

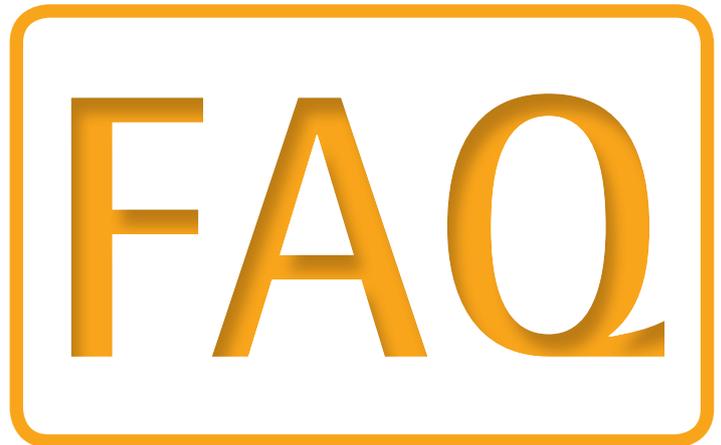


Low Retention Tips

Frequently Asked Questions

What are low retention tips?

Low retention tips, also called low binding tips, are pipette tips that have been modified to reduce the adhesion of DNA, enzymes, proteins, cells, as well as other viscous materials to the tip surface. The surface of the polypropylene material has been altered either chemically or physically to reduce the adherence or binding of samples to the plastic surface.



When does one use low retention tips?

Viscous or "sticky" samples are often difficult to fully dispense. They tend to adhere to the tip surface, affecting pipetting performance. Examples of such liquids are enzymes, plasma, detergents, and foaming liquids.

Low retention tips are especially advantageous when pipetting detergent-containing solutions (e.g. PRC master mixes, buffers, or enzyme solutions). These solutions have a low surface tension compared to water. Typically, such solutions are not completely repelled from the tip surface, meaning that a liquid film remains after dispensing. This film reduces pipetting accuracy and precision.

What are the benefits of using low retention tips?

The modified surface properties of low retention tips prevent viscous or sticky liquids from adhering to the tip surface. They allow more economical use of scarce or costly reagents and ensure maximum recovery of valuable samples. The optimal and stable liquid recovery improves pipetting accuracy and precision by reducing inconsistent sample retention in the tip.

When does one not use low retention tips?

Small volumes (<10 µl) of aqueous liquids are not well suited for pipetting using low retention tips. The inner wall of the tip is so slippery that the aspirated volumes may remain lower than targeted, or it may be impossible to aspirate the liquid at all.

How are low retention tips manufactured?

There are three methods for reducing liquid retention in pipette tips.

- **Highly polished surfaces of tip molds (e.g. diamond polished)**
Mechanical polishing of the mold with a diamond abrasive, results in the tip's surface being extremely smooth, in order to prevent samples from adhering to it. The quality of the low retention surface may vary depending on the age of the mold.

Plastic additives or post-dipping into surface-modifying chemicals

Tips that include additives either within the polymer material or on the plastic surface present the risk of chemical compounds leaching from the tip into the pipetted solutions, which is a contamination risk. Moreover, the dipping process may result in uneven coverage of the tip's surface, which reduces the reliability of pipetting results.

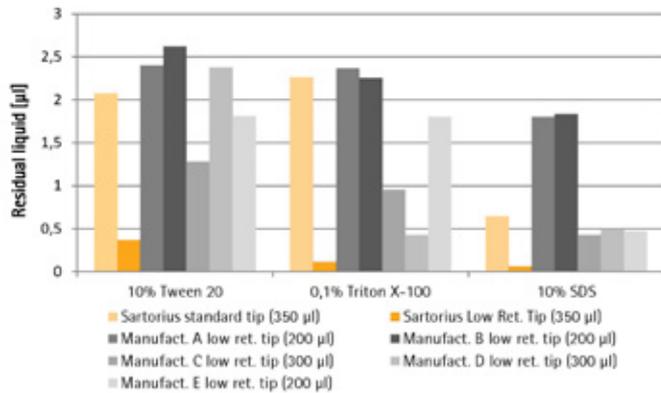
Complete hydrophobic coverage by innovative proprietary technology

The most advanced methods, including that used by Sartorius, use an innovative process that provides the tips with complete hydrophobic coating. Tips produced in this way have high chemical resistance and are of consistent quality.

How do various manufacturers' low retention tips differ from each other?

There is no commonality in the composition or performance of low retention tips by various manufacturers. The chemical composition and surface properties of low retention tips (sometimes called low binding tips) by various manufacturers can differ greatly.

Comparison of residual liquid amounts



The figure above shows the results of a test in which low retention tips from five manufacturers were compared to Sartorius standard and Low Retention Tips. 200 µl of the following detergents were pipetted with tips of volumes 200 µl, 300 µl, or 350 µl (depending on the manufacturers' offering and compatibility) using a Picus® electronic pipette (10-300 µl): 10% Tween 20, 0,1% Triton X-100, and 10% SDS. The amount of residual liquid retained in the tip was measured using the gravimetric analysis. The test was performed with 10 tips from each manufacturer. The results show that the performance of low retention tips varies greatly according to manufacturing method and manufacturer.

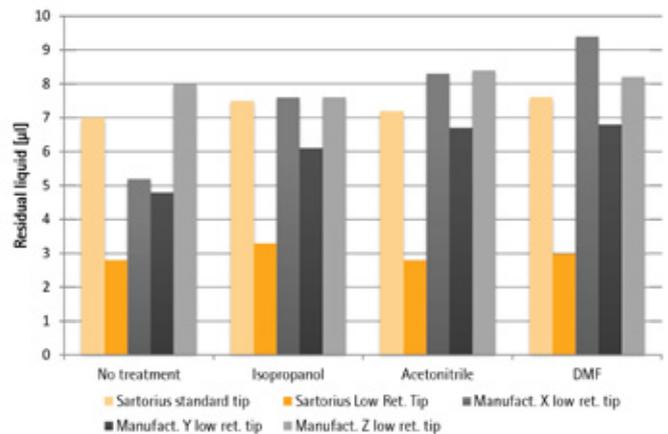
Is there a risk of leachables contaminating the sample when using low retention tips?

How low retention tips are manufactured affects the integrity of the tips and the risk of leaching.

Are low retention tips chemically resistant?

As there are several methods for manufacturing low retention tips, there are also significant differences in terms of their chemical resistance.

Comparison of chemical resistances



The figure above shows the results of a test in which low retention tips from different manufacturers were treated with solvents prior to measuring the amount of residual liquid retained in the tip. The low binding ability of some of the tips was weakened by the solvent treatment. Innovative manufacturing methods such as the one used by Sartorius produce low retention tips that withstand chemical treatment well, indicating their inert nature and good chemical tolerance.

Can low retention tips be autoclaved?

You should check with the manufacturer whether or not their tips can be autoclaved. Sartorius low retention tips can be autoclaved in the same way as standard tips (121 °C, 20 min, 1 bar) without any effect on performance.

If you have any questions, please contact lhinfo.finland@sartorius.com

Sartorius Lab Instruments GmbH & Co. KG
 Weender Landstrasse 94-108
 37075 Goettingen, Germany
 Phone +49.551.3080
 Fax +49.551.308.3289

www.sartorius.com