NEXTPETTE

Instruction Manual

ACCURIS INSTRUMENTS a division of

Benchmark Scientific
P.O. Box 709 Edison, NJ 08818 USA
Ph: 908-769-5555 EM: info@BenchmarkScientific.com

Introduction:

Accuris NextPette Pipettes are designed for laboratory research use, and specifically for the measurement and transfer of aqueous solutions. The NextPette pipettes offer variable volume setting, and are available in different ranges to cover volume measurements from 0.1ul to 10ml.

NextPette pipettors utilize the principle of air displacement. A vacuum is created by the plunger movement, and a precise volume of sample liquid is drawn into the attached pipette tip. Disposable pipet tips must always be used for liquid aspiration, and the shafts of the NextPette pipettes are designed to accept a wide range of different brands and styles of disposable pipette tips.

Proper operation and proper use of disposable tips will prevent liquid samples from entering the pipette and contaminating the internal parts.

Each variable volume NextPette incorporates a 4-digit counter display to show the set volume. The volume setting can be changed using the volume adjustment dial below the push button. A volume adjustment lock is located just below the tip ejector button, and this allows the user to securely lock the adjustment dial at the appropriately set volume.

NextPette Parts and Features:

The top of the finger hook has a place under the removable window for an identification label. Each pipette comes with a set of different colored labels for color coding. Under the window and label is the serial number label and calibration switch. See the calibration section of this manual for details.

Tip Compatibility:

The NextPette Pipettes feature a universal tip fitting shaft that is designed to work with most manufacturer's brands of pipette tips. Before pipetting, always ensure that a pipette tip of the appropriate size has been attached.

See below for a chart identifying the appropriate tip size for each NextPette Pipette:

P77700-1:	0.1-1µl	10ul tip
P7700-10	0.5-10µl	10ul tip
P7700-20	2-20µl	200ul tip
P7700-100	10-100µl	200ul tip
P7700-200	20-200µl	200ul tip
P7700-1000	100-1000µl	1000ul tip
P7700-5M	500-5000µl	5000ul tip
P7700-10M	1000-10000µl	10,000ul tip

Attaching the Tip:
Attach the tip by firmly pressing the pipette cone into the tip. A proper seal is necessary for optimal pipetting accuracy and precision.

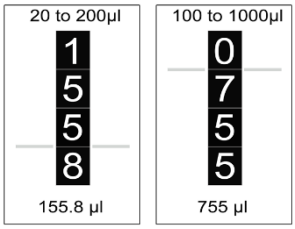
NOTE: For 5ml and 10ml pipettes (P7700-5M and P7700-10M) always ensure that the included filter is properly installed onto the pipette shaft prior to tip attachment. Failure to do so can result in harm to the internal components of the pipette.

Operation:

(Before operation, please refer to the “attaching the tip” instructions above.)

1. **Volume setting**:

Example:



Ensure that the volume adjustment lock is in the unlocked position (pushed up). Turn the volume adjustment dial and monitor the volume display to select the pipetting volume. When the volume is selected, push the volume lock to the locked position.

2. Aspirate the liquid sample:

Push the plunger button down with the thumb to the first stop. Holding the pipette vertically, immerse the pipet tip into the liquid sample 2mm to 3mm. ***Slowly*** release pressure on the plunger button so that the liquid sample is drawn into the pipet tip. **NOTE:** It is very important that the sample liquid is aspirated slowly. Leave the tip immersed in the sample for 1 to 2 seconds then remove it from the sample.

NOTE: Always keep the pipette in an upright vertical position when there is liquid in the pipette tip. Laying the pipette horizontally may cause liquid to flow from the tip in to the pipette shaft, causing contamination.

3. Dispensing

Place the pipet tip so it is touching the wall of the container or tube into which the sample will be dispensed. The pipette should be held at a 30 to 40 degree angle relative to the wall of the container.

Press the plunger button slowly to the first stop to dispense the sample. Increase pressure on the plunger button to pass the first stop and reach the second stop (this is the blow out step which helps to dispense the full amount of sample from the tip).

During the blow out step, slowly move the pipet tip against the wall of the vessel. This will help to remove any remaining liquid from the pipet tip.

Remove the pipette tips away from the vessel wall and allow the plunger to return to the starting position.

4. Ejecting the tip

Hold the pipette over a suitable waste container and press the tip ejector button to remove the tip.

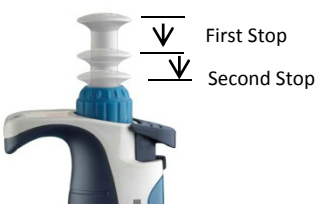
1.

Volume Setting

2.

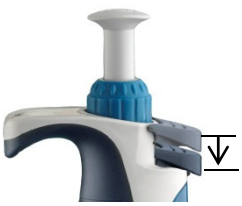
Aspirating

3.



Dispensing

4.



Ejecting tip

Tips for Proper Pipetting:

Accurate pipetting requires skills that improve with practice. It is also necessary to follow recommended best practices and understand proper pipetting technique. The following are recommendations on how to get the best performance from your NextPette pipette:

- Always operate the plunger button slowly and smoothly when aspirating and dispensing samples.
- The end of the pipette tips should be immersed 2 to 3 mm below the surface of the sample to be aspirated, and this depth or immersion should be kept constant during the aspiration.
- Always keep the pipette in a vertical position during the pipetting process.
- Use a new pipette tip whenever switching from one type of sample to another.
- Carefully check the pipette tips used. Any inconsistencies in manufacture will result in inaccurate and imprecise results.
- Carefully check the pipette tips for left over sample liquid staying inside the tip during the pipetting process.
- Always use the pre-rinsing technique on a new tip before aspirating the measured volume.
- Sample liquid should not enter the pipette shaft.
- Never lay the pipette horizontally when there is sample liquid in a pipette tip.
- Do not aspirate liquids above 70C.
- After pipetting acids or any other aggressive liquids, it is recommended to disassemble the pipette and rinse the plunger, shaft, seal and other internal elements with distilled water.

Cleaning and Sterilization:

Cleaning: External surfaces of the pipette can be cleaned with water or isopropyl alcohol.
Sterilization: The NextPette is fully autoclavable at 121°C for 20 minutes. After autoclaving, it is important to let the pipette completely cool to room temperature prior to use.
Important: Always check the autoclave to confirm the maximum temperature setting of 121°C prior to autoclaving the NextPette. Temperatures higher than 121°C or a sterilization process longer than 20 minutes may damage the NextPette.

Specifications:

Item No.	Volume	Increment	A*≤±% Min volume	A*≤±% Max volume	CV*≤±% Min volume	CV*≤±% Max volume
P7700-1	0.1-1 µl	（0.001ul)	20.00	2.00	12.00	1.20
P7700-10	0.5-10 µl	（0.01ul)	3.80	0.50	4.00	0.50
P7700-20	2-20 µl	（0.02ul)	3.00	0.80	3.00	0.80
P7700-100	10-100 µl	（0.1ul)	1.50	0.80	1.00	0.20
P7700-200	20-200 µl	（0.2ul)	1.20	0.60	1.50	0.80
P7700-1000	100-1000 µl	（1ul)	1.50	0.60	1.00	0.60
P7700-5M	500-5000 µl	（5ul)	0.60	0.50	0.60	0.50
P7700-10M	1000-10000 µl	（10ul)	2.50	0.50	2.00	0.50

Checking the Accuracy and Precision:

It is recommended that each NextPette pipette is checked on a regular basis to confirm that it is within its calibration specifications.

The gravimetric test method (according to DIN EN ISO 8655) is recommended for checking accuracy and precision.

It is recommended to use a fully calibrated electronic balance for the gravimetric testing. A 4 digit balance can be used to test volumes greater than 10ul. For 10ul and less a 5 digit balance is recommended. For 1.0ul and less, a 6 digit balance is recommended.

1. Set the maximum volume on the pipette.
2. Condition the pipette before testing. Attach an appropriate pipette tip, aspirate and dispense the test liquid (distilled water, at 20°C, is recommended) 5 times. Discard the pipette tip.
3. Perform a gravimetric test:
    a. Attach a new pipette tip. Note: the pipette tips should be of high quality, and should be the same tips that will be used on a regular basis with the pipette.
    b. Pre-rinse the tips a few times by aspirating and dispensing the test liquid. This will coat the inner surface of the tip with liquid and enable an accurate test.
    c. Weigh the measured volume of liquid from the pipette by aspirating to a weighing vessel on the balance.
    d. Calculate the liquid volume by converting using the correction factor considering the temperature of the water.
    e. At least 10 aspirations and weighings in 3 volume ranges: 100%, 50%, 10% of nominal volume, are recommended in order to calculate the accuracy and precision results

Calculation (for nominal volume)

X_1 = Weighing results
N= Number of weighings
Z = Correction factor
(e.g. 1.0029ul/mg at 20°C, 1013 hPa)

$$\text{Mean value } \bar{x} = \frac{\sum x_i}{n} \qquad \text{Mean volume } \bar{V} = \bar{x} \cdot Z$$

Accuracy

$$A\% = \frac{\bar{V} - V_0}{V_0} \cdot 100$$

Coefficient of Variation

$$CV\% = \frac{100s}{\bar{V}}$$

Standard Deviation

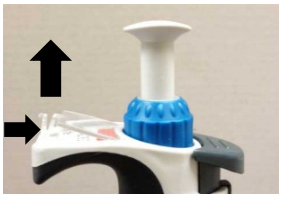
$$s = Z \cdot \sqrt{\frac{\sum (x_i - x)^2}{n - 1}}$$

NOTE: The accuracy and precision specifications have been developed using Benchmark pipette tips, using the gravimetric method and performing 10 measurements of distilled water at a temperature of 20°C +/- 1°C according to the EN ISO 8655 standard.

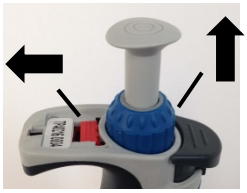
Calibration:

The NextPette is factory calibrated for use with aqueous solutions. If the pipette operation is inaccurate when pipetting aqueous solutions, or it is desired to pipette liquids of a density or viscosity different than water, or special types of pipette tips are to be used, it may be necessary to adjust the calibration.

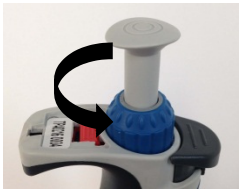
1. Set the adjustment dial of the pipettor to a volume for testing (ie. The nominal volume of the pipette).
2. Pipette a measured volume of sample liquid onto an analytical balance, and using the gravimetric method (with the appropriate correction factor), calculate the actual volume of the pipetted sample. If the actual volume differs from the volume set on the NextPette display, it is necessary to adjust the calibration.
3. Remove the clear window and label on the top surface of the finger hook.
4. Push the red calibration lock away from the adjustment dial and simultaneously pull upward on the volume setting dial until it clicks into the raised position. Release the red calibration lock.
5. Turn the volume adjustment dial to the volume that has been calculated for the sample that was measured (the actual volume).
6. Push the calibration lock again away from the adjustment dial, simultaneously push the volume setting dial down until it locks into position. Release the calibration lock.
7. Adjust the volume of the NextPette back to the nominal volume, and test the calibration again using the gravimetric method. If the value is still off, repeat the calibration procedure.



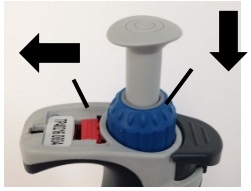
3. Remove the clear window



4. Pull up volume adjustment dial



5. Turn volume adjustment dial



6. Push down volume setting dial

Troubleshooting:

Droplets of liquid remain in the tip after dispensing:

The tip is emptied too fast

Solution 1.) Decrease the speed and force when pressing the plunger button

The tip has been overused

Solution 1.) Replace the pipette tip with a new one

Air pockets appear in the liquid of the pipette tip

The sample is aspirated too fast

Solution 1.) Decrease the speed of aspiration (raise the pipetting button smoothly during sample uptake)

The pipette tip is defective

Solution 2.) Check the pipette tip for quality issues, replace the pipette tip

Plunger button is difficult to depress (or does not move smoothly):

The piston may be contaminated or out of shape.

Solution 1.) Clean the piston and apply silicone lubricant

Solution 2.) Replace the piston or lower portion of the pipette

The tip is leaking or dripping liquid:

The pipette tip is defective or not compatible

Solution 1.) Replace the pipette tip with a new one

Solution 2.) Replace the pipette tip with a new one from a different brand/style

The tip is not properly sealed on the pipette shaft

Solution 1.) Press the tip firmly on the pipette shaft

The internal seal, O-ring, piston or pipette shaft is contaminated of damaged

Solution 1.) Disassemble and clean the piston and seal with distilled water

Solution 2.) Check the parts for damage/wear. Replace part as required

The dispensed volume is more or less than the set volume:

Plunger button has been pressed too far (past the blow out phase) before sample uptake

Solution 1.) Operate carefully, using proper pipetting technique

Pipette is out of calibration

Solution 1.) Recalibrate the pipette following the instructions in the manual

a division of

P.O. Box 709 Edison, NJ 08818 USA
Ph: 908-769-5555 EM: info@BenchmarkScientific.com