CELLTREAT® SCIENTIFIC PRODUCTS VistaLab™ TECHNOLOGIES

TECHNICAL NOTE

ali-Q™ Pipetting: Techniques and Tips

Aliquoting / Repeat Pipetting / Multidispensing with ali-Q is faster and easier than with standard pipet controllers using serological pipets. Once you've dialed in the volume you want to multidispense and aspirated the liquid you need, simply **press and hold** the purple aliquot button for the entire duration of each aliquot. When the LED blinks green and the motor turns ON at the end of the dispense, release the button. The ali-Q is now ready for your next press and hold.

For the best accuracy and precision using ali-Q, performing proper pipetting technique, accounting for environmental factors, and choosing the right equipment are all crucial for achieving optimal results.

1. **Proper aliquoting pipetting technique**
    a. Always discard the first 1 -2 aliquots.
    b. Dispense against the side wall of the receiving vessel to avoid hanging drops (**Fig. 1a**). Touch off any hanging drops before dispensing the next aliquot.
    c. Maintain a consistent angle and stable ali-Q position throughout the aliquot series.
        i. Dramatic changes in angle between successive aliquots can disrupt the water column and affect accuracy of the subsequent aliquot.
        ii. Going from a horizontal to a vertical angle changes hydrostatic pressure which can cause air bubbles (**Fig. 1b**) that lead to dripping. An ideal water column (**Fig. 1c**) has neither a hanging drop nor an air bubble for the best accuracy.
        iii. Minimize shaking. Use elbow or arm support whenever possible.
        iv. Keep a steady and smooth motion when transitioning between vessels. If possible, keep the ali-Q and serological pipet stationary while moving your plates or tubes.

Fig 1. Water column differences. a) A hanging drop will create a higher volume aliquot. **b)** An air bubble will create a lower volmer aliquot. **c)** An ideal situation with neither a hanging drop nor an air bubble.

2. Environmental factors

Different environmental factors (temperature, pressure, humidity) can affect ali-Q's performance. For best aliquoting accuracy, allow ali-Q to acclimate to the temperature of the location of intended use. See examples in **Fig. 2.**

a. Transitioning ali-Q from a higher temperature environment to room temp. and immediately attempting to aliquot will result in lower volume aliquots than what is selected on the dial. See **Fig. 2, red line**. Accuracy returns to within acceptable specs (+/-2%) after approximately 10 minutes. Similarly, when transitioning ali-Q from a cold temperature environment to room temp., the immediate aliquots will be a higher volume than set on the dial and it will take approximately 15 minutes of acclimation for the ali-Q aliquots to return to proper accuracy. See **Fig. 2, blue line**.

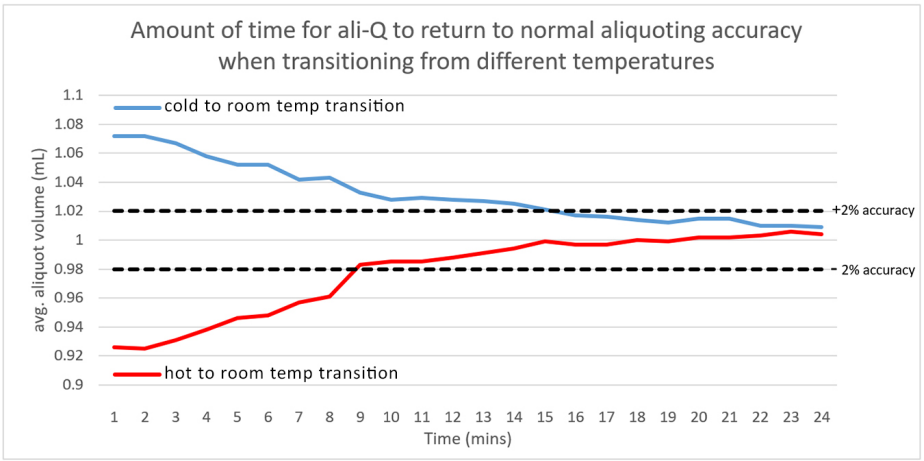

Fig 2. Amount of time for ali-Q to return to normal aliquoting accuracy when transitioning from different temperatures. Red line: — An ali-Q was left in an oven at 50° C for 1.5 hours and immediately brought to a room temperature environment for performance testing. The unit was set to dispense 1 mL of water in sets of 10 aliquots/min and the average of each set was determined. The entire test was run over 30 minutes before reaching stable temperature and performance. Blue line: — The same procedure was performed with an ali-Q refrigerated at 4° C overnight.

2. Environmental factors (continued)

b. Liquid temperatures that differ from the environment may also slightly affect ali-Q's aliquoting performance. Aliquoting cold liquid in a warm environment will cause ali-Q to dispense slightly higher volumes; aliquoting warm liquids in a colder environment will cause ali-Q to dispense lower volumes. To limit this effect, allow the liquid to equilibrate when possible. Otherwise, adjust the ali-Q volume dial appropriately to account for the difference. Similarly, a calibration adjustment can be performed according to the procedure in the Operators Manual to set the ali-Q for consistent use under these conditions.

2. Choose a serological pipet that will give you the best results

ali-Q is compatible with all brands and sizes of serological pipets. However, the selection of the serological pipet can affect optimal accuracy and precision. Different brands will result in different performance due to differences in the pipet's fit and seal within the nozzle of the ali-Q. When either the fit or seal is not optimal, then leakage/dripping may occur affecting the accuracy of aliquots that can be obtained. Differences in geometry of the serological pipet, namely the orifice diameter, will also affect performance. A smaller orifice provides easier control of the water column to avoid hanging drops and air bubbles (see **Fig. 1**). Typically, orifice size decreases with the serological pipet volume, so it is recommended to use the smallest volume pipet that is suitable for your application.

VistaLab recommends using Wobble-not™ serological pipets for best accuracy and performance. Wobble-not's two-tier plug end design provides the best seal and maximum stability due to the 2 points of contact within the controller's nozzle. This also helps to decrease dripping for better accuracy and precision.
(Note: ali-Q is factory calibrated with Wobble-not serological pipets.)