EDVOTEK® Quick Guide: Micropipeting Basics

What is the difference between accuracy and precision?

Accuracy describes how close a measurement is to the true value of a given quantity. Precision describes the reproducibility of the measurement. Accordingly, measurements can be categorized as follows in Figure 1.

Why are accuracy and precision important for biotechnology?

Accuracy and precision of measurements ensure that your experiments are both successful and reproducible. For example, small differences in primer or template concentration can make a big difference in the results of PCR experiments.

How can we accurately measure small volumes?

Scientists use carefully calibrated micropipettes to measure small volumes in the laboratory. Micropipettes draw liquid into a disposable plastic tip by creating a vacuum in the barrel above the tip. The liquid is dispensed when the vacuum is released. The plastic tip is changed between samples to prevent cross-contamination.

Edvotek® 5-50 µl
Variable Micropipet
Catalog # 590

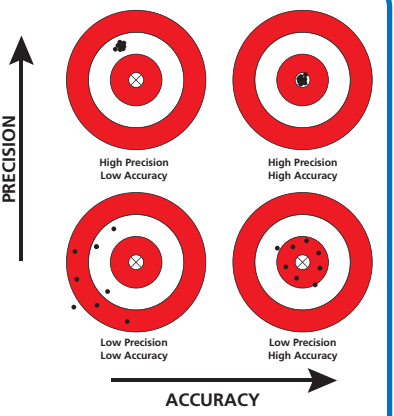

FIGURE 1: Precision vs. Accuracy

1. Low precision, Low accuracy– measurements do not match accepted value, nor are they reproducible.
2. Low precision, High accuracy– the average of the measurements matches the accepted value, but their values vary greatly.
3. High precision, Low accuracy – the value of the measurements match one another, but the average deviates from accepted value.
4. High precision, High accuracy– the measurements agree with one another and with the accepted value.

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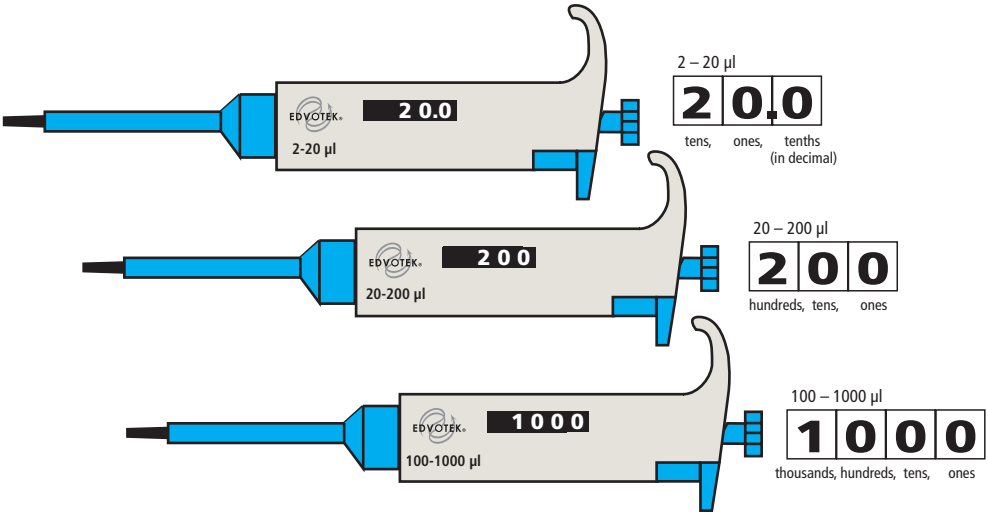

Setting the Volume of an Adjustable Volume Micropipet

1. **CHOOSE** the correct micropipet for the volume you are measuring. Make sure that the volume to be measured **DOES NOT EXCEED** the upper or lower volume setting of the micropipet.

2. **DETERMINE** the units measured by the micropipet by looking at the volume setting. The setting will appear in the window on the side of the micropipet. Note that the different micropipets use different scales for their measurements. Some micropipets are accurate to a tenth of a microliter, while others are accurate to one microliter.

3. **SET** the volume by twisting the top of the plunger. In general, twisting the plunger clockwise reduces the volume, and twisting the plunger counter clockwise increases the volume.

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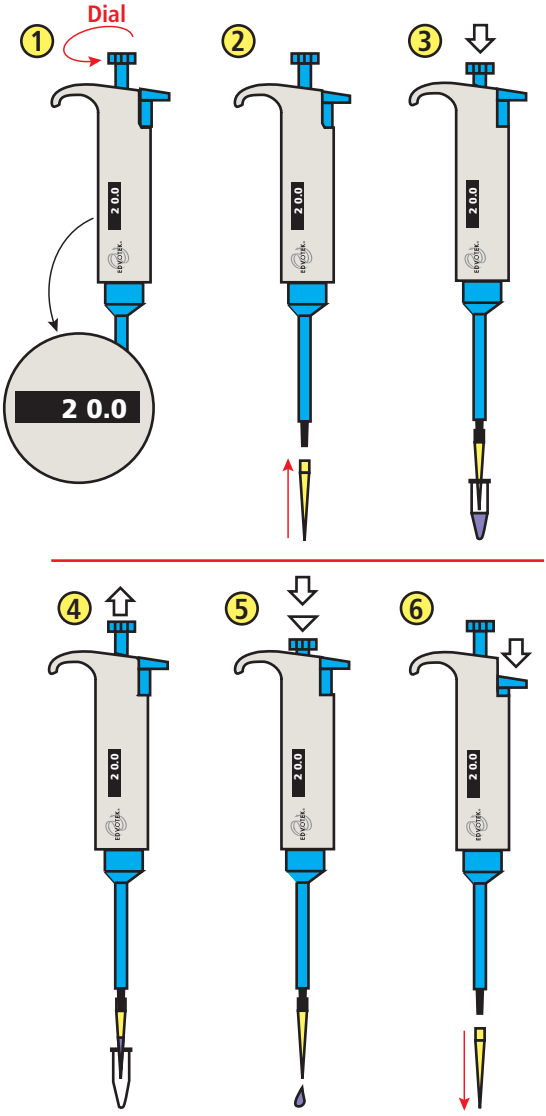
Measuring Liquids with a Micropipet

1. **SET** the micropipet to the appropriate volume by adjusting the dial.
2. **PLACE** a clean tip on the micropipet.
3. **PRESS** the plunger down to the first stop. **HOLD** the plunger down while placing the tip beneath the surface of the liquid.
4. Slowly **RELEASE** the plunger to draw sample into the pipette tip.
5. **DELIVER** the sample by slowly pressing the plunger to the first stop. Depress the plunger to the second stop to expel any remaining sample. **DO NOT RELEASE** the plunger until the tip is out of the sample container.
6. **DISCARD** the tip by pressing the ejector button. Use a new tip for the next sample.



Related Equipment

See the EQUIPMENT section in our Resource Guide for our full range of equipment or visit our website at: www.edvotek.com

Edvotek® Variable Micropipets

Our sturdy Variable Micropipets are designed with volumes ranging from 0.1 to 5000 µl. They are easy to use, highly accurate and use standard micropipet tips. The volume is easily selected by twisting the top. The lightweight design and tip ejector makes operation fast & easy. A tool and instructions are included for self-calibration.

Cat. # 589-2 0.1 - 2.5 µl Micropipet
Cat. # 589 0.5 - 10 µl Micropipet
Cat. # 589-1 2 - 20 µl Micropipet
Cat. # 590 5 - 50 µl Micropipet
Cat. # 591 10 - 100 µl Micropipet
Cat. # 591-1 20 - 200 µl Micropipet
Cat. # 592-1 100 - 1000 µl Micropipet
Cat. # 593-1 500 - 5000 µl Micropipet

Ultra Micropipet Tips
0.5-10µl, 2 racks of 96 each
Cat. # 635
0.5-10µl, Bag of 1000 tips
Cat. # 635-B

Yellow Micropipet Tips
1-200µl, 2 racks of 96 ea
Cat. # 636
1-200µl, Bag of 1000 tips
Cat. # 636-B

Micropipet Tips
100-1000µl, 2 racks of 100 ea
Cat. # 637
100-1000µl, Bag of 1000 tips
Cat. # 637-B

Fine Tip Micropipet Tips
1-200µl, 1 rack of 204
Cat. # 638

Jumbo Micropipet Tips
1000-5000µl, Bag of 100 tips

For NEW Variable Automatic Pipet
Cat. # 637-3

For Classic Variable Automatic Pipet
Cat. # 637-2

Pipet Stand
For 6 Micropipets
Cat. # 796

DNA DuraGel™

DNA DuraGel™ gels are permanent polymer gels that allow students to practice the critically important skill of pipetting/gel loading.The clear, reusable gels are designed for the practice of loading 5 - 35 µl of samples. The gel grids are imprinted with a ruler for sizing DNA fragments. Also included are simulated FlashBlue™ and Ethidium Bromide gel images, ideal for representing how actual gels are stained with Methylene Blue and Ethidium Bromide.

Kit Includes: Reusable DNA DuraGel™; Flash Blue™ and Ethidium Bromide gel images, practice gel load solution and mini-transfer pipets.

All you need: micropipets are recommended.

Cat # S-43
For 12 to 24 students
6 Gels and 8 images (4 FlashBlue™ & 4 Ethidium Bromide gel images)

Cat # S-43-20
For 4 students or classroom demo
2 Gels and 4 images (2 FlashBlue™ & 2 Ethidium Bromide gel images)