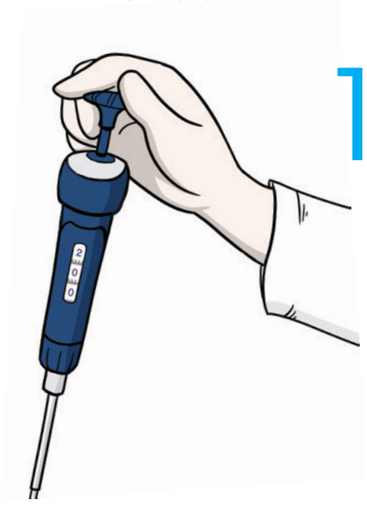
RAININ
Pipetting 360°

Quick Check

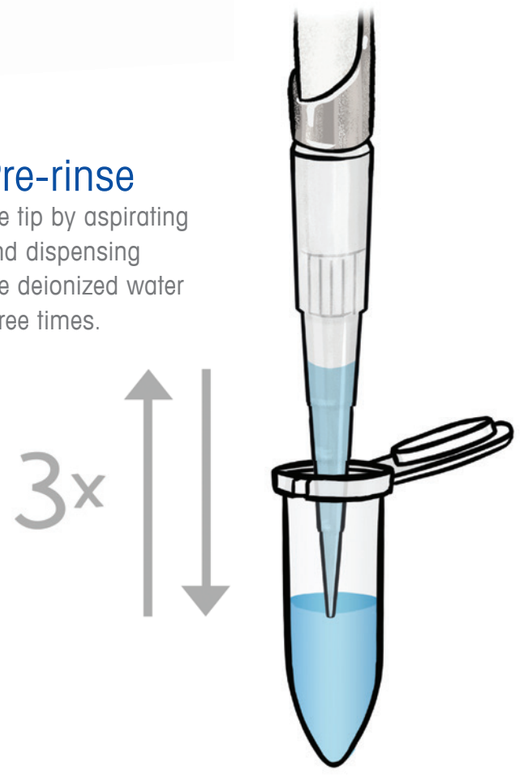
Evaluate a pipette's performance using this easy gravimetric Quick Check. You'll need a balance and vessel, some deionized water and an area to work in that's free from drafts, direct sunlight and vibration.

For 100 µL pipettes or larger, use a 5-place balance. Less than 100 µL use a 6-place balance.

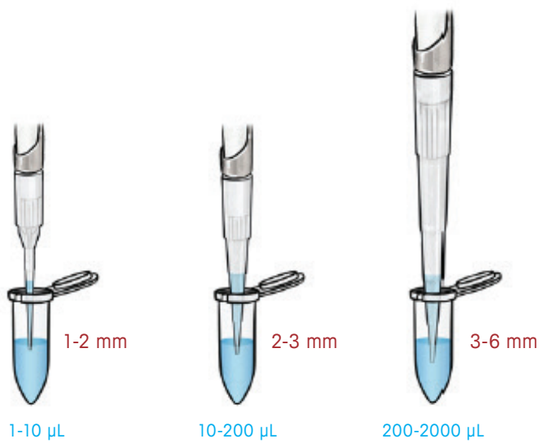


1
First, after preparing the vessel and taring the balance, adjust the pipette to 100 percent of its nominal volume and load the manufacturer's recommended tip.

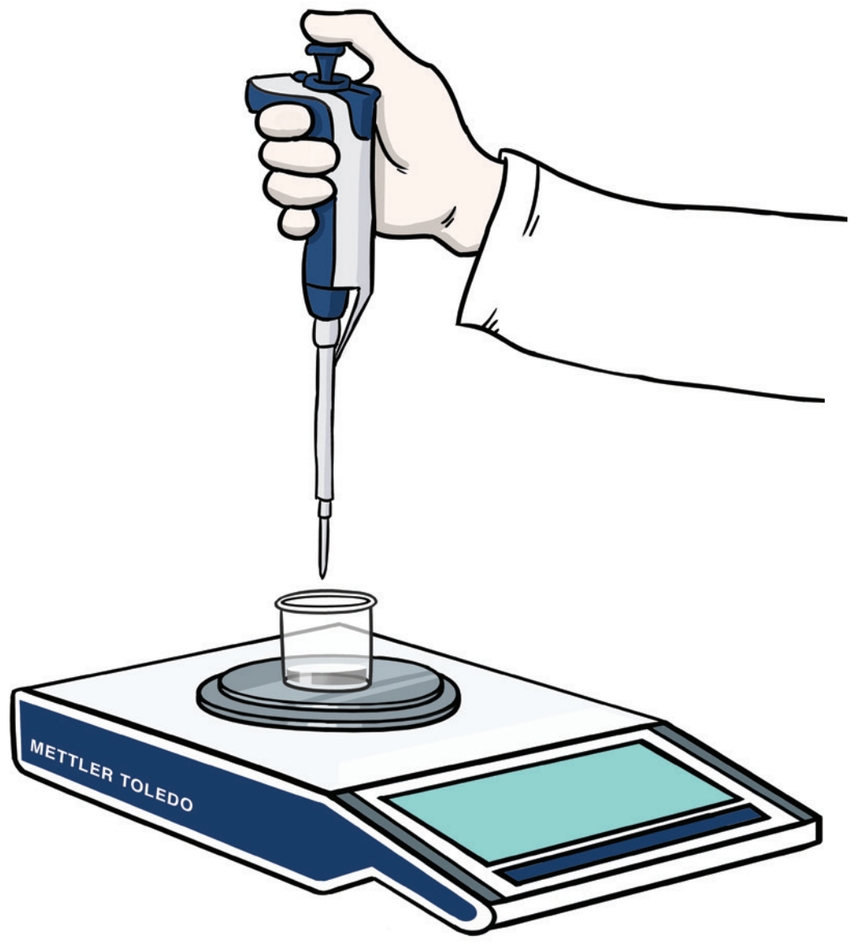
2
Pre-rinse the tip by aspirating and dispensing the deionized water three times.



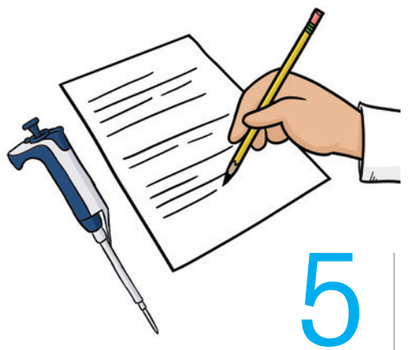
3
Holding the pipette vertically immerse the tip to the appropriate depth and aspirate the deionized water.



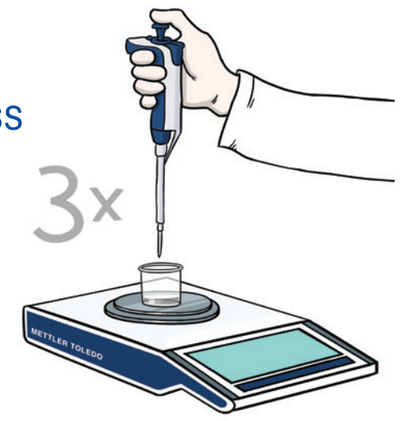
4
Carefully move the pipette over the vessel on the balance and dispense the water. Slide the tip up the side wall to remove any excess liquid.



5
To avoid the effects of evaporation, as soon as the balance stabilizes, record the mass of the water in milligrams.



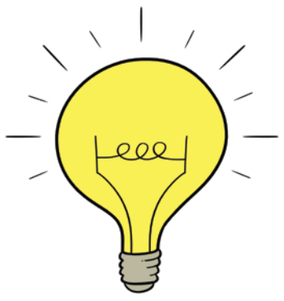
6
Repeat the process three more times using the same tip. Recording the mass each time.



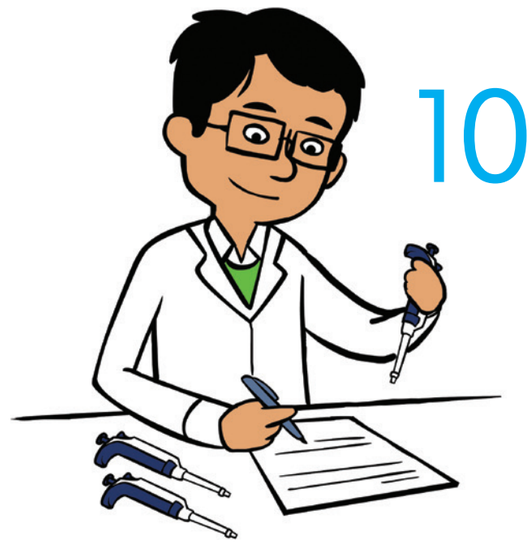
7
Eject the tip after the final dispense.

8
Now, adjust the pipette down to 50 percent of its nominal volume, pre-rinse a new tip three times, and repeat steps 3-7.

9
With the data you have collected, you can now calculate the pipette's mean volume, accuracy (mean error) and precision (standard deviation).



10
Now, compare your results to the manufacturer's specifications.



Volume
Expressed in mL.

$$v_i = (w_i)Z$$

Vi = individual volumes
W_i = individual weighings
Z = Z-factor

Mean Volume
The mean weight result with correction for Z-factor. Expressed in µL.

$$\bar{v} = \frac{\sum_{i=1}^{n} v_i}{n}$$

$\bar{v}$ = mean volume
n = number of weighings
v_i = individual volumes

Accuracy
Mean error is the difference between the mean volume of actual measurements and the true value as specified by the volume setting of the pipette. Expressed in µL.

$$E = \bar{v} - v_s$$

E = mean error
$\bar{v}$ = mean volume
v_S = volume setting

Precision
Standard deviation quantifies the magnitude of scatter due to random error.

$$s = \sqrt{\frac{\sum_{i=1}^{n} (v_i - \bar{v})^2}{n-1}}$$

s = standard deviation
n = number of weighings
v_i = individual volumes
$\bar{v}$ = mean volume

If your results don't match the pipette's specification, your pipette needs service or calibration.

For more Quick Check tools and white papers, visit mt.com/gpp-qc

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