

# Pipetting Techniques for Accurate Results



## WHAT IS AIR DISPLACEMENT VS. POSITIVE DISPLACEMENT PIPETTING?

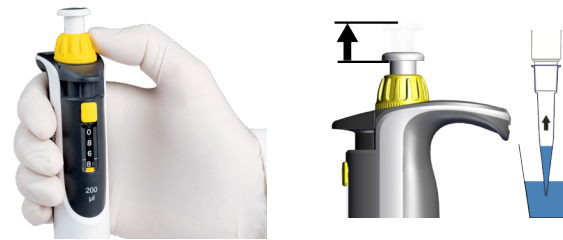
An air displacement pipette, also known as an air cushion pipette, is a piston-operated instrument used to accurately aspirate and dispense precise liquid volumes. The piston and liquid in the plastic tip are separated by an air cushion allowing for contamination-free liquid handling. As the piston is moved up and down, a negative or positive pressure is created. This movement results in liquid being aspirated into or expelled from the tip.

Air displacement pipettes are ideal for liquids with similar density, viscosity, and vapor pressure (volatility) to water. For slightly volatile, viscous, or foaming liquids we recommend using the reverse pipetting technique. For highly volatile, viscous, or foaming liquids we recommend using a positive displacement instrument.

## FORWARD PIPETTING

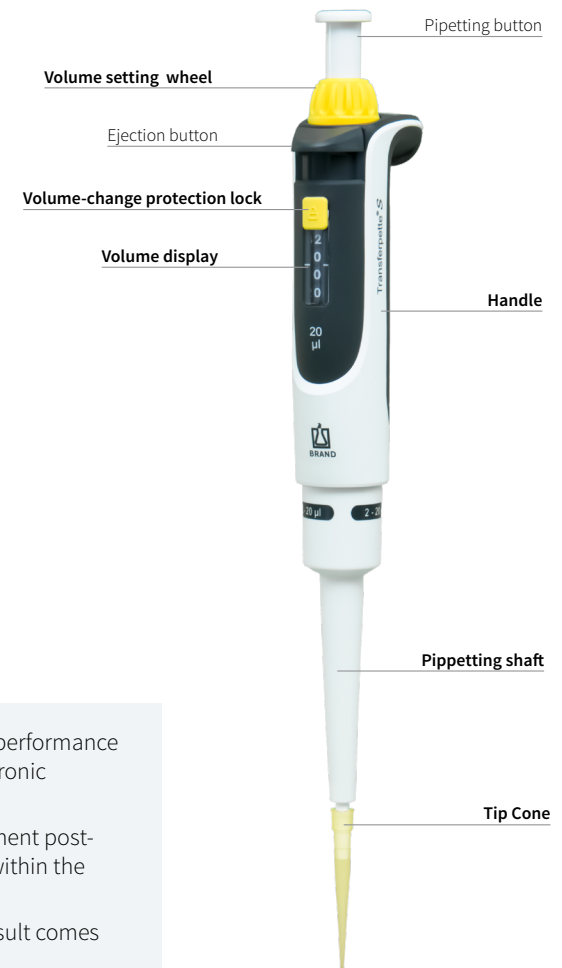
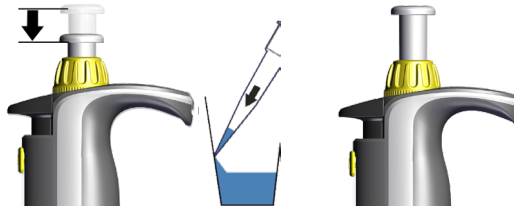
### Aspirating the Sample

1. Set the volume to be aspirated.
2. Press the pipetting button to the first stop.
3. Hold the pipette vertically and immerse the tip.
4. Slowly release the pipetting button.
5. With tip immersed in liquid, wait several seconds until set volume is completely aspirated.

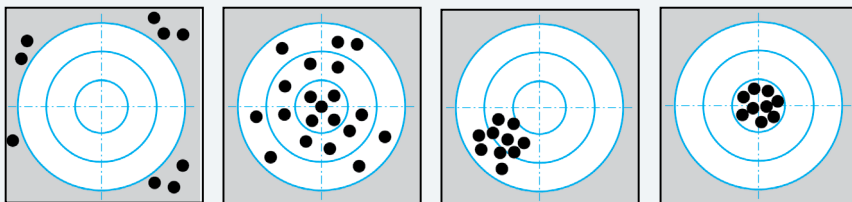


### Dispensing the Sample

1. Hold the pipette at a 30-45° angle touching the wall of the container.
2. Push the pipetting button to the first stop and hold.
3. Push the pipetting button to the second stop (blow-out) while wiping the tip against the wall.
4. Remove the pipette tip from the container and then release the pipetting button back to its original position.



## ACCURACY AND PRECISION



Inaccurate and imprecise

Accurate but imprecise

Inaccurate but precise

Accurate and precise

- Calibration is the process of determining the performance of an instrument without mechanical or electronic adjustment.
- Adjustment is the manipulation of the instrument post-calibration so that the instrument is aligned within the specified tolerances.
- Accuracy of measurement is how close the result comes to the target value.
- Precision (reproducibility) describes how closely grouped results are in a set of measurements, in units of volume.