
sartorius
mLINE
2 0 0
20 – 200 µl
sartorius
mLINE
1 0 0
10 – 100 µl
sarto

Mechanical Pipettes

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mLINE® Mechanical Pipettes

Effortless Accuracy

mLINE®'s low pipetting forces protect laboratory workers from injury.

Optiload secures even tip sealing onto every individual tip cone, and allows tips to be loaded and ejected with minimum force.

Safe-Cone filters protect the pipette from contamination, and should be changed regularly.

Sartorius' most advanced mechanical pipette family – the mLINE® – offers excellent ergonomics, performance and safety in manual pipetting. It is designed to maintain high accuracy and precision in repetitive and long-lasting manual pipetting. Its excellent ergonomics minimize the risk of work related hand, arm and shoulder disorders and Repetitive Strain Injury (RSI).

It covers the full volume range of 0.1 µl to 10 ml and is available in single- and multi-channel models.

Excellent Ergonomics with Low Pipetting Forces
Excellent ergonomics and low pipetting forces protect laboratory workers from injury. mLINE® has exceptionally light pipetting and tip ejection forces due to its patented spring mechanism. The light pipetting force improves pipetting precision in long pipetting series.

The starting forces in mLINE® pipettes are always constant, regardless of the set volume. This improves pipetting results especially for small volumes.

Optiload- Loading Tips with Minimum Force
mLINE® pipettes have spring-loaded tip cones - the Optiload mechanism – on both single and multi-channel models. Optiload secures even tip sealing onto every individual tip cone, and allows tips to be loaded and ejected with minimum force. This is an advantage especially when working with multi-channel models that otherwise would require more force for tip loading and ejection than a single-channel model.

Safe-Cone Filters Protect the Pipette
The replaceable Safe-Cone Filter located inside the tip-cone prevents aerosols and fluids from penetrating the pipette, also in cases of over-aspiration. The use of Safe-Cone filters lengthens the maintenance interval of the pipette.

Safe-Cone Filters are available for all mLINE® models greater than 10 µl. They must be replaced regularly, and always in cases of over-aspiration. Safe-Cone filters can easily and safely be ejected by removing the colour cap and pressing down the operating button.

Features and Benefits

- Low pipetting forces that prevent RSI and improve results in long pipetting series
- Ergonomic finger support minimizes the grip force needed to hold the pipette
- Optiload mechanism in both single- and multi-channel models for easy and light tip loading with perfect tip sealing
- Single and multi-channel models
- Volume adjustment locking for preventing accidental volume changes
- Easy-to-read volume display
- Colour-coding of volumes to ease the selection of corresponding pipette tips
- Safe-Cone Filters available for models > 10 µl with convenient filter ejection mechanism
- Fully autoclavable without disassembly
- Simple to clean and maintain with only three parts to disassemble
- Easy user calibration e.g. for different liquids
- Materials have high chemical and UV-resistance to ensure a long life span for the pipette

Ordering Information

mLINE®

Order Code	Channels	Volume Range (µl)	Colour-Coding	Increment (µl)	Test Volume (µl)	Systematic Error* (%)	Random Error* (%)	Safe-Cone Filters Standard	Plus
725010	1	0,1-3	●	0,002	3 1,5 0,3	1,30 2,40 10,00	0,80 1,60 6,00	-	-
725020	1	0,5-10	●	0,01	10 5 1	1,00 1,50 2,50	0,60 1,00 1,50	-	-
725030	1	2-20	●	0,02	20 10 2	0,90 1,20 3,00	0,40 1,00 2,00	721014	-
725050	1	10-100	●	0,10	100 50 10	0,80 1,00 2,00	0,15 0,40 1,00	721008	721018
725060	1	20-200	●	0,20	200 100 20	0,60 0,80 2,30	0,15 0,30 0,90	721007	721017
725070	1	100-1000	●	1,00	1000 500 100	0,70 0,70 2,00	0,20 0,20 0,50	721006	721016
725080	1	500-5000	●	10,0	5000 2500 500	0,50 0,60 2,00	0,20 0,30 0,60	721005	721015
725090	1	1-10 ml	●	20,0	10000 5000 1000	0,60 1,20 3,00	0,20 0,30 0,60	721005	721015
725120	8	0,5-10	●	0,01	10 5 1	1,50 2,50 4,00	1,00 2,50 4,00	-	-
725130	8	5-100	●	0,10	100 50 10	0,70 1,00 3,00	0,25 0,70 1,50	721008	721018
725140	8	30-300	●	0,20	300 150 30	0,60 1,00 2,00	0,25 0,50 1,00	721007	721017
725220	12	0,5-10	●	0,01	10 5 1	1,50 2,50 4,00	1,00 2,50 4,00	-	-
725230	12	5-100	●	0,10	100 50 10	0,70 1,00 3,00	0,25 0,70 1,50	721008	721018
725240	12	30-300	●	0,20	300 150 30	0,60 1,00 2,00	0,25 0,50 1,00	721007	721017

*The listed systematic and random error values are valid for pipetting mode only and are achieved under strictly controlled conditions during type tests per ISO 8655.
Due to the continuous product development by Sartorius, the systematic and random error values may change without prior notice.

mLINE® Multipacks come with a linear stand.

mLINE® Multipacks include matching tips in single tray racks.

mLINE® Pipette 5-pack

mLINE® Pipette 3-pack 20

mLINE® Multipacks

mLINE® Multipacks offer a set of our premium mechanical pipettes in an affordable package, where a Linear Stand and racks of matching tips are included.

The Multipacks allow the affordable renewal of existing pipettes, or to set up new workstations, with a set of highly ergonomic pipettes with excellent accuracy and precision.

Ordering Information

Order Code	Item
LH-725661	**mLINE® Pipette 3-pack 10** - mLINE® pipettes: 0,5-10 µl, 10-100 µl and 100-1000 µl - Linear Stand - Matching Optifit Tip Single Tray rack (96 tips)
LH-725662	**mLINE® Pipette 3-pack 20** - mLINE® pipettes: 2-20 µl, 20-200 µl and100-1000 µl - Linear Stand - Matching Optifit Tip Single Tray rack (96 tips)
LH-725663	**mLINE® Pipette 4-pack** - mLINE® pipettes: 0,5-10 µl, 10-100 µl, 20-200 µl and 100-1000 µl - Linear Stand - Matching Optifit Tip Single Tray rack (96 tips)
LH-725664	**mLINE® Pipette 5-pack** - mLINE® pipettes: 2-20 µl, 10-100 µl, 20-200 µl, 100-1000 µl and 500-5000 µl Linear Stand - Matching Optifit Tip Single Tray rack (96 tips)
LH-725665	**mLINE® Pipette 3+1 -pack** - mLINE® pipettes: 0,5-10 µl, 20-200 µl, 100-1000 µl and 8-channel 30-300 µl - Linear Stand - Matching Optifit Tip Single Tray rack (96 tips)

Pipette Tip Selection Guide

Mechanical Pipettes	Colour Code	µl	Optifit Tips, Non-filter*								SafetySpace Filter Tips*						
			10***	10 Ext	200	350	1000	1000 WB	5000	10 000	10***	10 Ext**	20	120	200	300	1000
mLINE® 1-channel	●	0,1-3	●	●							●	●					
	●	0,5-10	●	●							●	●					
	●	2-20			●								●				
	●	10-100			●	●								●			
	●	20-200			●	●									●	●	
	●	100-1000					●	●									●
	●	500-5000							●								
	●	1-10 ml								●							
mLINE® 8-channel	●	0,5-10	●	●							●	●					
	●	5-100			●	●								●			
	●	30-300				●										●	
mLINE® 12-channel	●	0,5-10	●	●							●	●					
	●	5-100			●	●								●			
	●	30-300				●										●	
Proline® Plus 1-channel	●	0,1-3	●	●							●	●					
	●	0,5-10	●	●							●	●					
	●	2-20			●								●				
	●	5-50			●									●			
	●	10-100			●	●								●			
	●	20-200			●	●									●	●	
	●	100-1000					●	●									●
	●	500-5000							●								
	●	1-10 ml								●							
Proline® Plus 8-channel	●	0,5-10	●	●							●	●					
	●	10-100			●	●								●			
	●	30-300				●										●	
Proline® Plus 12-channel	●	0,5-10	●	●							●	●					
	●	10-100			●	●								●			
	●	30-300				●										●	

* Note: Low Retention Tips are available in volumes up to 1200 µl.

** Filter tips with regular air gap

*** Extended inaccuracy and imprecision with pre-sterilized 10 µl tips

Mechanical Pipettes	Colour Code	µl	Optifit Tips, Non-filter*								SafetySpace Filter Tips*						
			10***	10 Ext	200	350	1000	1000 WB	5000	10 000	10***	10 Ext**	20	120	200	300	1000
Proline® Plus Fixed Volume 1-channel	●	5	●	●							●	●					
	●	10	●	●							●	●					
	●	20			●								●				
	●	25			●									●			
	●	50			●									●			
	●	100			●	●								●			
	●	200			●	●									●	●	
	●	250					●	●									●
	●	500					●	●									●
	●	1000					●	●									●
	●	2000							●								
	●	5000							●								
	●	10 ml								●							
Proline® 1-channel	●	0,1-2,5	●	●							●	●					
	●	0,5-10	●	●	●						●	●	●				
	●	2-20			●								●	●			
	●	5-50			●	●								●			
	●	10-100			●	●								●	●	●	
	●	20-200			●	●									●	●	
	●	100-1000					●	●									●
	●	1000-5000							●								
Proline® 8-channel	●	0,5-10	●	●							●	●					
	●	5-50			●	●								●	●	●	
	●	50-300				●										●	
Proline® 12-channel	●	0,5-10	●	●							●	●					
	●	5-50			●	●								●	●	●	
	●	50-300				●										●	
Proline® Fixed Volume 1-channel	●	5	●	●	●						●	●	●				
	●	10	●	●	●						●	●	●				
	●	20			●	●							●	●			
	●	25			●	●								●			
	●	50			●	●								●			
	●	100			●	●								●	●	●	
	●	200			●	●									●	●	
	●	250					●	●									●
	●	500					●	●									●
	●	1000					●	●									●
	●	2000							●								
	●	5000							●								


eLINE
sartorius
Pipetting
300.0 µl
Picus
300
sartorius
300
sartorius

Stands & Accessories

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Pipette Stands

Charging Carousel Stand

Charging Stand

Linear Stand (non-charging)

When the pipette is not in use, it should be stored in an upright position in order to avoid contamination from work surfaces. Sartorius provides stands for all of its pipettes. It is recommended that electronic pipettes be stored and charged on a charging stand whenever they are not in use. In this way, their batteries always remain charged for when work begins.

Compact carousel stands are ideal for saving bench space. There is one for mechanical pipettes, and a charging carousel stand for electronic pipettes.

The Linear Stand is designed for all Sartorius mechanical and electronic pipettes, particularly for mLINE®, Proline® Plus and Proline® mechanical devices. This stand is also compatible with a wide range of other pipette makes.

The simplest of all are the pipette holders which are attached to the front edge of a shelf. These are suitable for mechanical pipettes.

Ordering Information

Pipette Stands

Order Code	Item
730981	Charging Stand for one electronic pipette*
730991	Charging Carousel for 4 electronic pipettes*
725620	Linear Stand for all Sartorius pipette models
725600	Carousel Stand for 6 mechanical pipettes
725610	Holder for one mLINE® | Proline® Plus pipette
721259	Holder for Proline® pipette

* Supplied with a universal charger with EU, UK, US|JPN, AUS, KOR and CHN plugs.

Non-charging Carousel Stand

Pipette Holder
-mLINE® | Proline® Plus Pipettes

Pipette Holder
-Proline® Pipettes

Elbow Pad

The Elbow Pad provides comfort while pipetting. The visco-elastic material of the pad relieves contact stress, pain and discomfort under the elbow.

The Elbow Pad is Ideal for
- long periods of pipetting
- work requiring high concentration, e.g. micro plate work
- any work where a cushion beneath the elbow or wrist is needed

Features and Benefits

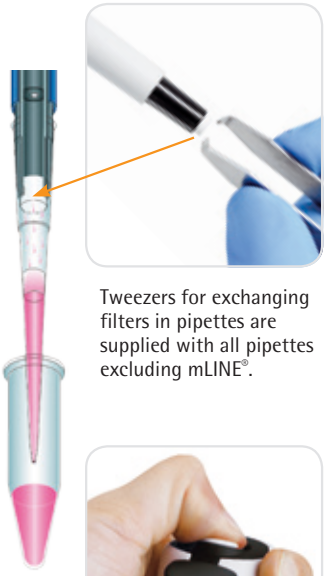
- Improves pipetting ergonomics
- Conforms to any elbow size or shape
- Coating is pleasant to the skin
- The compact size takes up little bench space
- Very durable
- Easy to clean with washing up liquid, or ethanol (70%)
- Not autoclavable

Ordering Information

Elbow pad

Order Code	Item	Qty
723103	Elbow Pad	1

Safe-Cone Filters



Tweezers for exchanging filters in pipettes are supplied with all pipettes excluding mLINE®.

Built-in filter ejector in mLINE®

Why Should You Use Safe-Cone Filters?
These unique and replaceable polyethylene (PE) filters act as a final barrier to prevent any fluids and liquid vapours from reaching the internal components of the pipette.

- Protect the pipette and sample from contamination
- Prolong the pipette's lifetime
- Reduce maintenance intervals
- Are cost-effective compared to filter tips

When Should You Use them?
The ultimate pipette protectors are available in two types:

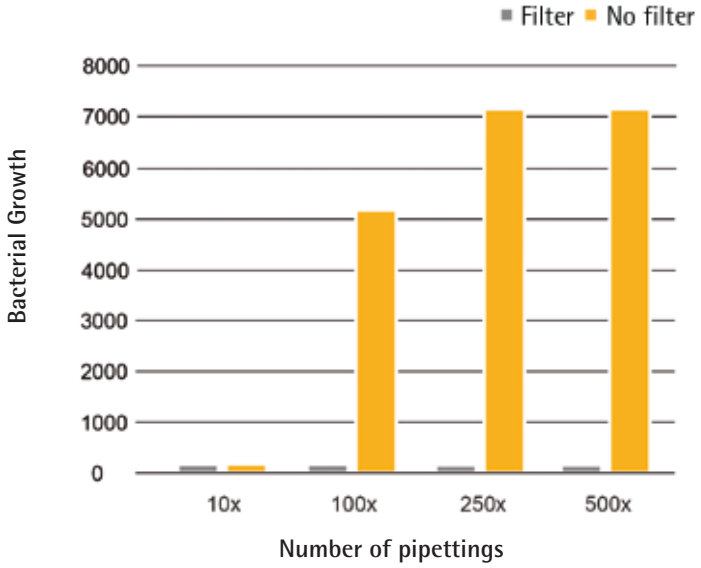
Plus Filter
For more demanding applications such as radioactive work, cell culture, bacterial and virological work and molecular biology.

Standard Filter
For general applications. Can be used in same type of work as the Plus filter, but needs to be changed more frequently.

How Often Should You Change?
The interval of changing the filter depends completely on the application and the sample. However, according to studies, the filter is recommended to be changed daily (after 50 to 250 pipettings) and immediately in case of over-aspiration.

How to Change?
To ensure that the user is protected from contamination, tweezers should be used when removing used filters from the pipette tip cone. The mLINE® also features a built-in filter ejector. In addition, the tip cone should be cleaned with ethanol (70%) prior to the insertion of a new filter.

Contamination in Pipette Barrel



Pipette contamination in pipette barrel when pipetting liquid culture of bacteria Micrococcus Luteus.

Ordering Information

Safe-Cone Filters

Order Code	Item	Qty/Unit
721008	Standard ∅ 2,51 mm PE	50
721007	Standard ∅ 3,15 mm PE	50
721006	Standard ∅ 5,33 mm PE	50
721005	Standard ∅ 6,73 mm PE	50
721014	Standard ∅ 1,83 mm PE	50
721018	Plus ∅ 2,51 mm PE	50
721017	Plus ∅ 3,15 mm PE	50
721016	Plus ∅ 5,33 mm PE	50
721015	Plus ∅ 6,73 mm PE	50

PE = polyethylene

Reagent Vessel

Made from polypropylene, the autoclavable and durable reagent vessel is chemically resistant to all common reagents.

121°C
Fully autoclavable

Ordering Information

Reagent Vessel

Order Code	Item	Qty
783500	Reagent Vessel (capacity 120 ml)	16

Calibration Tool|Tube Opener & Colour-coding Caps

The Calibration tool|Tube opener is used for calibrating mLINE® and Proline® Plus pipettes.

The Colour-coding Caps can be used for personalizing the mLINE® pipette.

121°C
Fully autoclavable

Ordering Information

Calibration Tool|Tube Opener and Colour-coding Caps

Order Code	Item	Qty
726203	Calibration Tool | Tube Opener	1
726001	Colour-coding Caps for mLINE®	5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Optifit
Low Retention
Refill Tips
350 µl
10 x 96
sartorius
Optifit Tip
Low Retention
5-350 µl
sartorius
SafetySpace Filter Tip
Low Retention
5-200 µl
sartorius

Pipette Tips

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Pipette Tips

The Perfect Match for Your Pipette

Optiload for a tight fit and equal sealing on every channel's tip cone.

In liquid handling, accurate pipetting results are not dependent on the pipette or the tip alone, but a combination of these and the comfort of the user. Our non-filter Optifit Tips and SafetySpace filter tips are designed and manufactured as a perfect fit for our pipettes, enabling maximal accuracy, precision and ergonomics. Moreover, well-matching tips protect the pipette tip cone from wear and tear.

The unique Optiload mechanism of our pipettes allows tip attachment and loading with reduced force, but with complete sealing, which is vital to get accurate results.

Sartorius tips correspond with the colour-coding of Sartorius pipettes, to allow easy matching of corresponding volumes.

The factory in Kajaani, Finland.

Premium Quality and Purity

Manufacturing the tips in our own production facility allows us to maintain the highest quality and purity standards, by selecting the best plastic materials and controlling the manufacturing process from beginning to end. Our quality management system follows not only ISO 9001 and ISO 14001, but also ISO 13485. Tip production also abides by the ISO 14644-1 standard, in order to fulfil ISO Class 8 cleanroom conditions for secured tip purity.

Lot-specific purity certificate

Contamination Free Tips

To avoid contamination through human contact, we have automated the entire tip manufacturing process. Pure virgin polypropylene (PP) plastic is automatically fed from silos into moulding machines. Moulding machines and robots located in isolated clean cells, load the tips automatically into tip trays and packaging. HEPA filters and higher air pressure are applied for purity within the cell. All Sartorius Single Tray tip racks, Single Refill Packs and FlexiBulk packs are individually and automatically packed in air-tight plastic, in order to rule out any danger of contamination.

Additionally, our highly experienced and trained personnel are equipped with specially designed coveralls, masks, hair nets and gloves, in order to further diminish risks of contamination.

An independent laboratory checks each Single Tray and Refill Pack tip lot for RNase, DNase and endotoxins. Lot-specific purity certificates can be downloaded from www.sartorius.com (select from the navigation bars: -> Liquid Handling -> Tip Purity Certificates).

ISO9001 - 13485 - 14001 Sartorius Certified

DNase - RNase - Endotoxin Free Sartorius Certified

121°C Fully autoclavable

Definitions:

DNase	A deoxyribonuclease (DNase) is any enzyme that catalyzes the degradation of DNA. The absence of DNase is tested by using fluorometric assay. The detection level of the assay is 6,25* 10^{-5} U/µl when DNase I is used as a standard.
RNase	Ribonuclease (RNase) is an enzyme that catalyzes the degradation of RNA into smaller components and can be generally found from organisms. The absence of RNase is tested by using fluorometric assay. The detection level of the assay is 3,125* 10^{-9} U/µl, when RNase A is used as a standard.
Endotoxins	Endotoxins are lipopolysaccharides found in the Gram-negative bacteria and can cause several serious health effects in humans and animals. Limulus Amebocyte Lysate (LAL) Gel Clot method is used to detect the presence of endotoxins on the pipette tips. The detection level of the LAL assay is 0.03 IU/ml (EU/ml).
Sterilization	The destruction of all microbial life, including bacterial endospores. Can be accomplished e.g. using steam, heating, chemicals, or radiation. We use e-beam irradiation.

Features and Benefits

Best Fit – Highest Possible Accuracy
- Perfect fitting and sealing with Sartorius pipettes secure the highest possible accuracy and precision
- Compatible with Optiload feature in Sartorius Picus® NxT, Picus®, eLINE®, mLINE® and Proline® Plus pipettes enabling ergonomic and light tip attachment and ejection
- Colour-coding of tip trays allows easy matching with a corresponding colour-coded Sartorius pipette
- Compatible with most other pipette makes

Premium Quality and Purity:
- Strict quality standards, ISO 9001 and ISO 13485, are followed from R&D to production and delivery
- Manufactured in ISO 8 classified clean room conditions
- Manufacturing process free of DNase, RNase and endotoxins: Single Trays,Refill Packs and FlexiBulk packs certified pure by lot number
- Pre-sterilised tips are e-beam irradiated
- All tip packages, including individual racks, are lot numbered for full traceability
- The highest quality virgin polypropylene used as raw material

Tip Selection Guide per Application

Tip Type	Optifit Tips			SafetySpace Filter Tips	Low Retention Tips
Purity	**Standard**	**Free of DNase, RNase & endotoxins**	**Pre-sterilized & free of DNase, RNase and endotoxins**	**Pre-sterilized & free of DNase, RNase and endotoxins**	
Regular pipetting applications	✓				
Applications where prevention of cross-contamination is vital		✓	✓	✓	
Pipetting liquids with low surface tension (e.g. detergents, solvents)					✓

Packaging Options

Single tray racks

Racked Tips

Single Tray Rack
- 96 tips in convenient and reusable tray racks (sales unit contains 10 tray racks, total 960 tips)
- Certified free of DNase, RNase and endotoxins
- e-beam pre-sterilized option available
- Lot-specific purity certificates can be downloaded from www.sartorius.com
- Informative rack labelling: volume, product number, lot number improves tip identification and traceability
- Air-tight plastic wrapping around the rack secures purity during transport and storage (wrapping is regular waste)
- Tip trays are colour-coded to indicate the matching, colour-coded Sartorius pipette
- Covers a large range of tip volumes from 10 µl to 5 ml
- Fully autoclavable at 121°C for 20 minutes
- Tray racks can be easily reloaded with Refill tips
- Racks, trays and tips are 100% recyclable polypropylene (PP)

Refill towers

Refill Tips

Refill Tower
- Space-saving with 10x96 tips in one tower
- Tip trays are compatible with Single Tray racks for convenient use
- Trays are colour-coded to indicate the matching, colour-coded Sartorius pipette
- Covers the most widely used tip sizes: 10 µl, 200 µl and 350 µl
- Trays and tips are fully autoclavable at 121°C for 20 minutes
- 100% recyclable cardboard packaging, and plastic (PP) trays and tips

Single refill packs

Single Refill Packs
- 10, 15 or 20 trays of 96 tip trays, depending on tip volume
- Certified free of DNase, RNase and endotoxins
- e-beam pre-sterilized option available
- Lot-specific purity certificates can be downloaded from www.sartorius.com
- Individually packed air-tight tip trays for maximum purity with less packaging material compared to racked tips
- Tip trays are compatible with Single Tray racks for convenient use
- Informative rack labelling: volume, product number, lot number improves tip identification and traceability
- Tip trays are colour-coded to indicate the matching, colour-coded Sartorius pipette
- Covers a large range of tip volumes from 10 µl to 1200 µl
- Trays and tips are fully autoclavable at 121°C for 20 minutes
- 100% recyclable trays and tips (PP). Container lid is regular waste.

Bulk Tips

FlexiBulk

FlexiBulk
- Tips made to the Sartorius quality standard in economical packaging
- Packed orderly in compact re-sealable plastic packages (480 or 960pcs depending on tip volume)
- Covers a large range of tip volumes from 200 µl to 1200 µl
- Certified free of DNase, RNase and endotoxins
- Lot-specific purity certificates can be downloaded from www.sartorius.com
- Tips are fully autoclavable at 121°C for 20 minutes
- 100% recyclable tips (PP) and package (PET)

Bulk in a box

Bulk in a Box
- Tips made to the Sartorius quality standard in economical packaging
- Packed in re-sealable bags in cardboard boxes (100, 250 or 1000 pcs depending on tip volume)
- Covers tip volumes 10 µl, 5 ml and 10 ml
- Tips are fully autoclavable at 121°C for 20 minutes
- 100% recyclable tips and package

Optifit Tips

Standard Tips for Various Needs

Sartorius Optifit tips are an excellent choice for various laboratories and pipetting tasks with their wide packaging and purity options. The Optifit tips are packed in single tray racks, refill towers, single refill packs, and bulk packages. Optifit tips are available DNase, RNase and endotoxin free, as well as e-beam pre-sterilized.

The Single Tray tip racks are ideal for easy tip loading and for contamination-free pipetting. In order to reuse the empty tip racks and to create less waste, you may fill the empty racks with Refill tips, either using the refill tower or purity certified refill pack tips. The FlexiBulk tips are the choice, if you need a cost-effective, yet purity certified solution, in bulk tip format.

Available Packaging Options

- Single tray rack
- Refill tower
- Refill pack
- FlexiBulk pack
- Bulk in a box

See details on packaging options on pages 56 and 57.

Features and Benefits

- Standard non-filter tips made to Sartorius quality standards
- Low Retention Tip range also available for liquids with low surface tension
- Perfect fitting and sealing with Sartorius Picus® NxT, Picus®, eLINE®, mLINE®, Proline® Plus, and Proline® pipettes
- Wide tip volume range from 10 µl to 10 ml
- Wide selection of packaging and purity options
- Available as DNase, RNase and endotoxin-free
- e-beam pre-sterilized packaging options available
- Full traceability
- Colour-coded trays to match with corresponding Sartorius pipettes
- Fully autoclavable at 121 °C for 20 minutes


Optifit
Refill Tips
sartorius
sartorius

SafetySpace Filter Tips

Protect Valuable Samples

SafetySpace filter tips, made of virgin polypropylene, feature filter barriers that effectively capture solid and liquid aerosol particles. The filter is made of polyethylene without self-sealing additives to avoid any interference with the sample and results. The filter protects the sample against contamination. In addition, it protects the pipette and prolongs the maintenance interval of the pipette.

The SafetySpace Filter Tips are Ideal for

- molecular biology
- microbiology
- cell culture applications
- radioactive work

The unique feature with SafetySpace Filter Tips is the additional space left between the sample and the filter that conventional filter tips do not have. This extra space prevents the liquid from touching, and permeating, the filter and thus guarantees the pipetting accuracy. Any liquid types and pipetting techniques can be applied without the risk of the liquid permeating the filter.

The Extra Space is Particularly Useful in the Following Applications:

- pipetting foaming liquids such as buffers and proteins
- pipetting solvents
- multiple dispensing functions of electronic pipettes
- reverse pipetting

Available Packaging Options

- Single tray rack

Features and Benefits

- Filter minimizes the risk of aerosol contamination
- Large empty volume between the sample and filter prevents liquid from contacting the filter
- Covers tip volumes from 10 µl to 1200 µl
- Certified free of DNase, RNase and endotoxins
- e-beam pre-sterilized
- Full traceability
- Colour-coded trays indicate the matching colour-coded Sartorius pipette

Low Retention Tips

Ensure Optimal Sample Recovery

The four tips on the right are low retention tips, providing maximum sample recovery.

Pipetting liquids that contain detergents can be problematic when using standard pipette tips. Some liquid residue often remains in the tip due to differences in surface energies between the plastic pipette tip and the sample. The residue causes imprecision in pipetting and loss of valuable samples or reagents.

We use an advanced technology to manufacture Low Retention Tips that have an extremely even and durable hydrophobic surface. Unlike some other hydrophobic tips on the market, our low retention tips do not contain any leachables that might risk your sample.

Low Retention Tips maximize the sample recovery, when handling detergent containing or other liquids with low surface tension. Better reproducibility in pipetting is especially beneficial in sensitive molecular biology applications, where reagents often contain detergents, for example in:

- PCR, real-time PCR
- Cloning, sequencing and other DNA & RNA techniques
- SDS-PAGE and other protein analysis methods
- Protein purification techniques

Packaging options for Low Retention tips.

Available Packaging Options

- Single tray rack
- Refill tower

Features and Benefits

- Extremely hydrophobic tips surface
- Maximum sample recovery for fluids with low surface tension
- Durable, high chemical resistance, no leachables
- Covers tip volumes from 10 µl to 1200 µl
- Filter (SafetySpace) and non-filter (Optifit) tip options are available
- DNase, RNase and endotoxin-free packaging options available
- e-beam pre-sterilized packaging options available
- Full traceability
- Colour-coded trays indicate the matching colour-coded Sartorius pipette
- Non-filter tips are fully autoclavable at 121°C for 20 minutes

Ordering Information

Optifit Tips

Volume Range	Length	Packaging	Low Retention	Purity Level: Free of RNase, DNase, endotoxins	Purity Level: Pre-sterilised	Tips/Unit	Order Code
0,1-10 µl	31,5 mm	Single Tray		•		10 x 96	790010
		Single Tray	•	•		10 x 96	LH-L790010
		Single Tray		•	•	10 x 96	790011
		Refill Tower				10 x 96	790012
		Refill Tower	•			10 x 96	LH-L790012
		Refill Pack		•	•	20 x 96	790013
		Bulk in Box				1000	790014
0,1-10 µl Extended	46 mm	Single Tray		•		10×96	783210
		Single Tray		•	•	10×96	783211
0,5-200 µl	51 mm	Single Tray		•		10 x 96	790200
		Single Tray	•	•		10 x 96	LH-L790200
		Single Tray		•	•	10 x 96	790201
		Refill Tower				10 x 96	790202
		Refill Tower	•			10 x 96	LH-L790202
		Refill Pack		•	•	15 x 96	790203
		FlexiBulk		•		960	LH-B790204
5-350 µl	54 mm	Single Tray		•		10 x 96	790350
		Single Tray	•	•		10 x 96	LH-L790350
		Single Tray		•	•	10 x 96	790351
		Refill Tower				10 x 96	790352
		Refill Tower	•			10 x 96	LH-L790352
		Refill Pack		•	•	15 x 96	790353
		FlexiBulk		•		960	LH-B790354
10-1000 µl	71,5 mm	Single Tray		•		10 x 96	791000
		Single Tray	•	•		10 x 96	LH-L791000
		Single Tray		•	•	10 x 96	791001
		Refill Pack		•		10 x 96	791002
		Refill Pack		•	•	10 x 96	791003
		FlexiBulk		•		480	LH-B791004

For your guidance the tips are illustrated in the actual size.

Empty Tip Boxes for Refill System (Tips and Trays are Not Included)

Item	Tip Type (Non-filter Tips)	Racks/Unit	Order Code
Empty Tip Box for Refill System	10, 200, 350 µl	10	790910
Empty Tip Box for Refill System	1000, 1200 µl	10	790920

Volume Range		Length	Packaging	Low Retention	Purity Level: Free of RNase, DNase, endotoxins	Purity Level: Pre-sterilised	Tips/Unit	Order Code
10-1000 µl	Wide bore tip	68,5 mm	Single Tray		•		10 x 96	791020
			Single Tray		•	•	10 x 96	791021
			FlexiBulk		•		480	LH-B791024
50-1200 µl		71,5 mm	Single Tray		•		10 x 96	791200
			Single Tray	•	•		10 x 96	LH-L791200
			Single Tray		•	•	10 x 96	791201
			Refill Pack		•		10 x 96	791202
			Refill Pack		•	•	10 x 96	791203
			FlexiBulk		•		480	LH-B791204
50-1200 µl	Extended	90 mm	Single Tray		•		10 x 96	791210
			Single Tray	•	•		10 x 96	LH-L791210
			Single Tray		•	•	10 x 96	791211
			Refill Pack		•		10 x 96	791212
			Refill Pack		•	•	10 x 96	791213
100-5000 µl		150 mm	Single Tray		•		50	780304
			Single Tray		•	•	50	780305
			Bulk in Box				100	780300
			Bulk in Carton				1000	780308
1-10 ml		155 mm	Bulk in Box				250	LH-780316

Note: The ordering information for 10 ml tip for MidiPlus can be found on page 69.

NOTE! Tip compatibility with pipettes are shown in the Tip Selection Guides at Electronic Pipettes, page 25, and Mechanical Pipettes, pages 42 - 43.

SafetySpace Filter Tips

Volume Range	Length	Packaging	Low Retention	Purity Level: RNase, DNase, endotoxin-free	Purity Level: Pre-sterilised	Tips/Unit	Order Code
0,1-10 µl 	31,5 mm	Single Tray		•	•	10 x 96	790011F
		Single Tray	•	•	•	10 x 96	LH-LF790011
0,5-20 µl 	51 mm	Single Tray		•	•	10 x 96	790021F
		Single Tray	•	•	•	10 x 96	LH-LF790021
2-120 µl 	51 mm	Single Tray		•	•	10 x 96	790101F
		Single Tray	•	•	•	10 x 96	LH-LF790101
5-200 µl 	52,5 mm	Single Tray		•	•	10 x 96	790201F
		Single Tray	•	•	•	10 x 96	LH-LF790201
5-300 µl 	52,5 mm	Single Tray		•	•	10 x 96	790301F
		Single Tray	•	•	•	10 x 96	LH-LF790301
50-1000 µl 	78 mm	Single Tray		•	•	10 x 96	791001F
		Single Tray	•	•	•	10 x 96	LH-LF791001
50-1200 µl 	90 mm	Single Tray		•	•	10 x 96	791211F
		Single Tray	•	•	•	10 x 96	LH-LF791211

For your guidance the tips are illustrated in the actual size.
Filter tips are not recommended to be used simultaneously with Safe-Cone Filters

Filter Tips with Regular Air Gap

Volume Range	Length	Packaging	Low Retention	Purity Level		Tips/Unit	Order Code
				RNase, DNase, endotoxin-free	Pre-steri-lised		
0,1-10 µl 	46 mm	Single Tray		•	•	10x96	783201

NOTE! Tip compatibility with pipettes are shown in Tip Selection Guides at Electronic Pipettes, page 25, and Mechanical Pipettes, pages 42 - 43.


sartorius
TOC

Maxi-volume Liquid Handling

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Midi Plus Pipetting Controller

Excellent Performance and Ergonomics

The Midi Plus is a lightweight electronic cordless pipetting controller, which allows aspiration from bottles and tubes, without the arm and hand elevations required in the case of serological or volumetric pipettes. It fits all commonly used 1 - 100 ml glass or plastic pipettes, but can also be used with Sartorius 5 ml and 10 ml disposable tips. The speed can be fine-tuned by applying varying finger pressure to the operating buttons.

The Midi Plus is ideal, for example, in microbiological work: dispensing into a culture media dish can be performed carefully, drop by drop, without breaking the fine surface of the medium.

- Stepless speed control
- Hydrophobic autoclavable filter protects the device in case of over-aspiration
- Convenient fold-out bench stand supports the unit and pipette when not in use*
- Low battery warning

Stepless speed control
- Allows the aspiration and dispensing speed to be adjusted easily and precisely to suit either large or small volume pipettes.

Fold-out stand*
- Prevents pipette contamination
- Saves space
- Allows the unit to be rested on a table with a pipette attached

*Not available in units sold in the United States

Features

Pipette types	Plastic or glass 1– 100 ml Pasteur pipettes 5 ml and 10 ml Sartorius pipette tips
Rechargeable during use	Yes
Speed control	Stepless adjustable control
Gravity dispensing	Yes
Stand	Attached support
Weight	207 g
Low battery indicator	Yes
Autoclavable parts	Nose cone, pipette holder and filter

Ordering Information

Order Code	Item	Qty/Unit
710931	Midi Plus Pipetting Controller with Universal Charger[1]	1
LH-7129120	Replacement filter, 0,45 µm, non-sterile, autoclavable	5
LH-7129130	Replacement filter, 0,2 µm, sterile	5
LH-711019	Adapter set (standard), autoclavable, including nose-cone and silicone adapter	1
LH-711017	Adapter set for 5 ml pipette tip, autoclavable, including nose-cone and silicone adapter	1
LH-711018	Adapter set for 10 ml pipette tip, autoclavable, including nose-cone and silicone adapter	1
780300	Optifit Tip 5 ml (length 150 mm)	100
780308	Optifit Tip 5 ml (length 150 mm)	1000
780310	Midi Plus Tip 10 ml (length 242 mm)	100

1) Supplied with a universal charger (incl. EU, UK, US | JPN, AUS, KOR and CHN plugs)

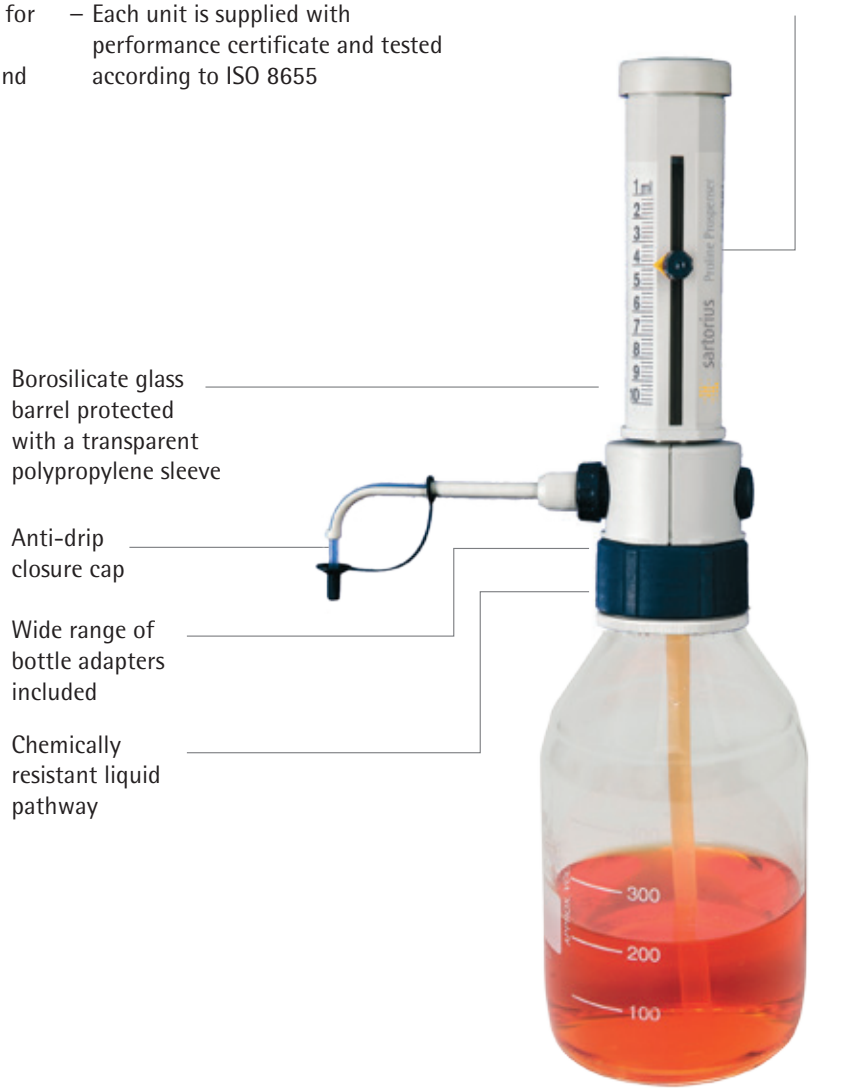
Proline® Prospenser

Easy-to-use Bottle-top Dispenser

Proline® Prospenser has been designed for trouble-free and reliable bottle-top dispensing of liquids, including concentrated acids, bases, saline solutions, as well as many organic solvents.

- Dispensing directly from the supply bottle
- Fully autoclavable at 121°C, 2 bar, 20 minutes
- Accuracy of delivery within ±0.5%
- Chemically resistant fluid pathway
- Anti-drip closure cap included
- Easy-to-use volume adjustment for reproducible dispensings
- Easy to dismantle for cleaning and maintenance
- Wide range of adapters included to fit the most common bottle sizes
- Optional flexible dispense tube extension (max length 800 mm) with safety handle enables fast and precise dispensing even into narrow tubes
- Each unit is supplied with performance certificate and tested according to ISO 8655

Optional flexible dispense tube extension
- Coiled
- Length 800 mm



2 YEAR SARTORIUS WARRANTY

121°C
Fully autoclavable

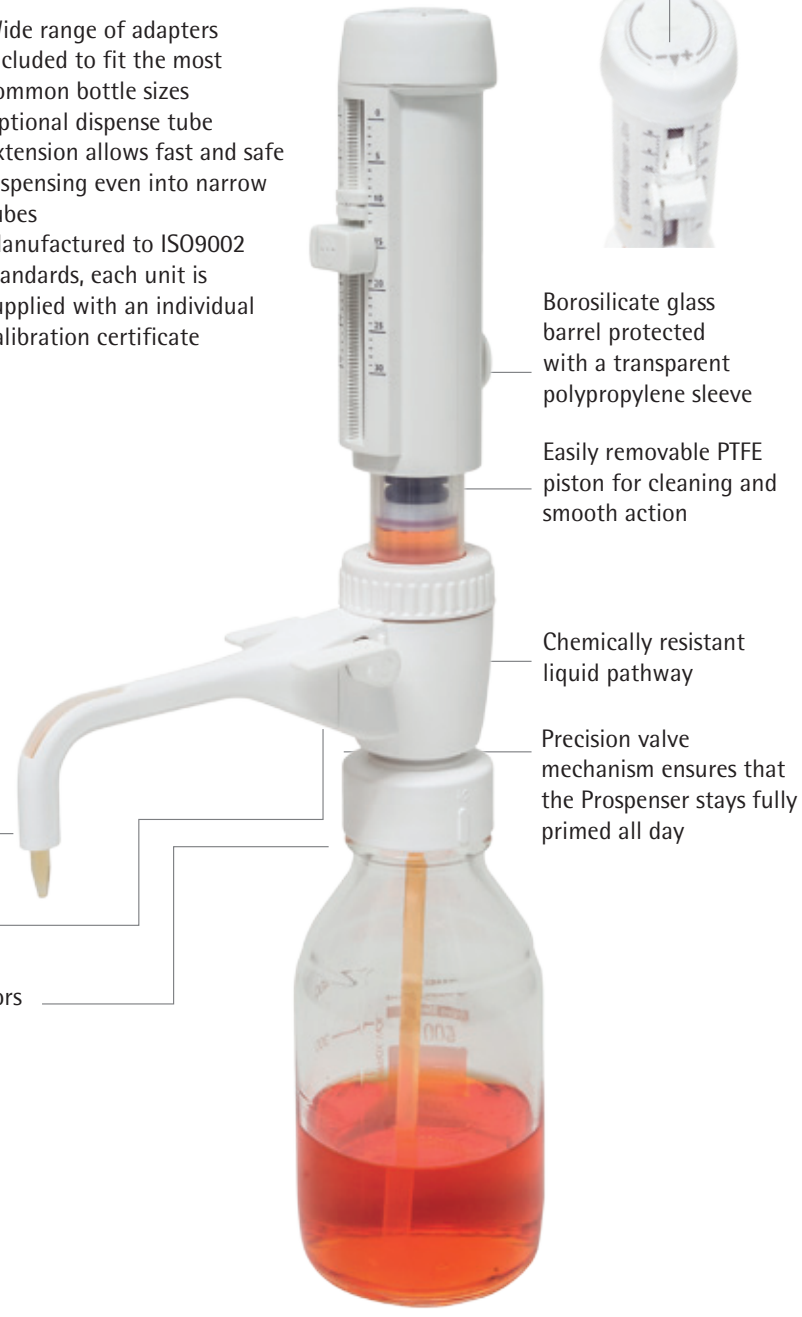
Prospenser

Bottle-top Dispenser with Anti-drip Valve

The Prospenser bottle-top dispenser delivers safe and precise liquid dispensing, including of strong acids, bases and solvents. Special features include an easy-to-adjust calibration mechanism and precision valve for enhanced accuracy and usability.

- Dispensing directly from the supply bottle
- Easy-to-adjust calibration mechanism
- Fully autoclavable at 121°C, 2 bar, 20 minutes
- Accuracy of delivery within ±0.3%
- Chemically resistant fluid pathway
- Anti-drip precision valve mechanism ensures easy priming and minimum waste with no leakage back into the reservoir
- Easy-to-use volume adjustment for reproducible dispensing
- Unlike other bottle-top dispensers, Prospenser's glass barrel can be disassembled from the pedestal for thorough cleaning
- Wide range of adapters included to fit the most common bottle sizes
- Optional dispense tube extension allows fast and safe dispensing even into narrow tubes
- Manufactured to ISO9002 standards, each unit is supplied with an individual calibration certificate

Optional dispense tube extension
- Allows fast and safe dispensing into narrow tubes



2 YEAR SARTORIUS WARRANTY

121°C Fully autoclavable

Biotrate Digital Burettes

Ranges of 0 – 30 ml and 0 – 50 ml

The streamlined Biotrate digital burette and dispenser delivers accurate, precise and convenient bottle-top titration, as well as optimum operator safety. Due to its life-long battery concept, there is no need for an electrical outlet. This feature makes Biotrate ideal for both laboratory and field-based analyses, where it can be easily moved from one place to another.

- Chemically resistant and autoclavable liquid-path construction is made of borosilicate glass, PTFE, PVDF, FEP and ceramic components
- Based on positive displacement principle for maximum accuracy
- An automatic low battery indication is shown on the large easy-to-read LCD display
- Simple for user to calibrate and restore factory calibration
- With a zero reset feature, it is easy to move from one titration to another

Rotating head and clear numbers on the display increase working reliability

Chemically resistant and autoclavable liquid pathway

Simple user calibration and factory reset for ISO 9000 and GLP requirements

Visible borosilicate glass barrel protected with a transparent polypropylene sleeve allows inspection of liquid before dispensing

Anti-drip tap

Bubble-free dispensing

2 YEAR SARTORIUS WARRANTY

121°C
Fully autoclavable

CE

Ordering Information and Performance Specifications

Proline® Prospenser

Order Code	Item	Increment	Max Volume	Systematic Error (%)	Random Error (%)
723045	Proline® Prospenser 0.5 – 5 ml (with 25, 28, 32, 38 and 40 mm adaptors)	0,1 ml	5 ml	0,5	0,1
723046	Proline® Prospenser 1 – 10 ml (with 25, 28, 32, 38 and 40 mm adaptors)	0,2 ml	10 ml	0,5	0,1
723047	Proline® Prospenser 2.5 – 25 ml (with 32, 38 and 40 mm adaptors)	0,5 ml	25 ml	0,5	0,1
723048	Proline® Prospenser 5 – 50 ml (with 32, 38 and 40 mm adaptors)	1,0 ml	50 ml	0,5	0,1
721633	Flexible tube extension for 5 and 10 ml Proline® Prospensers				
721634	Flexible tube extension for 25 and 50 ml Proline® Prospensers				

Prospenser

Order Code	Item	Increment	Max Volume	Systematic Error (%)	Random Error (%)
723049	Prospenser 0.01 – 2.5 ml (with 38, 40 and 45 mm adaptors)	0,05 ml	2,5 ml	0,3	0,1
723050	Prospenser 0.1 – 5 ml (with 38, 40 and 45 mm adaptors)	0,1 ml	5 ml	0,3	0,1
723051	Prospenser 0.2 – 10 ml (with 38, 40 and 45 mm adaptors)	0,2 ml	10 ml	0,3	0,1
723052	Prospenser 1 – 30 ml (with 38, 40 and 45 mm adaptors)	1,0 ml	30 ml	0,3	0,1
723053	Prospenser 1 – 50 ml (with 38, 40 and 45mm adaptors)	1,0 ml	50 ml	0,3	0,1
721998	Dispense tube extension				

Biotrate Digital Burettes 0 – 30 ml and 0 – 50 ml

Order Code	Item	Increment	Systematic Error (%)	Random Error (%)
723054	Biotrate 0 – 30 ml (with 33, 38 and 45 mm adaptors)	0,01 ml	0,2	0,1
723055	Biotrate 0 – 50 ml (with 33, 38 and 45 mm adaptors)	0,01 ml	0,2	0,1
721998	Expandable delivery jet			

Pipetting Academy

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Pipetting Academy

Training for Better Performance, Ergonomics and Safety

Seminars include both theory and practice!

Videos and animations support learning.

Are you concerned about the results of your work due to poor pipetting practices or RSI (Repetitive Strain Injury)?

Have you considered that the pain in your hand or arm may be related to the instruments or techniques you use?

Do you know which pipetting technique to use with different types of liquids?

Do your results vary between users?

The Pipetting Academy seminar offers a comprehensive tutorial package, developed to answer these questions together with you. During the seminars, you will learn to recognise pipetting-related risk factors and increase your knowledge of ergonomics, safety and pipetting techniques, in order to avoid these risks in your daily work.

What Will You Learn?

- Get hands-on training in pipetting techniques that will help you and your co-workers to obtain more accurate and precise results in the lab
- Gain a better understanding of the influence of pipetting techniques and environmental factors on testing results
- Be guided through the essentials of laboratory ergonomics
- Gain a better understanding of the ergonomic risks in the laboratory environment and liquid handling in particular
- Learn how to avoid these risks by choosing the most appropriate working postures, liquid handling devices and accessories
- Appreciate how you can help make savings in both direct and indirect costs due to bad ergonomics
- Become able to instruct your employees on all of these issues, making work more efficient and enjoyable.

Build Your Own Seminar

Pipetting Academy offers you various seminars for different purposes.

You May Choose from

Ergonomics
Learn about the optimal posture for pipetting and become familiar with tools that can help you work ergonomically and efficiently. Understand the risks and learn about the solutions.

Pipetting Techniques
Master your working tool. Handle the pipette correctly. Be guided through the many techniques of which your pipette is capable.

Pipette Service
Learn which aspects to consider to keep your pipette in good working condition to deliver accurate results repeatedly, year after year.

How to Sign Up for Seminars?

- To sign up for the seminar, contact your local Sartorius representative
- The seminar will be held in the location most suitable to you and your colleagues
- The trainer will be certified to hold Pipetting Academy seminars
- Each participate will receive a certificate of participation after the seminar

Gain access to educational material, videos and animations
Once you have signed up and participated in the seminar, you will automatically gain access to educational videos, animations and presentations on ergonomics, pipetting techniques and calibration.

- Through these animations, you will be guided step by step in the correct handling of the pipette and through reverse pipetting, diluting and all other pipetting modes, to make your work easier and more efficient
- A Certified Professional Ergonomist will guide you through the essentials of ergonomics
- Presentations with explanations and illustrations on calibration and quality standards, are also available

See You at the Pipetting Academy!

Pipetting Recommendations

Hold the pipette in a vertical position during aspiration

Avoid contamination with Safe-Cone Filters

mLINE® volume lock prevents volume changes during pipetting

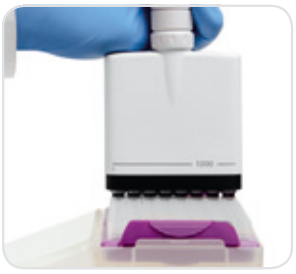
Preparations Before Pipetting

- Use the tip specified by the manufacturer.
- Ensure that the pipette and the tip have been tested according to ISO 8655 and the tip is seated correctly.
- Make sure pipettes have been correctly calibrated.
- Check that the pipette, tip and liquid are all at the same temperature.
- When pipetting liquids with temperatures different to the ambient temperature, do not pre-rinse the tip. Change the tip after each pipetting.
- Ensure that any fluid viscosity variations have been accounted for and the correct technique is employed, i.e. reverse pipetting.
- If handling infectious or radioactive agents make sure appropriate shielding and other precautions protect the operator.
- Use Safe-Cone Filter in the tip cone whenever possible.

While Pipetting

- Hold the pipette in a vertical position. Tilting the pipette at an angle causes a volume greater than the set volume of liquid to enter the tip.
- In most cases, pre-rinsing of the tip is recommended, to achieve accurate results. Do not pre-rinse the tip, if the temperature of the liquid is different to the ambient temperature.
- When aspirating fluid, the pipette tip should normally be immersed to a depth of 2-3 mm.
- When using a mechanical pipette, operate the piston with a smooth and consistent thumb action, for repeated results without foaming or bubbles.
- You should pipette against the inside wall of the receiving vessel. Remove the tip by drawing it upwards against the inside wall.
- Ensure that the pipette blow out action is fully activated.
- Ensure that the volume is still set at the required position. A pipette with a volume locking mechanism is recommended, in order to avoid accidental volume change during pipetting.
- Avoid leaving the pipette on its side
  with liquid in the tip, which may seep back into the mechanism.

Charging while pipetting is possible with Sartorius electronic pipettes



Load the tip onto the pipette carefully and take advantage of the Optiload tip loading mechanism

Clean the pipette before sending it to service

Other Precautions

- Store the pipette on a stand when not in use – see pages 46-47, on pipette stands, for more information. Electronic pipettes should be returned to their charging stands.
- Avoid dropping the pipette or allowing contact with dirt or grease.
- Change the Safe-Cone Filter regularly (recommendation after 50 to 250 pipetting cycles), and in every case of over-aspiration.
- Never strike the tip cone against the tip tray when loading the tip, as this can damage the pipette.
- Avoid exposing the unit to extreme temperature changes, humidity and dust (operating temperature from 15°C to 40°C).
- Service the pipette regularly.
- Clean the pipette thoroughly before sending it in for service. Decontaminate the pipette with 70% ethanol. Notify the service personnel of the purpose for which the instrument has been used. Postal services may refuse to deliver instruments used for hazardous materials. Make sure that a qualified person services the pipette.

Calibration and Maintenance Services

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Pipette Calibration and Maintenance Services

Why is Calibration and Maintenance Needed?

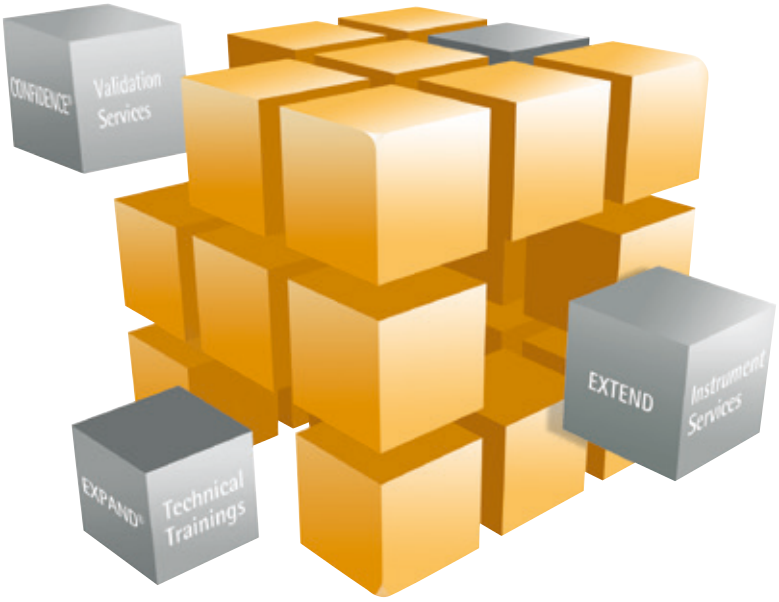
All pipette manufacturers recommend that regular maintenance and calibration is applied to maintain reliable pipetting results and to maximize the lifetime of the pipette.

Pipette calibration is a fundamental part of Good Laboratory Practice (GLP) and quality systems and must be considered a vital part of any laboratory regime where precise volumes of fluid need transferring or diluting. Pipette performance is measured as accuracy and precision or how close the dispensed volumes are to the target and how close the results are to each other.

Sartorius Service Centres

It is vitally important to Sartorius that our customers receive world class service and support, from the first phone call to the moment the engineer leaves, with the customer's equipment in perfect working condition.

Sartorius provides a global network of service centers for calibration of all makes and models of pipettes, burettes, bottle top dispensers and other liquid handling instruments. With over 20 years of experience in pipettes and liquid handling instrument services, the global organization provides world class services tailored to customers' needs, simultaneously fulfilling standards and regulatory body requirements. With the Sartorius concept of "all makes and models liquid handling services" you can be certain that your instruments are handled according to the international ISO 8655 standard defining the use and calibration of pipettes and other liquid handling instruments. Sartorius provides reliability of operation, reduced instrument downtime and confidence, so that your work is according to the strictest requirements.



Maintenance, Repair and Calibration Services

Maintenance consists of the cleaning and lubrication of the piston and tip cone(s) of the pipette, and the replacment of parts prone to wear, in order to guarantee a long lifetime and consistently accurate and precise results.

As with all mechanical devices, pipettes may need repairs. It is usually worth the expense to maintain and repair the pipettes rather than to dispose of them. This is also an ecologically sustainable choice. Sartorius provides spare parts and repairs for any make and model. If the pipettes are beyond economical repair, then we offer replacements.

Calibration and maintenance can be done either at a dedicated calibration laboratory, or at the customer site. Laboratory conditions can provide a smaller uncertainty of measurement in calibration, but the quickest turnaround time is often achieved by performing maintenance and calibration on-site.

Services Provided

- Maintenance and calibration for all makes and models of pipettes and other liquid handling instruments, including cleaning, relubrication and adjustment of instruments
- Pipette calibration done according to ISO 8655 standard by our network of ISO 17025 accredited pipette calibration laboratories around the world
- Pipette maintenance and calibration services available either as mail-in service at service centers or as on-site service at the customer's laboratory
- Repair services and spare parts for all makes and models of pipettes available
- Extended Warranty for an additional 12 months

Benefits

- Maximum reliability and lifetime with regular maintenance and original spare parts
- Confidence in the quality of your work provided by regular calibration
- All documentation needs met by our detailed service and calibration documentation, including ISO 17025 accredited calibration certificates with measurement results traceable to international standards
- Efficient and time saving services provided either at your site or as a mail-in service, which includes courier collection and delivery
- Affordable, planned warranty of your equipment

Accreditation and Calibration Standards

Good Laboratory Practices (GLP), accredited processes and quality systems require traceability of measurement and compliance with a multitude of standards. Sartorius operates a global network of accredited calibration laboratories, providing services around the world.

What is ISO 17025?
The ISO 17025 standard specifies the general requirements for the competence of calibration laboratories to carry out tests and calibrations. A pipette calibration laboratory with an ISO 17025 accreditation provides the highest level of reliability and confidence in pipette calibration, proven with a Measurement Uncertainty Certificate provided with each calibration, when required. Gaining and maintaining an ISO 17025 accreditation requires extensive reviewing and development of personnel, procedures and facilities, audited annually by the accreditation body.

Sartorius provides ISO 17025 accredited pipette calibration services in various countries, for example DAkkS in Germany, Cofrac in France, UKAS in the United Kingdom, A-Class in the USA, JCSS in Japan, and FINAS in Finland. All European accreditation bodies are members of the European Co-operation for Accreditation (EA) and signatories of the Multilateral Recognition Agreements (MLA) ensuring that accredited pipette calibration certificates are accepted around the world.

Ask your local Sartorius representative for more information on accredited pipette calibration services available for you.

What is ISO 8655?
The ISO 8655 standard specifies the requirements for piston operated volumetric apparatus (pipettes) and pipette calibration laboratories, providing detailed requirements for procedures and equipment used in pipette calibration. Pipettes calibration, according to ISO 8655, is done in a carefully controlled environment, with no drafts or vibrations, using repeatable and reliable measurement technology. Sartorius balances meet such specifications and calibration is always done according to the strictest, repeatable procedures.

Making sure your pipettes are calibrated according to ISO 8655, Sartorius provides the best confidence in the reliability of results. Sartorius pipette calibration is always done according to ISO 8655.

In Conclusion

Adopting a regular calibration and maintenance routine for your pipette has the following benefits:

Confidence
Your pipettes are operating correctly with the accuracy and precision you know.

Reliability
With maintenance and calibration and operational qualification you are able to trust the instrument's operational capability.

Efficiency and Effectiveness
With properly working pipettes you can work uninterrupted and be more efficient.

Sustainability
Extending the lifespan of your pipette reduces waste, and consequently is an environmentally considerate choice.

Frequently Asked Questions

Question: What makes and models of pipettes does Sartorius service?

Answer: Sartorius provides calibration and maintenance services for all manufacturers' pipettes, the most common being Sartorius (Biohit *family*), Gilson, Eppendorf, and Rainin. With over 20 years of experience in the field we have the skill and ability to service any pipette.

Question: What is pipette calibration?

Answer: It is when a pipette is tested for inaccuracy, imprecision and linearity to determine the uncertainties of measurement for each volume calibrated. Test volumes and data points are selected according to the customer requirements.

Question: Can I have my pipettes calibrated in my laboratory, as I need them every day?

Answer: Yes. Sartorius offers calibration and maintenance services both at our workshops and at your laboratory site. Ask for on-site services, especially if you need your pipettes every day.

Question: Why should I get a Service Contract?

Answer: Often the most economical and easiest way to handle your calibration and maintenance needs, is to enter into a contract with a service provider. This saves time, and is usually the most economical choice. Sartorius service technicians are experts in pipettes and also offer training in the use of instruments. They can also offer replacements for worn out pipettes.

Question: How often should my pipettes be calibrated?

Answer: The ISO 8655 standard states that pipettes should be calibrated regularly, at least annually, or more often, for example every 3-6 months. It depends on the accuracy requirements of your work as well as the nature of liquids used - corrosive or volatile liquids create more wear and tear on your pipettes.

Pipette Decontamination Procedure

Mechanical Pipettes (mLINE® and Proline® Plus)

1. Unscrew the tip ejector collar counter clockwise and remove it.

2. Unscrew the tip cone holder counter clockwise and carefully remove it along with the tip cone. Remove the Safe-Cone Filter if fitted.

3. Unscrew the piston counter clockwise from the pipette.

4. Place the tip ejector collar, tip cone holder, tip cone and tip cone cylinder into a beaker containing 70% ethanol and leave for at least 30 minutes.
5. After performing the procedure described above, remove the components from the beaker and rinse them with distilled water, then dry preferably with warm air, for at least an hour.
6. Re-grease the piston as described in the instruction manual. Replace all components including new filter if fitted.

Electronic Pipettes (Picus®, Picus® NxT and eLINE®)

1. Unscrew the tip ejector collar counter clockwise and remove it.

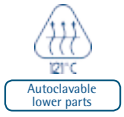
2. Unscrew the tip cone holder counter clockwise and carefully remove the tip cone holder, tip cone and spring.Remove the Safe-Cone Filter if fitted.

3. Unscrew the piston counter clockwise from the pipette.

4. Place the tip cone, tip cone holder, tip ejector collar, piston and spring into a beaker containing 70% ethanol and leave for at least 30 minutes.
5. After performing the procedure described above, remove the components from the beaker and rinse them with distilled water, then dry preferably in warm air, for at least an hour.
6. Re-grease the piston as described in the instruction manual. Replace all components including the new filter if fitted.

Note: When performing the decontamination procedure, as a matter of routine the o-ring seal should be checked for possible wear on every sixth occasion, and replaced if necessary. Calibration should also be checked at the same time.

Autoclaving Instructions



mLINE® and Proline® Plus Mechanical Pipettes
The entire mLINE® and Proline® Plus mechanical pipette can be steam sterilized by autoclaving at 121°C (252°F), 1 bar (15 p.s.i.) for 20 minutes. The dispensing head of the multi-channel pipettes must be unscrewed 360° counter clockwise before autoclaving.

- Remove the Safe-Cone Filter (if fitted)
- Put the pipette into the sterilisation bag and place it into the autoclave
- After autoclaving the pipette must be cooled down and left to dry overnight before use

It is recommended that you check the performance of the pipette after every autoclaving, and grease the piston | seal of the pipette after every 10th autoclaving.

Picus®, Picus® NxT and eLINE® Electronic Pipettes Lower Parts
The dispensing head (tip ejector collar, tip cone holder, tip cone, spring and piston) of the single-channel and multi-channel models (except for multi-channel 1200 µl) can be autoclaved (121°C, 1 bar for 20 minutes). These parts can be autoclaved as one unit or separately as individual parts. It is also possible to clean the parts and grease the piston prior to autoclaving.

- Remove the Safe-Cone Filter (if fitted).
- Put the dispensing head into the sterilisation bag and place it into the autoclave
- After autoclaving the parts must be cooled down and left to dry before use

It is recommended that you check the performance of the pipette after every autoclaving, and grease the piston | seal of the pipette after every 10th autoclaving.

Tips and Tip Boxes

- Place the bulk tips into the sterilisation bag and the tip tray as such in the autoclave
- Autoclave for 20 minutes at a temperature of 121°C under 1 bar (15 p.s.i.)
- Cool before use

Note:

- Excessive heat or length of time may damage the products. Never place the handle part of the Picus®, Picus® NxT or eLINE® into the autoclave
- The lower ends of multi-channel pipettes are not interchangeable between 8 and 12-channel pipettes
- The cover of the tip tray should be closed during autoclaving

Troubleshooting Guide

Problem	Cause	Solution
Droplets left inside the tip	Unsuitable tip	Use original Sartorius tips
	Non-uniform wetting of the tip plastic	Attach new tip and pre-wet it
	Optiload not fully utilised and thus tip does not fit very well (All mLINE® models and Proline® Plus MC-models and 2ml, 5ml and 10ml SC-models have Optiload)	Pick up the tip so that it strikes the lower edge of the tip ejector collar
Leakage or pipetted volume too small	Tip incorrectly attached	Attach firmly
	Unsuitable tip	Use original Sartorius tips
	Tip is leaking and | or Optiload not fully utilized	Replace a new tip or see above for Optiload
	Plunger movement not uniform, constant or balanced	It is very important that the plunger movement is slow and that this is always done in the same way during pipetting cycles. Volumes 1ml and greater: if plunger is released too quickly upon aspirating, it will affect the amount of liquid drawn.
Test results are incorrect and/or results are non-linear	Improper maintenance of lower parts	Clean and re-grease lower parts as per instructions in the pipette's manual, only applies to single-channel pipettes
	Piston or tip cone damaged/non-linear	Replace part with new one, only applies to single-channel pipettes
	Dirt on stop surfaces/inside the machinery	Clean the stop surfaces/interior of the machinery as per instructions
	Uneven piston movement |inconsistent pipetting technique/rhythm	It is very important that the plunger movement is slow and that this is always done in the same way during pipetting cycles. Volumes 1ml and greater: if the plunger is released too quickly upon aspirating, it will affect the amount of liquid drawn.
Display not sitting properly (in particular the lower edge of the display does not fit)	Calibration wheel (726066) not properly in place	Remove display and push calibration wheel down
Counter reading does not make sense and /or counter feels very slack	The wings on the lead screw have come out of the grooves on the machinery	Return the wings to the grooves
	The wings on the lead screw have been broken	Replace machinery with new parts
	There is something broken inside the machinery	Replace machinery with new parts
Multi-channel pipettes: tip cone(s) does not draw liquid	Tip cone (bajonet connection) has accidentally come off	Refit tip cone
	Piston(s) is not connected to the piston support plate	Refit piston(s) so that they connect to the piston support plate properly
	Piston/tip cone damaged	Replace parts with new ones
	Improper maintenance	Maintain lower parts as per instructions

Problem	Cause	Solution
Pipette does not draw liquid at all	Magnet holder/magnet is disconnected from the lower part	Remove the dispensing head and refit it so that the magnet holder/magnet is properly connected to the dispensing head
Multi-channel pipettes: Tip ejection does not work/ tip does not fit	Tip ejection bar has come off (the snap fit is disengaged)	Make sure that the tip ejection bar is properly connected
Electronic pipettes: Error in the display and motor is unable to start	Discharged battery/defective battery	Recharge battery/replace battery
	Actuator rod jammed	Clean and lubricate actuator rod
	Penetration of solvent vapours and thus actuator rod/tip ejection mechanism jammed	Clean tip ejection mechanism and clean/ lubricate actuator rod
	Failure in the handle parts (upper body parts)	Check error messages
Electronic pipette can start but is unable to complete self test when switched on (error blinking on the display)	Discharged battery/defective battery	Recharge battery/replace battery
	Tip ejector mechanism jammed/ contaminated	Clean tip ejection mechanism and clean/lubricate actuator rod
	Failure in the handle parts (upper body parts)	Check error messages
	Internal error has occurred	Check error messages and proceed accoringly
Tip ejector jammed or moves erratically	Ejector mechanism contaminated	Clean lower parts of pipette
	Ejector mechanism damaged	Replace damaged parts
Tip ejector feels slack	Ejector mechanism damaged	Replace damaged parts
Fading display and/or segment missing	Display damaged or incorrectly attached to the PCU-board/defective PCU board	Open handle cover and check the display
Autotest (a test programmed by service engineer) failed	Discharged battery/defective battery	Replace a battery
	Failure in the handle parts (upper body parts)	Check error counters and autotest counters and proceed accordingly
Pipette not charging	Pipette incorrectly positioned in the charging stand/carousel	Check the position of the pipette
	AC-adaptor damaged	Replace AC-adaptor
	Charging carousel/stand damaged	Open the bottom, check wires and replace the unit if needed
	Battery contacts inside the battery compartment damaged/oxidated/ flattened	Clean battery contacts
	Battery damaged	Replace battery
Reduced operating time with fully charged batteries	Batteries damaged	Replace battery

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Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct.
If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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Please contact us if this literature doesn't answer all your questions.