

# AquaLab Series 3 Water Activity Meter Standard Operating Procedure

for Series 3 & 3TE Model

## I. Objective

To establish guidelines for proper AquaLab measurement procedures in order to ensure the accuracy and precision of the instrument.

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

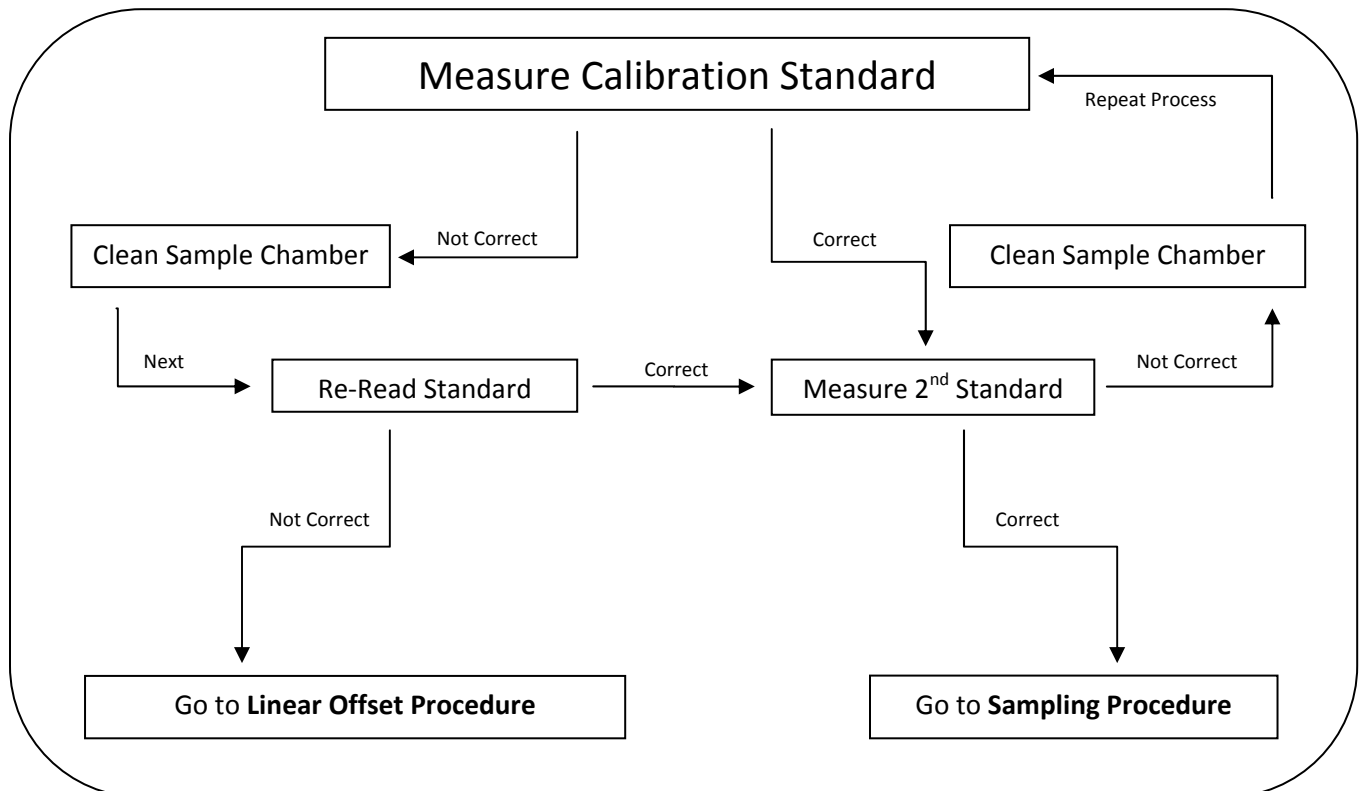
## II. Setup

### A. Location

1. Place AquaLab on a level surface.
2. Place AquaLab in a relatively temperature-stable environment.
3. Place AquaLab in a location where cleanliness can be maintained to prevent contamination of sample chamber.
4. Allow instrument to warm up ~15 minutes after turning it on for optimal performance.

## III. Performance Verification

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



Verify the performance of the instrument with calibration standards that have known water activities:

<b>Calibration Standard @ 25 °C</b>	<b>Molality</b>	<b>Water Activity</b>
Distilled Water		1.000 ±0.003
KCl	0.5m	0.984 ±0.003
NaCl	6.0m	0.760 ±0.003
LiCl	8.57m	0.500 ±0.003
LiCl	13.41m	0.250 ±0.003

### **Verification**

Note: The AquaLab needs to warm up for approx. 15 minutes to make accurate readings.

1. Choose a verification standard that is close to the water activity of the sample you are measuring.
2. Empty a vial of the calibration standard solution into a sample cup and place it in the AquaLab's sample drawer. Make sure the standard is as close to instrument temperature as possible.
3. Carefully slide the drawer closed and turn the knob to the READ position.
4. Take two readings. The water activity readings should be within  $\pm 0.003 a_w$  of the given value for the calibration standard. See Appendix B in the Operator's Manual for the correct water activity value of Decagon's Calibration Standards at temperatures other than 25 °C.
5. If your AquaLab is reading within  $\pm 0.003 a_w$  of the calibration standard, choose a second calibration standard that would border the range of water activity you plan to test with the first standard. For example, if you plan to test for  $a_w$  readings ranging between 0.713 and 0.621 you should use the 6.0 m, NaCl ( $0.76a_w$ ) standard for your first verification and the 8.57 m LiCl ( $0.50 a_w$ ) for the second verification.
6. Prepare a sample cup of the second calibration standard and make two readings. The second water activity reading for the second verification standard should be within  $\pm 0.003 a_w$  of the standard.
7. If the reading of the first standard is not within  $\pm 0.003 a_w$ , it is probably due to contamination of the sample chamber. Refer to the Operator's Manual for cleaning instructions.
8. If your first standard reading is correct but your second calibration standard is not, it is probably due to contamination of the sample chamber. Refer to the Operator's Manual for cleaning instructions. After cleaning, repeat verification from step two.
9. If you consistently get readings outside the  $a_w$  of your first calibration standard by more than  $\pm 0.003 a_w$ , a linear offset may have occurred. In this case, adjust the reading on the calibration standard to its correct value as outlined below.

## IV. Linear Offset Procedure

1. Enter the system configuration menu by pressing the lower left button while in the main menu. 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.
2. 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,” you will be prompted to “place standard in drawer and read.”
3. Empty the whole vial of a calibration standard into a sample cup. We recommend using the 6.0 m NaCl (0.76  $a_w$ ). Do not adjust for the offset using distilled water.

*NOTE: The same calibration standard may be used to verify and adjust the linear offset.*

4. Ensure the rim of the cup is clean. Place the prepared sample cup in the AquaLab’s sample drawer.
5. Carefully close the drawer and turn the knob to the READ position.

*NOTE: If you decide at this point not to continue with the linear offset, just return the knob to the OPEN/LOAD position and remove the sample.*

6. After your AquaLab has finished measuring the calibration standard, it will display the reading and the + and – options to adjust the reading.
7. Press the up and down buttons (next to the Adjust + and - ) to adjust the  $a_w$  reading to its proper value for the particular calibration standard you are measuring. When the correct value is displayed, press the exit button to store this new value.

*NOTE: This is the only menu where these buttons can change the linear offset, so you won’t change the offset but pressing these buttons in other menus.*

8. Re-measure the calibration standard again in normal sampling mode. It should read the proper value at a given temperature for your particular standard (see Appendix B in the Operator’s Manual for temperatures other than 25 °C).
9. Measure the  $a_w$  of a second calibration standard according to the verification procedure described above. If both verification readings are within  $\pm 0.003 a_w$  then the instrument is ready to begin testing.

If you still have incorrect calibration standards readings after cleaning the chamber and/or adjusting for linear offset, contact Decagon for further instructions at [support@decagon.com](mailto:support@decagon.com) or 1-800-755-2751 or 509-332-2756. If you purchased your Decagon instrument from one of our international distributors, please contact them for local service and support.

## V. Sampling Procedure

*Note: Be consistent in sample preparation practices.*

1. Make sure that the sample to be measured is representative of the product.
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 sample chamber!**
4. Make sure that the rim of the sample cup is clean.
5. Turn the knob to the OPEN/LOAD position and slide the drawer open.
6. Place your prepared sample cup in the drawer and carefully slide the drawer closed.
7. Turn the knob to the READ position. This will seal the chamber and start the reading.
8. In 1 to 2 minutes, the first  $a_w$  reading will be displayed on the LCD. Length of read times may vary depending on temperature differences between the sample chamber and your sample, and other properties of your sample.
9. When the AquaLab is finished measuring your sample, it will beep (if audible notification is enabled) and the  $a_w$  and the sample temperature will be displayed on screen.
10. Remove sample when finished sampling.

*Note: Do not leave samples inside the sample chamber for extended periods of time, as this can contribute to contamination of the chamber.*