Finntip® Filter – guaranteed purity

Finntip Filter Micro up to Finntip Filter 1000 µl are guaranteed free of human DNA, DNase and RNase. The tip racks are irradiated to ensure a Sterility Assurance Level of 10^{-6}. In this technical note we highlight the importance of guaranteed purity and describe manufacturing and testing of certified Finntips.

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Finntip Filter range of pipette tips provides certified protection against contamination for both sample and pipette. The non-sealing filter prevents the transfer of aerosols from tip to pipette and vice versa, ensuring the integrity of any pipetting function.
Finntip Filters are designed for pipetting DNA and RNA solutions, infectious materials, radioactively labeled samples and others liquids that may cause aerosol contamination. The tips are optimized for use with Finnpipettes. The filter prevents aerosol contamination of both pipette and sample. By preventing e.g. acid aerosols from entering the pipette, its lifetime can be prolonged.
The tips are produced from virgin polypropylene that has an excellent chemical resistance. The straight even sides and hydrophobic surface allow complete dispensing of the liquid. The filters are made of virgin polyethylene which is non self-sealing with hydrophobic nature. The average pore size is 18-40 µm.
Finntip Filter Micro up to Finntip Filter 1000 µl are guaranteed free of human DNA, DNase and RNase. For applications requiring sterility, they are supplied in irradiated tip racks.

The Finntip Filter products are certified by validation of the manufacturing process to be free of the following contaminants:

Human DNA< $1{,}9 \times 10^{-11}$ g/tip
DNase < $9{,}4 \times 10^{-4}$ U/tip
RNase < $6{,}5 \times 10^{-8}$ U/tip

Free of human DNA

Deoxyribonucleic acid (DNA) is a nucleic acid that contains the genetic instructions specifying the biological development of all cellular forms of life. It is present in all cells of living organisms.
Absence of human DNA on pipette tips is important to prevent false results when working with DNA. For example, PCR techniques are highly sensitive and enable the detection of individual molecules.

Free of DNase

DNases are enzymes that degrade DNA into small pieces. These enzymes are not as prevalent as RNase, but nevertheless of concern. Absence of DNases is important since the enzymes impair applications involving DNA, e.g. PCR assays with very small quantities of rare DNA.

Free of RNase
RNases are very powerful enzymes that degrade RNA into small pieces. RNases are durable and heat resistant, therefore not easy to inactivate e.g. by autoclaving or irradiation. RNases are extremely common and result a in short lifespans for any RNA that is not in a protected environment.
Absence of RNases is important since it destroys RNA quickly and thus impairs applications involving RNA, e.g. Northern Blot.
In summary, certified human DNA-free tips ensure that amplification applications are free of contaminates that can lead to erroneous results and interfere with PCR. RNase- and DNase-free certification ensures reliable nucleic acid testing results.

Sterility
Sterility means that there are no living organisms present on the surface of the product. This is ensured by irradiating the products according to ISO 11137 guidelines so that a Sterility Assurance Level (SAL) of 10^{-6} is achieved, which is the probability that 1 object out of 1 000 000 is non-sterile.
Sterility of pipette tips is important to prevent wrong test results, e.g. in microbiological labs.

Manufacturing of certified Finntips

During the production of tips, human contact, skin particles or bacteria may cause contamination of the products with DNase, RNase or DNA. This is prevented by production in controlled environment which means that particles and microorganisms in the production area are monitored, the personnel is trained and instructed to their work and the production processes are as stable as possible. As a major contamination source the manual handling of products is minimized and the automation level is high. To ensure sterility, the tips are irradiated with gamma rays. The powerful nature of gamma rays have made them useful in sterilising by killing bacteria.

Test methods used in validating the manufacturing process
Tips are flushed with sterile water which is divided into aliquots and used for testing:

RNase and DNase
RNase and DNase in the sample are detected by using fluorescent-labeled RNase and DNase substrates. A green fluorescence is emitted when the substrate is cleaved. This fluorescence can be measured in a fluorometer.

Human DNA
Possible DNA in the sample is duplicated in a PCR reaction using universal primers for human DNA. The PCR products are analyzed using a commercial kit.

Sterility
For Finntip Filter the SAL is 10^{-6}. ISO 11137 outlines validation methodologies for irradiation dose setting to achieve a given SAL. These include bioburden evaluation and dose experiments.

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