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How to Use a Socorex Pipette

Abstract

Pipettes are precision tools that, when used properly, will provide years of trouble-free service. However, many users do not receive training to use this common laboratory utensil.

Procedure

Your Socorex Pipettes are precision tools that will help you efficiently perform your research and testing tasks. Like any tools, your pipette should be used and stored with care to provide the best possible results.

The information below will apply to Socorex pipettes as well as other manufacturers'. All air displacement pipettes work on the same principle. A plunger is used to displace air- when the plunger is returned to its initial position (upper stop); it creates a vacuum that is used to draw liquid into the disposable tip. The pipette is calibrated such that the vacuum draws a volume of water as indicated on the volume setting. The vacuum is unable to draw liquids heavier than water to the same volume as the same mass of water. Lighter liquids than water are pulled further into the tip, so these liquids will pipette to a larger volume. In the case of either lighter or heavier liquids, compared with water, the volume dispensed will be different than that indicated on the pipette. Pushing the plunger pushes air, which then pushes on the liquid in the tip, which is dispensed.

It is important that you use approved tips with your pipettes to assure accuracy. Using unapproved tips may lead to inconsistent results.

Normal Pipetting

1. Fit the tip, set the volume (variable pipettes only), and press down the pipetting plunger to the first stop (metering stroke) with your thumb. Immerse the tip 2-3 mm in the sample while holding the pipette ertically.

2. Slowly retract the pipetting plunger while watching the liquid fill the tip. You should not observe bubbles or turbulence, which indicate gasses being pulled from the liquid. These gasses reduce the vacuum that draws the liquid, reducing the amount of liquid aspirated into the pipette tip.

3. When the pipetting plunger has been retracted to its upper stop, remove your thumb since the absence of pressure increases the precision of the pipette. Slowly withdraw the pipette from the liquid. Wipe any drops on the outside of the tip on the wall of the vessel you are drawing liquid from.

4. To dispense the liquid, hold the tip against the side of the receiving container at a slight angle. Use your thumb to push down the pipetting plunger to the first stop, and hold it for one second. Wait one second, then push the button to the second stop. Pushing to the second stop blows out any liquid left in the tip.

For work with volatile solvents, such as methanol, you may perform this procedure on a “dummy” sample to saturate the system with vapor. This may improve accuracy, as presaturating the air will reduce the tendency to “blow out” the liquid before you are ready to dispense the sample. You should saturate the tip in this fashion every time you change tips.

Reverse Pipetting

Reverse pipetting is used to aspirate an additional volume of liquid. This technique is useful when working with thick, viscous liquids. This is also useful for volatile solvents.

1. Press the pipetting plunger with your thumb to the second stop. This is different from the procedure listed above for regular operation.

2. Holding the pipette vertically, slowly retract the plunger to its upper stop. Wait for the liquid to properly fill the tip. With viscous liquids, this will take longer than when pipetting water. A larger amount of liquid will be aspirated than normal operation since the plunger was pushed to the second stop.

3. When dispensing, push the plunger only as far as the first stop. Wipe any liquid hanging on the tip on the side of the receiving container. Any remaining liquid will be discarded with the tip.

Working Position

When aspirating the sample, the pipette must be held vertically, or else too much liquid will be drawn in. Tilting the pipette means the vacuum caused by lifting the plunger works less hard to draw liquid, so it draws more liquid than calibrated. Tilting the pipette by 30 degrees causes nearly 1% more liquid to be drawn!

When dispensing the sample, the tip should be held at an angle against the container to draw out the liquid in the tip. Under normal pipetting operations, analytical chemists will recognize the pipette as a “to contain” pipette.

When aspirating the sample, the tip should generally be immersed to 2-3 mm. Placing the tip deeper into the sample allows pressure from the liquid to help push the sample into the tip, reducing accuracy.

Working Conditions

Under ideal conditions, the sample should the same temperature used to calibrate the pipette. Cold liquids are denser than warm liquids. If the pipette was calibrated at room temperature, but used in a cold-room, smaller samples than expected would be dispensed.

Storage

Pipettes should be stored in an appropriate rack or stand. This reduces the risk of scratching or damaging the nose cone. Damage to the nose cone could result in a poor seal to the pipette tip, which will reduce accuracy.

Testing & Calibration

You should periodically check the operation of your pipette by checking its calibration.

Socorex air-displacement pipettes are warranted for calibration for 2 years. Under modern quality management such as GLP/GMP, ISO-9000, or regulatory requirements, you should test your pipettes’ calibration. If your pipette is dropped, or you suspect any type of damage, you should check your pipette’s calibration.

Testing is generally performed gravimetrically, using an analytical balance. Calibration is usually done at room temperature, away from drafts or direct sunlight. The actual calibration details vary between pipettes, and are listed in the pipette instructions.

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