

# A pipette tip is a pipette tip right?

## Not even close

The pipette is one of the most commonly used handheld instruments in a research laboratory and the model of the pipette is chosen based on your needs for performance, ergonomics and quality. But it doesn't end there – you may have the most advanced pipette on the market but a poor quality tip means that the reproducibility of your results may be at risk.

Don't be caught out; the fact is that quality pipette tips are critical to ensuring that the correct volume of liquid is aspirated and dispensed and that your samples are not contaminated in the process. Here are some quick hints to ensure that your pipette tips are perfect match for your pipette of choice and do not compromise your lab work.

### 1. Not all tips are created equal. An introduction.

A pipette is only as good as the pipette tip attached. Below is an introduction to some common terms and some basic considerations in choosing the right tip for you.

#### Quality moulding

Evaluate your tips by giving them a visual inspection. Roll them on the table to see how straight they are. Does there appear to be any external inconsistencies or any irregularities in either cavity? If the tips are not moulded well, this will affect pipetting performance.

#### Plastics additives

Any metal additives found in pipette tips (yellow and blue tips in particular) can contaminate samples, potentially affecting the results of your assays. High-quality pipette tips are marketed as being free of these additives.

#### Standard vs low-retention tips

It is crucial for all the liquid drawn into a pipette tip to leave the tip when it is dispensed. Although the polypropylene used in pipette tips is hydrophobic, some liquid is still held up in standard pipette tips, preventing accurate and repeatable results. Even with smooth surfaces (derived from quality moulding), standard tips tend to retain small amounts of liquid, especially sticky solutions of protein or DNA. A low-retention tip is designed to increase pipetting accuracy by eliminating tip retention and sample hold-up.

#### Standard vs filtered (barrier) tips

Filtered pipette tips are good for two purposes. First, they protect the pipette from aerosols which are created when liquids are aspirated into the pipette tip. Second, they protect the samples from aerosols in the pipette that were generated from prior pipetting operations.

#### Sterile vs. DNA/RNase-free

Sterile tips undergo a sterilisation process (typically via radiation) to ensure that no living organisms are on them. Sterilisation however does not eliminate dead organisms or their biomolecules such as nucleic acids, ATP or endotoxins. For a number of biological assays the complete absence of these biomolecules is critical. Researchers performing this type of sensitive testing should purchase tips that have been certified DNA, RNase, ATP and endotoxin-free.

### 2. How to choose the right low retention tip?

#### Conduct a dye test

To compare the surface tension characteristics of selected tips, use a coloured solution such as a food dye, aspirate and dispense a set volume using the same pipette. Visually inspect the sample left behind in each tip.

#### Use a spectrophotometer

If the difference of sample retention between two tips cannot be determined by visual inspection, you can quantify it with a spectrophotometer. Simply aspirate and dispense a volume of food dye from your chosen tip then sequentially aspirate and rinse water into the same tip, dispensing the rinse solution into a cuvette. The bigger the absorbance, the worse the retention. Using this method you can compare several tips to choose the best ones.

Note: Not all low-retention tips are created equal. Some manufacturers add chemicals to their plastic mix or add a coating such as silicone to reduce liquid retention. These chemicals can contaminate your sample. If you need a low-retention tip, you should look for a tip that has its liquid-repellent properties covalently bound to the plastic surface so that it cannot contaminate your samples.

If your tip looks like this, then you are losing your samples.



Neptune S3 Low-Retention tips virtually eliminate sample hold-up.



### 3. How to choose the right filtered tip?

#### Choose the right material

Go with tips made of pure polypropylene and the filter of polyethylene without “self-sealing” additives to avoid any interference with the sample and the results.

#### Ensure the right fit

Request a sample of filtered pipette tips to ensure the fit with the pipette of your choice. This is important as the filter occupies space inside the tip that may get in the way of the tip cone of your particular pipette.

#### Consider your volume requirements

The filter limits the volume of liquid that can be aspirated into the tip. If volume restriction is an issue, consider SafetySpace Filter Tips which leave more space between the sample and the filter than conventional filter tips. This allows pipetting any type of liquid or using any pipetting technique without the risk of the precious sample absorbing into the filter.

Note: Not all filtered pipette tips are created equal. Some tip filters contain additives that block the flow of liquid and/or change colour if liquid is aspirated into them. They protect the pipette from the liquid but the sample is wasted and potentially contaminated.

### 4. What is perfect sealing?

In a perfect sealing scenario, the pipette tip is attached well enough to hold the pipette yet loosely enough to eject the tip effortlessly. The seal formed between the pipette and tip ensures leak free pipetting; this is made possible by a flexible tip mouth.

Regardless of the type of features selected (low-retention, sterile, filter, etc.), it's wise to do some qualification testing of the selected tip before using it for lab work.

### 5. What packaging options are there available?

#### Bulk in a bag

An economical solution for teaching labs; tips are provided in a bulk bag and are racked manually into tip boxes, often by students. If required, these tips can be sterilised once racked.

#### Racked tips

Tips are packed and supplied racked. A convenient solution for research and diagnostics labs.

#### Environmentally Sustainable Pack (ESP)

Designed to meet industry demands to minimise plastic waste by 90% and provide an environmentally friendly solution. ESP tips provide a low cost alternative compared with racked product, while saving time not having to load bulk tips (reload 10 trays in as little as 90 seconds). You can also halve the space needed to store your inventory.



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