

Pipetting Procedures

The most important aspect of pipette calibration is being consistent in your procedure and having a good cadence. A smooth rhythm will increase your throughput while minimizing errors - having a timed, audible prompt can assist in your accuracy.

1. ENSURE CONSISTENT TECHNIQUES AMONGST ALL OPERATORS

Differences in user background, training and even personal preferences vary from person to person. These differences can affect both accuracy and precision. Standard Operating Procedures should be adopted for pipetting techniques, and ensure that each operator is properly trained to an acceptable level of proficiency. Be sure to follow the recommendations of the pipette manufacturer. *This first point is more important than all the others combined.*

2. Work at Room Temperature

Allow liquids and equipment to reach ambient temperature. Liquids at too high a temperature will tend to deliver a lower volume, while too low a temperature will tend to deliver a higher volume. It would be best if all samples and equipment are at room temperature, and that this temperature is consistent for all tests.

3. Ensure proper Room Humidity

Errors due to evaporation will be considerably higher when room humidity is less than 50% - especially with small samples. Be sure the calibration software has the environmental corrections turned on.

4. Ensure you use a good quality Balance

Use a balance that has been properly calibrated and is on a flat, level surface – and preferably to 5 decimal places. A four-place balance will not provide the required accuracy for small samples – and a six-place may have difficulty stabilizing due to evaporation and vibration.

5. Ensure stable environment

Work in an area free of drafts and excessive vibration, as these will have a detrimental effect on your results.

6. Pipette Tip should be pre-wetted

Dry pipette tips will deliver lower volumes than pre-wetted tips. Aspirate and expel an amount of the sample liquid at least 3 times before aspirating a sample for delivery. This will increase the humidity within the tip and reduce the error due to evaporation.

7. Use the Correct Pipette Tip

Securely attach a good quality tip, designed for use with your pipette. A poorly fitting tip can not provide quality results.

8. Examine the Tip Before Dispensing Sample

Wipe the tip only if there is liquid on the outside of the tip, being careful to avoid touching tip's orifice.

9. Immerse the Tip to the Correct Depth

The pipette tip should be 2 - 5 mm below the center of the meniscus during sample aspiration.

10. Use Consistent Plunger Pressure and Speed

Depress and release the plunger smoothly and *slowly*, consistently for each sample.

11. Pause Consistently after Aspiration

The tip should remain in the liquid for a short time after aspirating, to ensure all the volume is contained.

12. Pull the Pipette Straight Out

Be careful not to touch the sides of the container.

13. Minimize Handling of the Pipette and Tip

To avoid the transfer of body heat, set the pipette down between sample deliveries. Avoid touching the tip to prevent contamination.