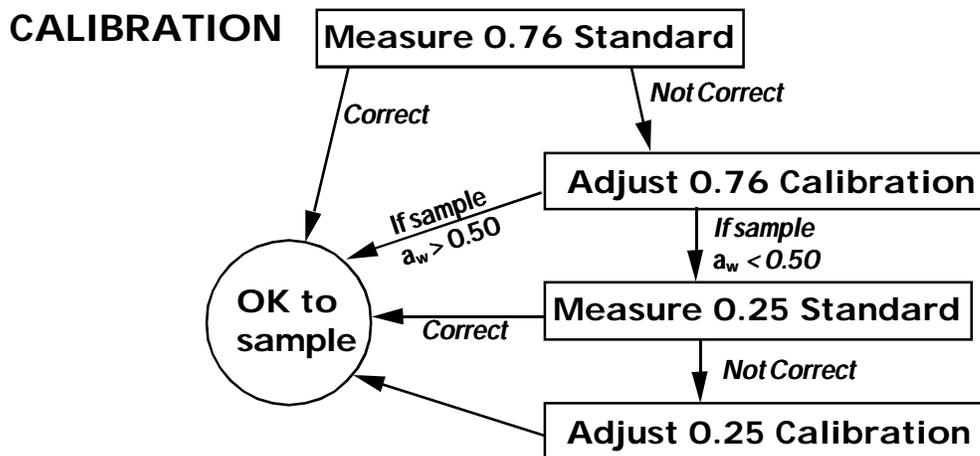
Performance verification should be conducted before sampling at least once per day or shift; or if readings become unstable.

II. Setup

A. Location

1. Place AquaLab on a level surface.
2. Place AquaLab in a relatively temperature-stable environment. This location should be well away from air conditioner and heater vents, open windows, outside doors, refrigerator exhausts, or other items that may cause rapid temperature fluctuation.
3. Allow instrument to warm up 15 minutes to an hour after turning it on for optimal performance.

III. Verification of Calibration



This flowchart is a graphical representation of the directions given below for verification of calibration.

Verify the calibration of the Volatiles Sensor with the following verification salt standards at known water activities: 6.0 m NaCl (0.760 a_w) and 13.41 m LiCl (0.250 a_w).

Verifying Calibration

1. Use the 0.760 a_w NaCl verification standard. Make sure that your standard is at ambient temperature before you load it into the AquaLab.
2. Empty the whole vial of verification standard into a sample cup and place it in the AquaLab's sample drawer.
3. Carefully slide the drawer closed, being careful not to splash or spill the solution and contaminate the chamber.
4. Turn the drawer knob to the READ position to make an a_w reading. Make two readings. The a_w readings should be within ± 0.015 of the given value for your verification standard.
5. The final water activity will be displayed when the LED flashes and the buzzer beeps (depending on beeper setting). If it is reading the correct water activity ± 0.015 , your Volatiles Sensor needs no calibration. If not, take a second reading. After the second reading, note the water activity value shown. If it is reading the correct water activity ± 0.015 , your Volatiles Sensor needs no calibration. If you consistently get readings that are outside of the a_w of your salt solution by more than ± 0.015 , a linear offset has probably occurred. In this case, adjust the linear offset reading on the salt solution to its correct value, proceed to the Adjusting Calibration section.
6. If the samples to be tested have a water activity $>0.50 a_w$ it is not necessary to perform any additional checks, so you may proceed to the Sampling Procedure section. If the samples to be tested have a water activity $<0.50 a_w$ then repeat the above process with the 0.25 a_w LiCl standard. If the samples to be tested have water activities near 1.00 then repeat the above process with either 0.5 m KCl (0.984 a_w) verification standard or distilled water (see Precautions below).

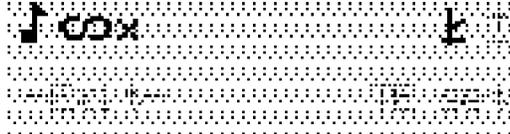
Precautions:

Long exposure to samples with water activities near 1.00 or to a variety of volatile substances can shift the sensor calibration. Therefore, always remove samples as soon as the AquaLab is finished sampling (beeps) to avoid changes in calibration. If a sample is accidentally left in the chamber for an extended period of time, be sure to check the calibration when the instrument is next used.

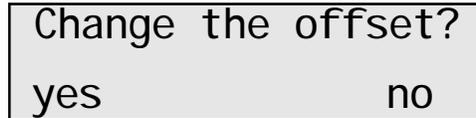
AquaLab's Volatile sensor can be damaged by long term exposure to high concentrations of ethyl alcohol. Reading samples with alcohol concentrations above about 10% can shift calibration. If the instrument is used to read water activity of extracts and other samples with high alcohol concentrations, the calibration should be checked frequently to make sure the readings are accurate. Effects on the sensor can be reduced by removing the sample immediately after reading and allowing the Volatiles Sensor to stand open for a time between readings to allow the alcohol to diffuse out of the sensor chamber, or by measuring a cup of activated charcoal.

Adjusting Calibration

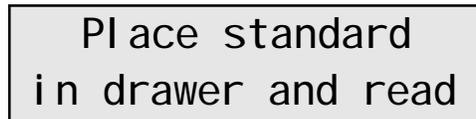
1. Once you are certain that a linear offset has occurred, choose a verification standard that is close to the a_w of the sample you are measuring. Each of the verification standards supplied by Decagon has its a_w labeled. Before you begin sampling, make sure that your standard is at ambient temperature before you load it into the sample drawer, and that your AquaLab has warmed up long enough to make accurate readings.
2. Enter the system configuration menu by pressing the lower left button in the main menu.



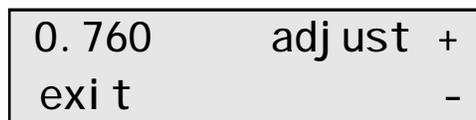
3. Press the upper right button in the system configuration menu to enter the linear offset menu. You will be guided through the linear offset routine. The following screen will appear:



4. If you wish to continue, press the button next to “yes.” To return to the main menu, press the button next to “no.” After selecting “yes,” the following screen will appear:



5. Place the 0.76 a_w NaCl verification standard into the drawer. Carefully slide the drawer closed, being careful not to splash or spill the solution and contaminate the chamber.
6. Turn the drawer knob to the READ position to make an a_w reading.
Note: If you decide at this point that you do not want to continue with the linear offset program, just return the knob to the OPEN/LOAD position and you will be returned to the main screen. After it has finished sampling the verification standard, the following screen will appear:



7. At this screen, adjust the water activity value to 0.76 a_w . Press the upper right button to move the value up, the lower right button to move it down. When the value is correct, press the Exit button. The value will be stored. *Note: This is the only menu where these buttons can change the linear offset.*
8. Remeasure the 0.760 a_w NaCl verification standards in the normal sampling mode. It should read 0.76 \pm 0.015 a_w .

9. If, after adjusting for linear offset and cleaning the chamber, you still are getting incorrect readings when reading verification standards, contact Decagon at 509 332-2756 (1-800-755-2751 in US and Canada) for further instructions.

IV. Sampling Procedure

1. Make sure that the sample to be measured is homogeneous.
2. Place the sample in a disposable sample cup, completely covering the bottom of the cup, if possible.
3. **Do not fill the sample cup more than half full. Overfilled cups will contaminate the sensors in the sampling chamber!**
4. Make sure that the rim and outside of the sample cup are clean.
5. Turn the sample drawer knob to the OPEN/LOAD position and pull the drawer open.
6. Place your prepared sample in the drawer. Check the top lip of the cup to make sure it is free from sample residue (remember, an over-filled sample cup will contaminate the chamber's sensors).
7. Carefully slide the drawer closed, being especially careful if you have a liquid sample that may splash or spill and contaminate the chamber.
8. Turn the sample drawer knob to the READ position to seal the sample cup with the chamber. This will start the read cycle. In about 40 seconds, the first a_w measurement will be displayed on the LCD. Length of read times may vary depending on temperature differences between the chamber and your sample, and other properties of your sample.
9. When the AquaLab is finished measuring your sample, it will beep (if beeper enabled) and the green LED will flash. The water activity and the sample temperature will be displayed on screen.
10. Remove sample from drawer when finished sampling. *Note: Do not leave samples inside the chamber overnight or for extended periods of time, as this can contribute to contamination of the chamber.*