

AquaLab Series 4 Water Activity Meter Standard Operating Procedure

for Series 4, 4TE, and DUO Models

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.

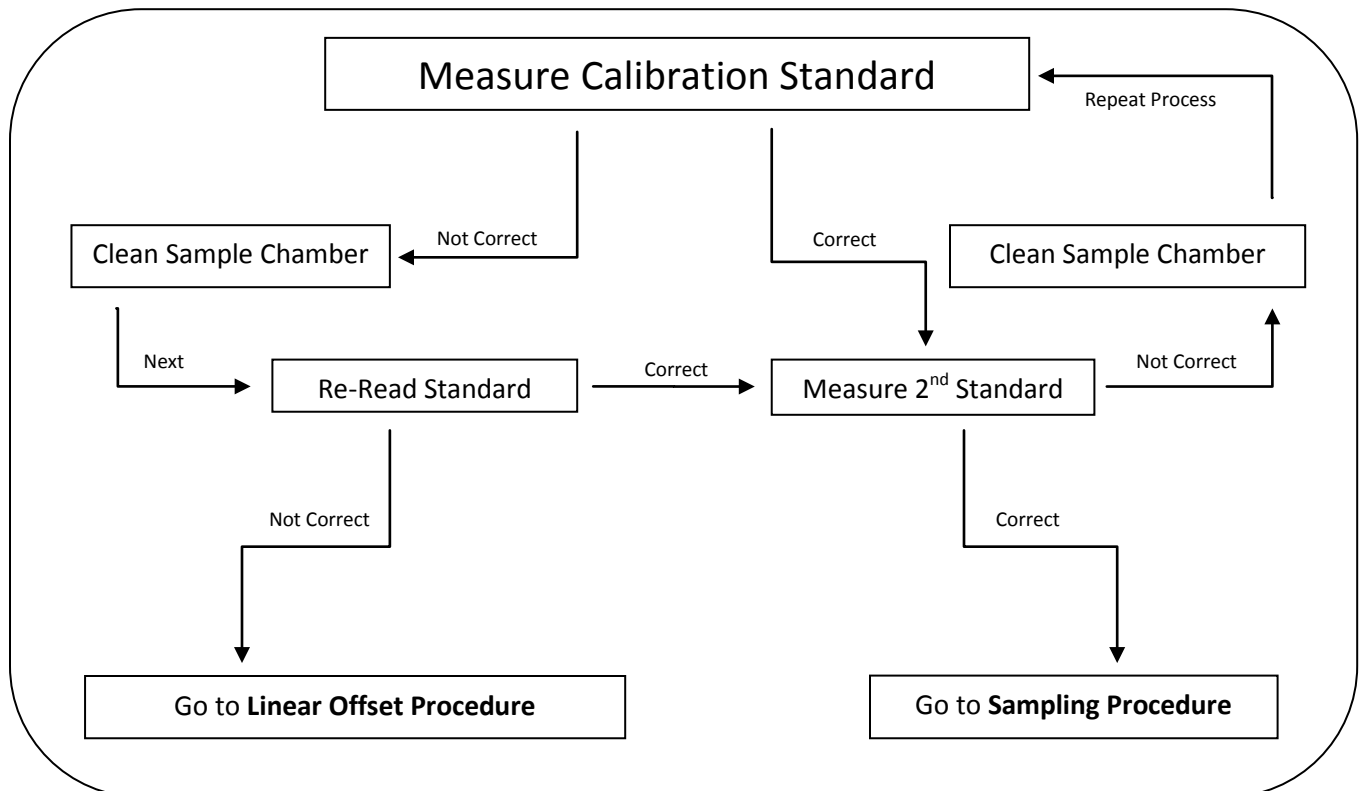
II. Setup

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:

Calibration Standard @ 25° C	Molality	Water Activity
Distilled Water		1.000 ±0.003
KCl	0.5 m	0.984 ±0.003
NaCl	6.0 m	0.760 ±0.003
LiCl	8.57 m	0.500 ±0.003
LiCl	13.41 m	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 chamber. Make sure the standard is as close to instrument temperature as possible.
3. Carefully close the lid and move the lever 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 (0.76 a_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. Once you are certain a linear offset has occurred, toggle to the Configuration tab by pressing the Menu icon button. Calibration is the first option highlighted in the configuration tab. Press the Enter icon button to access the calibration routine. You will be guided through the linear offset routine by on screen commands.
2. Press the Enter button to start the linear offset process. To return to the main menu, press the cancel button. After pressing the enter button, you will be prompted to “Insert a fresh standard and seal the chamber.”
3. Empty the whole vial of solution into a sample cup. We recommend using the 6.0M NaCl (0.76 a_w). Do not adjust for the offset using distilled water. Ensure the rim and the outside of the cup are clean. Place the sample cup in the AquaLab’s sample chamber.

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

4. Carefully close the lid and slide the lever to the READ position. Press the Check icon button to begin testing.

Note: If you decide at this point not to continue with the linear offset program, just return the lever to the OPEN position or press the cancel (X) button and you will be returned to the previous screen.

5. After your AquaLab has finished measuring the calibration standard, it will display the Change the Offset screen.
6. Press the up and down arrows 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 Save icon button to store this new value. To cancel and return to the main menu, press the cancel button and no changes will be made.
7. 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). 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 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 and outside of the sample cup are clean.
5. Move the lever to the OPEN position.
6. Ensure the AquaLab sample chamber and sensors are clean.
7. Place your prepared sample cup in the chamber.

Note: For prepared samples that have lids, please remove before placing sample cup in chamber.

8. Close the lid and move the lever to the READ position. This will seal the chamber and start the reading.
9. 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.
10. 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.
11. 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.