

User Guide:

Cleaning & inspection of pipettes.



Passionate for science.

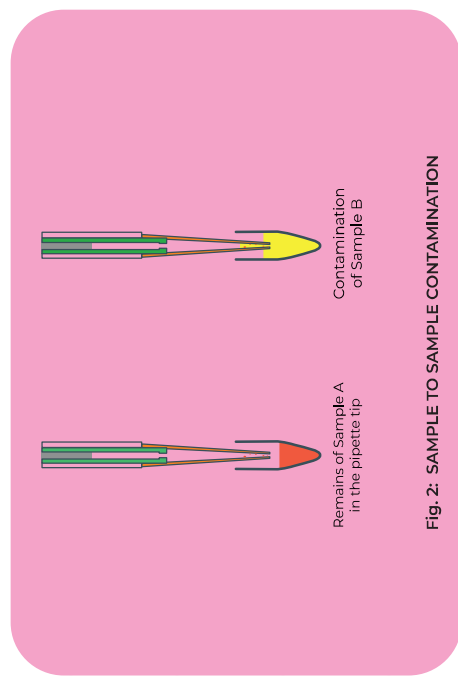
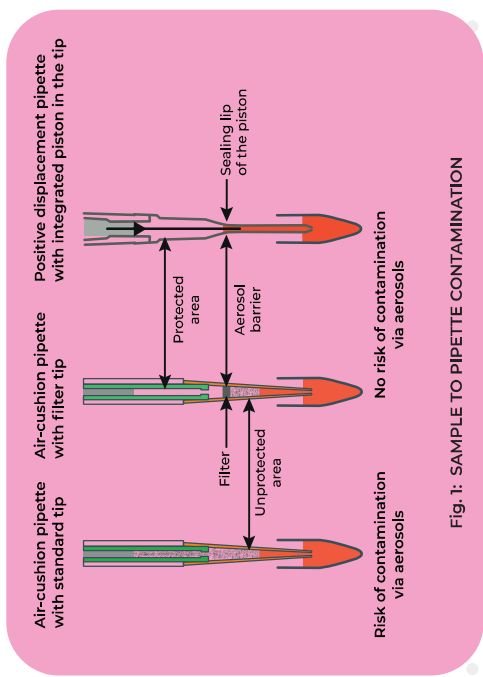
Decontamination & cleaning.

Quality management in the laboratory calls for regular cleaning and inspection of pipettes. How often a pipette needs to be cleaned and inspected depends on the frequency of use, the number of people who use the pipette, the type of aggressiveness of the liquids being dispensed, and the acceptable maximum permissible error specified by the user.

SOURCES OF CONTAMINATION & PREVENTION

SOURCE	REASON	PREVENTION
Pipette to sample	This results from using a contaminated pipette or non-certified pipette tips.	Regularly clean or autoclave your pipette. Use good quality certified or sterile pipette tips.
Sample to pipette	When the sample, or its aerosols, enter the pipette.	Hold the pipette vertically and move the control button slowly upwards during aspiration. Filter tips offer the most effective way to avoid contamination as they prevent aerosols from entering, and contaminating, the pipette. Immediately ejecting the pipette tip after use to prevent vapors from entering the pipette is also recommended, as well as storing the pipette suspended in a pipette stand. Using positive displacement pipettes with tips that feature a piston with integrated sealing lip can also prevent contamination (Fig. 1).
Sample to sample	When frequently pipetting concentrated bases, it is advised to occasionally rinse the lower part of the pipette with distilled water. The use of filter tips is also recommended.	The plastics used in ErgoOne® pipettes, and the ceramic pistons, are resistant to bases. However, aerosols from the bases may enter the lower part and negatively affect the performance of the pipette. Clean as described in “Aqueous solutions”.

Table 1: Sources of contamination & prevention



DECONTAMINATION AND CLEANING

EXTERNAL CLEANING

Pipettes should be checked every day for external contamination. It is particularly important to ensure the tip holder is clean and undamaged.

External contamination can be removed using a non-corrosive surface disinfectant such as Chemgene®, a mild detergent, or 60% isopropanol. Spray or wipe the handle, volumeter, tip holder and tip ejector, rinse with distilled water and allow to dry. UV-resistant pipettes, such as Starlab's ErgoOne®, can also be placed under UV light, if necessary.

INTERNAL CLEANING

Regular checking of the pistons, springs, seals and tip holder is recommended. Internal cleaning can be carried out using a non-corrosive surface disinfectant such as Chemgene® (1:10), a mild detergent or 60% isopropanol. Pipettes requiring full decontamination can be dismantled and cleaned thus:

- Use a container deep enough to immerse the parts completely. (NOTE: Electronic pipettes must not be submerged in any liquids)
- Dismantle the pipette (as specified by the manufacturer) and place only parts that can be immersed, eg tip holder, piston, tip ejector etc completely into the solution for 30 minutes
- Remove parts and rinse with de-mineralised water
- Lie on a lint-free cloth and place in a dry oven at 60°C for at least one hour or until dry. Alternatively, place on the bench on a lint-free cloth and air dry for approximately 4 hours
- Reassemble the pipette following the manufacturer's instructions, lightly lubricating* the piston, if required.

*Note for Starlab ErgoOne® pipettes: The ErgoOne® piston material is an innovative, wear-resistant plastic (piston material for red colour-coded models is stainless steel), that is treated with a special lubricant during manufacture so during normal use, it is not necessary to relubricate. In the event of frequent autoclaving however, more frequent relubrication is recommended. See User Manual for more info.



AUTOCLAVING

Many of today's pipettes can either be fully autoclaved, dismantled and the lower parts autoclaved. Air-cushion pipettes, and pipette tips, are normally autoclaved at 121°C with a positive pressure of 1 bar (100 kPa) over a period of 20 mins.

When autoclaving a fully autoclavable pipette, open the pipette in the middle by 1 – 2 turns after removing the tip ejector sleeve to allow the vapor to enter more easily. After autoclaving, the pipette (or autoclaved parts) must be allowed to completely dry and cool down at ambient temperature. Warmed plastic parts may stretch or get damaged if screwed back together before they have cooled down completely. With Starlab's ErgoOne® pipettes, regreasing the piston is not required after autoclaving*.

UV DECONTAMINATION

UV-resistant pipettes, such as Starlab's ErgoOne® pipette, can be left in laminar flow rooms or cabinets without any risk, as the UV light required for disinfection will have no adverse effect on the materials the pipette is made from, and subsequently, the performance of the pipette. When decontaminating pipettes with UV light, use a 30 Watt low-pressure mercury-vapor lamp with a characteristic wavelength of 254 nm. The optimum distance between the lamp and the pipette is 60 cm.

DECONTAMINATION AND CLEANING

The frequent use of highly volatile organic reagents can cause the sealing that is normally maintenance-free, to swell up and cause the pipette to become stiff. If this happens, remove the lower part of the pipette and let out the sealed air overnight.

Frequent pipetting of saturated solutions can lead to aerosols precipitating inside the pipette and the formation of crystals that destroy the seal. To avoid this, regular cleaning and regreasing of the piston as well as regular inspection of the piston seal is recommended.

SUBSTANCE CLASSIFICATION		HANDLING, SPECIAL FEATURES	DECONTAMINATION AND CLEANING
Aqueous solutions and buffers		The pipette is calibrated with distilled water and, thus, provides very high levels of accuracy.	Open the pipette, rinse contaminated parts with distilled water, allow to dry at max. 60 °C in a drying cabinet, then lightly grease the piston ¹ .
	Inorganic acids	When frequently pipetting concentrated acids, it is advised to occasionally rinse the lower part of the pipette with distilled water.	The plastics used in ErgoOne® pipettes are resistant to acids, as are the ceramic pistons (except hydrofluoric acid). However, aerosols from the acid may enter the lower part and negatively affect the performance of the pipette. Clean as described in "Aqueous solutions".
	Bases	When frequently pipetting concentrated bases, it is advised to occasionally rinse the lower part of the pipette with distilled water. The use of filter tips is also recommended.	The plastics used in ErgoOne® pipettes, and the ceramic pistons, are resistant to bases. However, aerosols from the bases may enter the lower part and negatively affect the performance of the pipette. Clean as described in "Aqueous solutions".
Potentially infectious liquids		The use of filter tips is recommended to avoid contamination. Alternatively, use a positive displacement system.	Autoclave (121 °C, 20 mins) the contaminated parts. ErgoOne® pipettes are fully autoclavable; to increase effectiveness, we recommend removing the tip ejector. Also loosen the tip holder by rotating it once (single-chamber only); if required, also immerse the lower part in standard laboratory cleaning agents; then thoroughly rinse with distilled water and dry at max. 60 °C in a drying cabinet, then lightly grease the piston ¹ .
Sterile solutions (eg. in a cell culture)		Sterile filter tips are recommended so sterility is not compromised.	Proceed as described above in "Potentially infectious liquids".
Organic solvents		1. The density is different to that of water. Therefore, the pipette must be adjusted. 2. Rapid pipetting is recommended (due to the high vapor pressure and changed wetting behavior). 3. After completion of the pipetting process, open the pipette and allow the solvents to evaporate.	Allowing solvents to evaporate is normally sufficient for liquids with high vapor pressure. If not, open the pipette and immerse the contaminated parts in detergents, then rinse thoroughly with distilled water and allow to dry at max. 60 °C in a drying cabinet, then lightly grease the piston ¹ .
Radioactive liquids		Filter tips should be used to avoid contamination. Alternatively, use a positive displacement system.	Open the pipette and immerse parts in complex-forming liquids or special cleaning solutions. Afterwards, rinse thoroughly with distilled water and allow to dry at max. 60 °C in a drying cabinet, then lightly grease the piston.
Proteins / Nucleic acids		The use of filter tips is recommended to avoid contamination. Alternatively, use a positive displacement system.	Proteins: Open the pipette, wash off proteins with detergents, then rinse and allow to dry at max. 60 °C in a drying cabinet, then lightly grease the piston. Nucleic acids: Decontamination by boiling in glycine/HCl buffer (pH2) for 10 mins (this ensures that no more DNA can be detected on agarose gels). Afterwards, rinse thoroughly with distilled water and allow to dry as described; lightly grease the piston ¹ . Clean with sodium hypochlorite (5 %). Afterwards, rinse thoroughly with distilled water.

¹ If required: for ErgoOne® pipettes, regreasing of the piston is not required after autoclaving.

Table. 2: Decontamination and cleaning of air-cushion pipettes

Inspection of pipettes.

Precise and correct dispensing of samples and reagents is of key importance for both research and diagnostics applications. To ensure reliable results, your pipette, and any tools or equipment used for its inspection, should be checked at regular intervals to ensure it is functioning correctly. Regular inspection and care of your pipette should be part of your ongoing process to ensure your pipette delivers reliable results, from daily inspections through Quick Checks in-house to regular calibrations by a professional, external provider. How often you carry out an inspection will depend on the frequency that the pipette is used, whether different people use the same pipette (you know how you treat the pipette, but can you vouch for your colleagues?) and the type of samples you are dispensing.

FUNCTION TEST

Pipettes should be visually checked for leaks, broken parts, air bubbles and contamination on a daily basis.

LEAK TEST

To perform a leak test, the nominal volume of a pipette is aspirated into the pipette tip (distilled degassed water) and the pipette is held vertically. The pipette, the pipette and the test liquid should have the same temperature. If a distinct drop has not formed at the tip after 30 seconds, the pipette is tight. (For volumes up to 20 µl the tip should always be pre-wetted.)

VOLUMETRIC TEST

Single or duplicate determinations of the volumes specified for the pipette should be carried out after relevant changes to the device (eg. new batch of pipette tips, exchange of volume-determining parts).

QUICK CHECK

Four measurements of each of the volumes specified for the pipette type should be carried out on a monthly basis to roughly determine random and systematic errors.

CALIBRATION

Calibration should be carried out by an external provider, quarterly, twice-yearly or at least annually.



Calibration of pipettes.

WHAT IS CALIBRATION?

Calibrations are performed to compare the expected volumes being dispensed (specifications) with the actual volumes the pipette is dispensing. Pipettes are precision instruments that contain small internal parts which are, over time, subject to wear and tear. These parts need to be kept in good condition so your pipette can perform accurately.

How often you have your pipette calibrated professionally will depend on the frequency that the pipette is used, and your lab's own, internal Quality Control levels and/or compliance with external regulatory guidance such as:

- ISO 9001 Quality Management System
- ISO 15189 Medical Laboratories Requirements for Quality and competence
- ISO 13845 Medical Services Quality Management System
- FDA 21 CFR Part 820 Good Manufacturing Practice for Medical Devices.

Depending on the type of laboratory / work for which the pipette is being used, the level of calibration required can differ too.

TYPES OF CALIBRATION

As Found Calibration checks the performance of your pipette prior to servicing or as part of your regular checks. No adjustment of the pipette is made; this is purely a statement of how the pipette is performing.

Service & Calibration is recommended for pipettes requiring a service (internal clean, inspection, leak test and worn parts replaced, plus an optional external clean), as well as a calibration.

Pre & Post Calibration comprises an As Found Calibration Certificate to show how your pipette has been performing, prior to a Service and a further calibration being carried out.

The **number of readings** and at which **points** on the pipette's volume range you choose (middle, minimum & maximum, or all three), may depend on when the pipette was last calibrated, and how stringent your lab's Quality Control level is in line with the work you perform.

DO I NEED AN ACCREDITED CALIBRATION?

Again, this will depend on the type of lab and the work being carried out, and is usually determined by your lab's own internal Quality Control levels and/or the need to comply with external regulations.

Starlab's calibration labs are accredited for UKAS calibration (Starlab UK) and the German Accreditation Body DAkkS (Starlab Germany). This means that either laboratory can perform calibrations under internationally recognised standards which ensure full traceability of data, and processes that require both internal and external quality controls.

For more info on pipette servicing or for help and advice on the levels of servicing that is right for you, please go to www.starlab.click/servicing

Starlab: total liquid handling.

For accuracy to the last drop: Starlab pipette calibration & servicing



 www.starlab.click/servicing

Your tools for being a great scientist: the ErgoOne® pipette family



 www.starlab.click/pipettes

Top tips for laboratory success: the TipOne® pipette tip system



 www.starlab.click/tipone



**Starlab
International GmbH**
Neuer Höltingbaum 38
22143 Hamburg
Germany

T: +49 (0)40 675 99 39 0
F: +49 (0)40 675 99 39 20
info@starlab.de
www.starlabgroup.com

Starlab GmbH
Neuer Höltingbaum 38
22143 Hamburg
Germany

T: +49 (0)40 675 99 39 0
F: +49 (0)40 675 99 39 20
info@starlab.de
www.starlab.de

Starlab (UK), Ltd
5 Tanners Drive
Milton Keynes MK14 5BU
United Kingdom

T: +44 (0)1908 283800
F: +44 (0)1908 283802
info@starlab.co.uk
www.starlab.co.uk

Starlab France SARL
30 Rue Jean Rostand
91400 Orsay
France

T: +33 (0)1 60 13 71 70
F: +33 (0)1 69 41 48 65
info@starlab.fr
www.starlab.fr

Starlab SRL
Via Bracco 6
20159 Milano
Italy

T: +39 (0)2 7020 1040
F: +39 (0)2 7020 1033
info@starlab.it
www.starlab.it



PIPETTE CALIBRATION & SERVICING

Professional pipette calibration and repair service,
with laboratories located in both Germany and the UK.
Mail-in servicing. On-site servicing. Fast turnaround.
UKAS or DaKKS accredited servicing.

Contact us for more information
or a competitive quote.

