

## Sartorius Pipetting and Dispensing Products



turning science **into solutions**

## ■ Table of Contents

### □ About Sartorius Pipetting and Dispensing

- 4 Introduction
- 6 Quality

### □ How to Choose a Pipette

- 8 Electronic or Mechanical Pipette

### □ Electronic Pipettes

- 12 Picus® and Picus® NxT Electronic Pipettes

### □ Mechanical Pipettes

- 20 Tacta® Mechanical Pipettes
- 26 mLINE® Mechanical Pipettes
- 32 Proline® Plus Mechanical Pipettes
- 39 Proline® Mechanical Pipettes

### □ Stands and Accessories

- 46 Pipette Stands
- 47 Elbow Pad
- 48 Safe-Cone Filters
- 50 Reagent Vessel
- 50 Adjustment Tool

### □ Pipette Tips

- 54 Pipette Tips
- 56 Optifit Tips
- 57 SafetySpace Filter Tips
- 58 Low Retention Tips
- 60 Packaging Options

### □ Maxi-volume Liquid Handling

- 68 Midi Plus Pipetting Controller
- 70 Prospenser Plus and Prospenser
- 72 Biotrate Digital Burette

### □ Pipetting Academy

- 78 Pipetting Academy
- 80 Pipetting Recommendations

### □ Calibration and Maintenance

- 84 Pipette Calibration and Maintenance Services
- 85 Pipette Decontamination Procedure
- 86 Autoclaving Instructions
- 88 Sales and Service Contacts



## ■ Introduction

Three key factors – ergonomics, design and reliability – form the cornerstone of our product development. These and other factors have been combined to produce a perfectly balanced mechanical pipette, the Tacta®, the newest family member, following the Picus® NxT, which is an excellent example of an electronic pipette that has all these aspects combined. Both are amongst the lightest pipettes on the market, reducing the risk of Work Related Upper Limb Disorder (WRULD). Their high reliability, and ease of use, make them valued instruments for professionals, who strive for high quality results.

Their functional and well-rounded design, suitable for a laboratory setting, has been recognised with design awards. All Sartorius pipettes are designed and manufactured in Finland, where our R&D team is constantly seeking solutions to further improve liquid handling instruments to make lab life easier.



Designing products that people work with on a daily basis is always challenging. Many users are interviewed and multiple aspects need to be taken into account, to combine excellent ergonomics and easy usability with today's technology and features. To solve this puzzle and come up with a great product is an exciting, but sometimes tough, journey. However, it is always rewarding in the end."

– Ville Hintikka, Chief Designer at Sartorius

### □ Ergonomics

When designing a pipette, we always consider the shape and function of the human hand. As we understand the risks of repetitive pipetting, we emphasise ergonomic design in every product we make. Simply put, this means products that you can use in a comfortable posture with minimum muscle power. Our pipettes and dispensers are designed for both right- and left-handed users. Their operating buttons are located sufficiently close together, within ergonomic reach of the thumb.

### □ Design

We provide products with a timeless and light, yet practical, design, suitable for laboratory settings and pleasing to the eye of the user. The Tacta® and the Picus®, won the Red Dot design award, in 2016 and 2012 respectively. The Picus® was distinguished with the Fennia Prize Honorary Mention in 2012. The Tacta® and the Picus®, won the German Design Award in 2017 and 2014 respectively.



### □ Reliability

For us, reliability has many aspects, the most important being accuracy and precision of results and secured purity.

The core of a pipette lies in its **accuracy and precision**. For this reason, we have used the newest technologies together with in-house innovations, to achieve even more reliable pipetting results. Our electronic brake, piston control system and plate tracker for electronic pipettes are our latest innovations. They increase accuracy, precision and reliability of the device. Another important factor in achieving reliable results is the optimal tip fit, which we can guarantee by designing and producing the tips ourselves, to perfectly match our pipettes.

To reduce the risk of contaminating the internal components of our pipettes, we offer special Safe-Cone Filters to be used in our pipettes, as we understand that purity is a key concern in many laboratories. We strive to produce as many autoclavable products as possible, both pipettes and tips. Our pipette tips are manufactured in ISO Class 8 Cleanroom conditions. We test every certified tip lot for DNase, RNase and endotoxins at an external laboratory. We also offer an innovative SafetySpace Filter Tip range for safer and contamination-free pipetting.



## Quality

Sartorius' products are developed and manufactured according to the requirements of the ISO 9001, ISO 13485 and ISO 14001 quality and environmental standards. Tip production also follows the ISO 14644-1 standard, in order to fulfil ISO class 8 cleanroom conditions.

We continuously develop our products and processes in order to meet, and often exceed, the demands of regulatory authorities, environmental bodies, and most importantly, our customers.



Sartorius' products are developed and manufactured according to the requirements of the ISO 9001, ISO 13485 and ISO 14001 quality and environmental standards. Tip production also abides by the ISO 14644-1 standard, in order to fulfil ISO Class 8 Cleanroom conditions. ISO 13485 is a specific standard for medical device quality systems, and supplementing the more generic ISO 9001 standard, which applies to many industries.



The Finnish national accreditation body operates independently as part of the Measurement Technology Centre (MIKES). Accredited pipette calibration laboratories in Finland, Germany, France, UK, China and Japan calibrate pipettes according to precise technical requirements. Our calibration laboratories in Finland, Germany, France, UK, China and Japan have been granted this status by their national accreditation bodies.



During production and service, pipette performance testing is carried out according to ISO 8655 specifications. Sartorius accredited pipette calibration follows the ISO 17025 standard. Our pipettes are supplied with individual quality control certificates.



Sartorius offers a 2-year warranty for all mechanical and electronic pipettes. The low lifetime cost and environmental friendliness of our products, which have long warranty periods, give a high return on investment.

We follow these manufacturing quality standards

ISO 9001 · ISO 13485 · ISO 14001 · ISO 17025 · ISO 8655



The ergonomic design label indicates products, which Sartorius has designed specifically to reduce the risk of work-related hand, arm and shoulder disorders, such as Work Related Upper Limb Disorder (WRULD).



The Optiload tip loading mechanism developed by Sartorius in Tacta<sup>®</sup>, mLINE<sup>®</sup>, Proline<sup>®</sup> Plus, Picus<sup>®</sup> and Picus<sup>®</sup> NxT pipettes allows tips to be loaded with constant force. This secures optimal tip sealing and minimum tip ejection force.



The Optilock<sup>®</sup>, volume locking system in Tacta<sup>®</sup> gives the choice of locking and unlocking the volume the traditional way, using both hands, or specially developed convenient method, using one hand.



The Optiject<sup>®</sup>, is a unique mechanism in Tacta<sup>®</sup> by which one ejects the Safe-Cone filter, without touching it or using tweezers. This allows for the truly safe disposal of contaminated filters without human contact.



Every lot of Sartorius Single Tray, Refill Pack and FlexiBulk<sup>®</sup> tips are certified to be free of DNase, RNase and endotoxins, for the protection of samples from contamination. This certificate can be downloaded from [www.sartorius.com](http://www.sartorius.com). Sartorius' tip production is ISO 8 cleanroom classified, which ensures a contamination-free manufacturing environment, and products.



Most Sartorius pipetting and dispensing products are autoclavable. Please see details in the following product specific chapters.

## How to Choose a Pipette

### Electronic or Mechanical Pipette

Are you looking for a pipette for sterile work, or one you could easily calibrate yourself? Or do you seek a really light and ergonomic solution? Perhaps you need a pipette with a certain pipetting mode to speed up your work? By consulting the tables below, you can choose the instrument that best suits your needs.

#### Electronic or Mechanical Pipette

Features	Electronic Pipettes	Mechanical Pipettes
Highest ergonomics	✓	
Fastest pipetting	✓	
User-independent results	✓	
Multiple pipetting modes	✓	
Fully autoclavable		✓ <sup>2</sup>
Adjustment by user	✓	✓

<sup>2</sup> Excluding Proline

#### Mechanical Pipettes

Features	Tacta®	mLINE®	Proline® Plus	Proline®
Most ergonomic	✓			
Ergonomic finger hook	✓	✓	✓	✓
Weight <sup>1</sup>	75 g	77 g	82 g	84 g
Length <sup>1</sup>	225 mm	240 mm	239 mm	224 mm
Volume range, single-channels	0.1 µl – 10 ml	0.1 µl – 10 ml	0.1 µl – 10 ml	0.1 µl – 5 ml
Volume range, multi-channels	0.5 – 300 µl	0.5 – 300 µl	0.5 – 300 µl	0.5 – 300 µl
Fixed-volume models			✓	✓
Pipetting force <sup>1</sup>	12 N	13 N	15 N	20 N
Optiject soft tip ejection	✓			
Light tip ejection		✓	✓	
Optiload spring-loaded tip cones	all models	all models	multi-channels only	
User adjustment	✓	✓	✓	✓
Optilock on   off volume lock	✓			
Volume locking	✓	✓	click stops	click stops
Big, and easy to read display	✓	✓	✓	
Safe-Cone Filters (models >10 µl)	✓	✓	✓	✓
Filter ejector	✓	✓		
Colour-coding on pipette	✓	✓	✓	
ID tags	✓	✓		
Fully autoclavable	✓	✓	✓	
Multipacks	✓	✓	✓	
Pipette holder with pipette	✓	✓	✓	
Warranty for 2 years	✓	✓	✓	✓

<sup>1</sup> 1,000 µl 1-channel models

<sup>2</sup> Excluding Proline

#### Electronic Pipettes

Features	Picus® NxT	Picus®
Most ergonomic	✓	✓
Weight <sup>1</sup>	100 g	100 g
Length <sup>1</sup>	210 mm	210 mm
Volume range, single-channels	0.2 µl – 10 ml	0.2 µl – 10 ml
Volume range, multi-channels	0.2 µl – 1.2 ml	0.2 µl – 1.2 ml
Language options <sup>2</sup>	5	5
Pipetting modes	9	8
Advanced functions	7	6
Repeated blow-out (advanced function)	✓	
Microwell plate tracker	✓	✓
Protocols – memory places	3	
Memory places (for storing programs)	10	10
Reminders for calibration and service	✓	
Information on service & calibration intervals		✓
Password protection	✓	
Certificate of accredited 3-point calibration	✓	
Electronic tip ejection	✓	✓
Calibration adjustment by user	✓	✓
Calibration adjustment in 1, 2 or 3 points	✓	✓
Hot key for stored programs	✓	✓
Use of pipette while charging	✓	✓
Fully charged in 1 hour	✓	✓
Safe-Cone Filters	✓	✓
Autoclavable lower parts <sup>3</sup>	✓	✓
Optiload in multi-channels	✓	✓
Colour-coding on pipette	✓	✓
Warranty for 2 years	✓	✓

<sup>1</sup> 300 µl 1-channel models

<sup>2</sup> English, French, German, Chinese and Russian

<sup>3</sup> Excluding 1 200 µl multi-channel pipettes



## ■ Electronic Pipettes

Table of Contents

12 Picus® and Picus® NxT



## ■ Picus® and Picus® NxT Electronic Pipettes

The Most Sophisticated and Ergonomic Pipettes Ever!



Picus® NxT is Sartorius' leading and most sophisticated electronic pipette. The smallest and lightest electronic pipette on the market eases the user's workload and provides protection from Work Related Upper Limb Disorder (WRULD). Its new generation technology, electronic brake and piston control system guarantee accurate and precise pipetting results. By guiding pipetting steps, the unique plate tracker increases reliability in microwell plate work.

Picus® and Picus® NxT are available in single-channel models, covering a volume range of 0.2 – 10,000 µl and in multi-channel models from 0.2 µl to 1,200 µl.

### Superior Ergonomics

The uniquely lightweight and streamlined design of the Picus® pipette ensures an effortless pipetting experience. The pipette rests lightly in the user's hand due to the comfortable handle and finger hook, and minimal gripping force is needed.

The conveniently located soft-touch operating buttons, and unique electronic tip ejection, help minimize muscle strain, further enhancing the ergonomics of the pipette.

### Reliable Results

The electronic brake and piston control system guarantee accurate and precise pipetting results, independent of the user. Using the unique plate tracker increases reliability in microwell plate dispensing, by guiding the steps to pipette into the correct microplate wells.



Picus® and Picus® NxT are lightweight pipettes, with a comfortable handle and finger hook, requiring minimal gripping force.



Adjustment wheel for quick single-handed operation and speed control.

### Calibration Adjustment

Gives the user the option to adjust the calibration according to conditions and fluids that are to be pipetted.

### Fast Execution of Pipetting Tasks

The unique adjustment wheel of Picus® pipettes offers extremely fast volume setting and menu navigation. The user can perform pipetting tasks quickly and easily with the extensive range of pipetting modes, from diluting and titrating to serial dispensing.

The pipetting functions are quick to learn, using the intuitive user interface, available in a choice of language options: English, French, German, Russian and Chinese.

### Picus® NxT Enhancements

Picus® NxT has the same qualities as Picus®, and has added features for increased efficiency and safety, which make it suitable for strictly regulated laboratories.

### Custom Protocols in Picus® NxT

Protocols are saved to memory in Picus® NxT, which speed up routine pipetting sequences. Create 1–3 different protocols; multiphase workflows of up to 10 steps. Ensure repeatable results. Reduced number of presses during pipetting.

### Picus® NxT for Highly Regulated Laboratories

The following features are only available with Picus® NxT pipettes, which are especially intended to conform to the strictest laboratory regulations and requirements:

- Certificate of accredited 3-point calibration (per ISO 17025 and ISO 8655)
- Reminders alert you when regular maintenance and calibration is required
- Advanced password protection for settings and pipetting protocol memory
- The pipette can be locked, to prevent its use, e.g. in case of contamination
- Custom protocols speed up routine pipetting sequences and standardise regulated workflows
- Repeated blow-out function helps dispense every last droplet, ensuring complete sample recovery



GERMAN  
DESIGN  
AWARD  
WINNER  
2017



German  
Design Award  
SPECIAL  
MENTION 2014



reddot award 2016  
winner



fennia prize 12  
good design grows global  
HONORARY MENTION



Microwell plate tracker in use



Calibration Adjustment in use as indicated by ADJ1

**Features and Benefits**

**Ergonomic Design for Reduced Risk of Strain Injury**

- Extremely compact and light (only 100 g) design maximizes user comfort
- Conveniently located, soft-touch operating button and comfortable electronic tip ejection help minimize muscle strain and reduce the risk of WRULD
- Comfortable handle design and finger hook allow the pipette to rest effortlessly in hand

**Innovative Technology for Reliable Results**

- Fully electronic functionality provides outstanding accuracy and repeatability of results
- Electronic brake stops piston movement rapidly and precisely, ensuring high precision, especially in serial dispensing
- Optical sensor controls and monitors piston movement in real time, ensuring unbeatable accuracy and reliability
- **Picus® NxT only:** Repeated blow-out function helps dispense the very last droplets of liquid, ensuring complete recovery

**Intuitive User-Interface for Ease of Use**

- Plug & Play – learn to use in a minute
- Natural to use buttons
- Easy menu navigation and unique adjustment wheel make for fast setting of volumes and modes
- Hotkeys for quick access to your preset programs
- Enables ergonomic single-handed operation

**Comprehensive Range of Pipetting Modes for Speed of Use**

- The main modes combined with the advanced functions enable fast and handy execution of various pipetting tasks
- Multi-dispensing mode replaces the need for a stepper

**Microwell Plate Tracker for Improved Efficiency and Reliability**

- Unique built-in tracker for 96 and 384 well plates guides the user to pipette into the correct wells
- Improves work efficiency and reliability of results

**Optiload in Multi-channel Models for Perfect Tip Sealing**

- Allows tip loading with an equal constant force onto every channel
- Enables perfect tip sealing onto every individual tip cone

**Safe-Cone Filters to Prevent Contamination**

- Are available for all models > 10 µl

**Autoclavable Lower Parts for Easy Sterilisation**

- For reduced risk of contamination (excl. 1,200 µl models)

**Calibration Adjustment**

- Define and save 3 calibration settings in addition to the factory setting
- The adjustment can be made in 1, 2 or 3 points by the user

**Fast Charge that Lasts Several Hours**

- Battery is charged in 1 hour
- Continue pipetting while charging with micro USB cable
- Most convenient way is to store your pipette in a charging stand

**Pipetting Modes**

Pipetting Modes	Advanced Functions*						
	Tracker	Mixing	Counter	Excess Volume Adjustment	Auto-dispensing	Repeated Blow-out**	Fast Dispensing
Pipetting	✓	✓	✓			✓	
Reverse Pipetting	✓	✓	✓	✓			
Multi-dispensing	✓	✓		✓	✓		
Manual Pipetting	✓					✓	
Diluting	✓	✓				✓	
Sequential Dispensing	✓			✓			
Multi-aspiration	✓					✓	
Titration	✓						✓
Protocols **   ***	✓	✓		✓	✓	✓	✓

\* Advanced functions are used in conjunction with the pipetting mode.  
 \*\* Only available in Picus® NxT models  
 \*\*\* Availability of the advanced functions varies according to the pipetting mode selected for the protocol.





### Ordering Information

Picus® NxT	Picus®	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Mode <sup>P D</sup>	Systematic Error <sup>N</sup> Limit ± (%)	Systematic Error <sup>N</sup> (µl)	Random Error <sup>N</sup> Limit (%)	Random Error <sup>N</sup> (µl)
LH-745021	735021	1	0.2 – 10	0.01	10	P	1.0	0.100	0.4	0.040
					5	P	1.2	0.060	0.7	0.035
					1	P	3.0	0.030	2.0	0.020
					0.2	P	17.5	0.035	10	0.020
					1	D	6.0	0.060	7.0	0.070
LH-745041	735041	1	5 – 120	0.10	120	P	0.5	0.60	0.15	0.18
					60	P	0.7	0.42	0.2	0.12
					12	P	2.0	0.24	1.0	0.12
					5	P	5.5	0.275	2.5	0.125
					12	D	4.0	0.48	4.0	0.48
LH-745061	735061	1	10 – 300	0.20	300	P	0.5	1.50	0.15	0.45
					150	P	0.6	0.90	0.2	0.30
					30	P	1.5	0.45	0.8	0.24
					10	P	5.0	0.50	2.4	0.24
					30	D	3.0	0.90	3.0	0.90
LH-745081	735081	1	50 – 1,000	1.00	1,000	P	0.45	4.5	0.15	1.5
					500	P	0.6	3.0	0.2	1.0
					100	P	2.0	2.0	0.5	0.5
					50	P	4.0	2.0	1.0	0.5
					100	D	2.5	2.5	2.0	2.0
LH-745101	735101	1	100 – 5,000	5.00	5,000	P	0.5	25	0.15	7.5
					2,500	P	0.7	17.5	0.2	5
					500	P	1.6	8	0.4	2
					100	P	8.0	8	2.0	2
					500	D	2.4	12	2.4	12
LH-745111	735111	1	500 – 10,000	10.00	10,000	P	0.6	60	0.2	20
					5,000	P	0.9	45	0.3	15
					1,000	P	3.0	30	0.6	6
					500	P	7.0	35	1.2	6
					1,000	D	4.0	40	2.4	24
LH-745321	735321	8	0.2 – 10	0.01	10	P	1.2	0.120	0.5	0.050
LH-745421	735421	12	0.2 – 10	0.01	5	P	1.5	0.075	0.8	0.040
					1	P	4.0	0.040	3.0	0.030
					0.2	P	25.0	0.050	15.0	0.030
					1	D	12.0	0.120	15.0	0.150
LH-745341	735341	8	5 – 120	0.10	120	P	0.6	0.72	0.3	0.36
LH-745441	735441	12	5 – 120	0.10	60	P	0.8	0.48	0.4	0.24
					12	P	2.5	0.30	1.67	0.20
					5	P	6.0	0.30	4.0	0.20
					12	D	4.5	0.54	8.0	0.96
LH-745361	735361	8	10 – 300	0.20	300	P	0.6	1.80	0.2	0.60
LH-745461	735461	12	10 – 300	0.20	150	P	0.8	1.20	0.3	0.45
					30	P	2.33	0.70	1.0	0.30
					10	P	8.0	0.80	3.0	0.30
					30	D	3.33	1.00	6.0	1.80
LH-745391	735391	8	50 – 1,200	1.00	1,200	P	0.6	7.2	0.2	2.4
LH-745491	735491	12	50 – 1,200	1.00	600	P	1.0	6.0	0.3	1.8
					120	P	2.5	3.0	1.0	1.2
					50	P	8.0	4.0	2.4	1.2
					120	D	3.33	4.0	3.33	4.0

<sup>N</sup> Note. The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Pipettes are tested at factory default speed settings. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.

<sup>P</sup> P = Pipetting Mode

<sup>D</sup> D = Multi-dispensing mode. The listed systematic and random error values are of 10 measurements at 10% of the nominal volume.

All pipettes are supplied with a universal charger (EU, UK, US | JPN, KOR, AUS and CHN plugs)

### Tip Selection Guide

Optifit Tip <sup>LRT</sup>		SafetySpace Tip <sup>LRT</sup>		Safe-Cone Filters	
Colour-Code	Volume	Colour-Code	Volume	Standard	Plus
●	0.1 – 10 µl	●	0.1 – 10 µl	-	-
●	0.5 – 200 µl	●	2 – 120 µl	721008	721018
●	5 – 350 µl	●	5 – 200 µl		
●	5 – 350 µl	●	5 – 300 µl	721007	721017
●	10 – 1,000 µl	●	50 – 1,000 µl	721006	721016
●	100 – 5,000 µl	-	-	721005	721015
●	500 – 10,000 µl	-	-	721005	721015
●	0.1 – 10 µl	●	0.1 – 10 µl	-	-
●	0.5 – 200 µl	●	2 – 120 µl	721008	721018
●	5 – 350 µl	●	5 – 200 µl		
●	5 – 350 µl	●	5 – 300 µl	721007	721017
●	50 – 1,200 µl	●	50 – 1,200 µl	721006	721016

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200 µl.

The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.



## ■ Mechanical Pipettes

### Table of Contents

20	Tacta®
26	mLINE®
32	Proline® Plus
39	Proline®



## ■ Tacta® Mechanical Pipettes

### Perfectly Balanced



Tacta's Optilock feature helps to prevent accidental volume changes during pipetting.



Easy adjustment ensures accurate results with a variety of liquids. The handy adjustment key is included in the package.



Unique to Tacta®, is its Safe-Cone Filter ejector, which enables the removal of used filters without tweezers or human contact with contaminated filters.

Have you ever considered the overall user experience in pipetting? We have.

Sartorius proudly presents Tacta®, the new premium mechanical pipette with superb comfort and reliability. Tacta® makes pipetting effortless and safe, while producing accurate and reliable results time after time.

At Sartorius, we listened to our customers and combined their views with our extensive experience, and state-of-the-art R&D, to create the exceptionally balanced design of Tacta®. Tacta® is designed to feel great in your hand, and it is easy and comfortable to use. All materials used for Tacta® have been carefully selected, and each component is designed to meet the highest standards.

#### Superior Ergonomics

Tacta® rests lightly in your hand thanks to its ergonomically designed handle and finger hook. Tacta® is effortless to use and exceptionally comfortable to hold. Tacta® eases your workload and protects you from strain, even when you pipette for extended periods of your working day. The unique handle and finger hook design lets the pipette rest lightly in your hand, with no need to grip the handle tightly. Tacta® is effortless to use and exceptionally comfortable to hold. Tacta® eases your workload and protects you from strain, even when you pipette for extended periods of your working day. The unique handle and finger hook design lets the pipette rest lightly in your hand, with no need to grip the handle tightly.

#### Low Pipetting, Tip Loading and Ejection Forces

The forces needed for a pipetting cycle, from tip attachment to pipetting and finally tip ejection, are exceptionally low with Tacta®, protecting you from Work Related Upper Limb Disorder (WRULD). The Optiload feature, with spring-loaded tip cones in both the single and multichannel models, secures tip loading with perfect sealing and minimal force. Consequently, Optiload also ensures light tip ejection to protect your hand. The light tip ejection is further enhanced by Sartorius Optiject, the soft, levered tip ejection feature that lets the tip detach in a smooth, controlled way with little force.

#### Large, Clear Display

The large, easy-to-read display helps you to see all four digits of the set volume from a distance without straining your eyes. The volume is easy to read even when the pipette is angled – eliminating the need to turn your head into an uncomfortable position.

#### Adjustment

Tacta® is very easy to adjust, for various types of liquids, using a simple adjustment key. The adjustment scale shows the degree of adjustment. By noting this value for a specific liquid, you can return to that setting any time. Easy calibration adjustment ensures accurate results with a variety of liquids.

#### Volume Adjustment

Use the Sartorius Optilock feature to prevent accidental volume changes during pipetting. Either hold down the volume lock button with one hand and adjust the volume with the other, then release to lock, or with just one hand, slide the volume lock up, adjust the volume and slide down to lock again. The choice is in your hands.

#### Safe-Cone Filters

The exchangeable Safe-Cone Filters, used in pipette tip cones, act as barriers to reduce the risk of contaminating the internal components of the pipette. The unique Safe-Cone Filter ejector enables the removal of used filters without human contact with contaminated filters. Safe-Cone Filters are available for all Tacta® models greater than 10 µl and offer a cost-effective method to reduce contamination. Filters should be changed regularly, and always after over-aspiration.

#### Easy Cleaning

Tacta® is the quickest and easiest pipette, on the market, to clean, with only three parts to be disassembled for cleaning and no tools are needed for disassembly. Tacta® can also be steam-sterilized or autoclaved as-is, without disassembly. It has also high UV and chemical resistance.

### □ Features and Benefits

#### Feel the Comfort

- Comfortable to hold due to the ergonomically designed handle
- Low pipetting and tip ejection forces that reduce the risk of Work Related Upper Limb Disorder (WRULD)
- Controlled and smooth tip ejection with the new Sartorius Optiject technology
- The unique Sartorius Optilock system provides flexibility for volume adjustment and locking

#### Achieve Reliable Results

- Reliable results, even over lengthy pipetting periods
- Calibration adjustment to provide accurate results for various liquid types
- 4-digit display for accurate and easy volume setting

#### Safe from Contamination

- Safe-Cone Filters provide cost-effective contamination prevention
- Easy to clean, with only three parts to disassemble
- Fully autoclavable



reddot award 2016  
winner

### Ordering Information

Tacta® Order Code	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Systematic Error <sup>N</sup> Limit ± (%)	Systematic Error <sup>N</sup> (µl)	Random Error <sup>N</sup> Limit (%)	Random Error <sup>N</sup> (µl)
LH-729010	1	0.1 – 3	0.002	3	1.4	0.042	0.8	0.024
				1.5	2.6	0.039	1.6	0.024
				0.3	10.0	0.030	6.0	0.018
LH-729020	1	0.5 – 10	0.01	10	1.0	0.100	0.6	0.060
				5	1.5	0.075	1.0	0.050
				1	3.0	0.030	2.0	0.020
LH-729030	1	2 – 20	0.02	20	1.0	0.200	0.5	0.100
				10	1.4	0.140	0.9	0.090
				2	4.0	0.080	3.0	0.060
LH-729050	1	10 – 100	0.10	100	0.8	0.80	0.2	0.20
				50	1.0	0.50	0.4	0.20
				10	3.0	0.30	1.0	0.10
LH-729060	1	20 – 200	0.20	200	0.6	1.20	0.2	0.40
				100	0.8	0.80	0.3	0.30
				20	2.3	0.46	0.9	0.18
LH-729070	1	100 – 1,000	1.00	1,000	0.7	7.0	0.2	2.0
				500	0.8	4.0	0.2	1.0
				100	2.5	2.5	0.6	0.6
LH-729080	1	500 – 5,000	5.0	5,000	0.6	30	0.2	10
				2,500	0.7	17.5	0.3	7.5
				500	2.4	12	0.6	3
LH-729090	1	1,000 – 10,000	10.0	10,000	0.6	60	0.2	20
				5,000	1.2	60	0.3	15
				1,000	3.0	30	0.6	6
LH-729120	8	0.5 – 10	0.01	10	1.5	0.150	1.0	0.100
LH-729220	12			5	2.5	0.125	2.0	0.100
				1	5.5	0.055	4.0	0.040
LH-729130	8	5 – 100	0.10	100	0.9	0.90	0.4	0.40
LH-729230	12			50	1.2	0.60	0.7	0.35
				10	4.0	0.40	2.0	0.20
LH-729140	8	30 – 300	0.20	300	0.6	1.80	0.25	0.75
LH-729240	12			150	1.0	1.50	0.5	0.75
				30	2.5	0.75	1.0	0.30

<sup>N</sup> Note: The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.

### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Filters Standard	Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	-	-	●	0.1 – 10 µl	●	0.1 – 10 µl
●	-	-	●	0.1 – 10 µl	●	0.1 – 10 µl
●	721008	721018	●	0.5 – 200 µl	●	0.5 – 20 µl
●	721008	721018	●	0.5 – 200 µl	●	2 – 120 µl
			●	5 – 350 µl		
●	721007	721017	●	0.5 – 200 µl	●	5 – 200 µl
			●	5 – 350 µl	●	5 – 300 µl
●	721006	721016	●	10 – 1,000 µl	●	50 – 1,000 µl
●	721005	721015	●	100 – 5,000 µl	-	-
●	721005	721015	●	500 – 10,000 µl	-	-
●	-	-	●	0.1 – 10 µl	●	0.1 – 10 µl
●	721008	721018	●	0.5 – 200 µl	●	5 – 200 µl
			●	5 – 350 µl		
●	721007	721017	●	5 – 350 µl	●	5 – 300 µl

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1 200 µl.

The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.

### Tacta® Multipacks Smart and Complete Set of Pipettes and Accessories

Choose from a range of eight Multipacks that include a selection of Tacta® Mechanical Pipettes, a Linear Stand, matching Optifit Tips, and Pipette Holders.

### Ordering Information

Multipack Order Code	Tacta® Pipettes	Optifit Tips	Accessories
<b>Tacta® Pipette 3 – pack 10</b> LH – 729670	1-channel – 0.5 – 10 µl – 10 – 100 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.2 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
<b>Tacta® Pipette 3 – pack 20</b> LH – 729671	1-channel – 2 – 20 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
<b>Tacta® Pipette 4 – pack 20</b> LH – 729672	1-channel – 0.5 – 10 µl – 2 – 20 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
<b>Tacta® Pipette 4 – pack 100</b> LH – 729673	1-channel – 0.5 – 10 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
<b>Tacta® Pipette 5 – pack 10</b> LH – 729674	1-channel – 0.5 – 10 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl – 500 – 5,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl Tip Rack (50 tips) – 100 – 5,000 µl	Linear Stand
<b>Tacta® Pipette 5 – pack 20</b> LH – 729675	1-channel – 2 – 20 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl – 500 – 5,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl Tip Rack (50 tips) – 100 – 5,000 µl	Linear Stand
<b>Tacta® Pipette 3+1 – pack</b> LH – 729676	1-channel – 0.5 – 10 µl – 20 – 200 µl – 100 – 1,000 µl 8-channel – 30 – 300 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 5 – 350 µl – 10 – 1,000 µl	Linear Stand
<b>Tacta® Pipette 3 – pack max</b> LH – 729677	1-channel – 100 – 1,000 µl – 500 – 5,000 µl – 1,000 – 10,000 µl	Tip Racks – 10 – 1,000 µl (96 tips) – 100 – 5,000 µl (50 tips) – 500 – 10,000 µl (35 tips)	Linear Stand



## ■ mLINE® Mechanical Pipettes

### Effortless Accuracy



mLINE® 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' 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 Work Related Upper Limb Disorder (WRULD).

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 WRULD 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
- Big 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
- 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)	Increment (µl)	Test Volume (µl)	Systematic Error <sup>N</sup> Limit ± (%) (µl)	Random Error <sup>N</sup> Limit (%) (µl)			
725010	1	0.1 – 3	0.002	3	1.4	0.042	0.8	0.024	
				1.5	2.6	0.039	1.6	0.024	
				0.3	10.0	0.030	6.0	0.018	
725020	1	0.5 – 10	0.01	10	1.0	0.100	0.6	0.060	
				5	1.5	0.075	1.0	0.050	
				1	3.0	0.030	2.0	0.020	
725030	1	2 – 20	0.02	20	1.0	0.200	0.5	0.100	
				10	1.4	0.140	0.9	0.090	
				2	4.0	0.080	3.0	0.060	
725050	1	10 – 100	0.10	100	0.8	0.80	0.2	0.20	
				50	1.0	0.50	0.4	0.20	
				10	3.0	0.30	1.0	0.10	
725060	1	20 – 200	0.20	200	0.6	1.20	0.2	0.40	
				100	0.8	0.80	0.3	0.30	
				20	2.3	0.46	0.9	0.18	
725070	1	100 – 1,000	1.00	1,000	0.7	7.0	0.2	2.0	
				500	0.8	4.0	0.2	1.0	
				100	2.5	2.5	0.6	0.6	
725080	1	500 – 5,000	10.0	5,000	0.6	30	0.2	10	
				2,500	0.7	17.5	0.3	7.5	
				500	2.4	12	0.6	3	
725090	1	1,000 – 10,000	20.0	10,000	0.6	60	0.2	20	
				5,000	1.2	60	0.3	15	
				1,000	3.0	30	0.6	6	
725120	8	0.5 – 10	0.01	10	1.5	0.150	1.0	0.100	
725220	12			5	2.5	0.125	2.0	0.100	
				1	5.5	0.055	4.0	0.040	
725130	8	5 – 100	0.10	100	0.9	0.90	0.4	0.40	
725230	12			50	1.2	0.60	0.7	0.35	
				10	4.0	0.40	2.0	0.20	
725140	8	30 – 300	0.20	300	0.6	1.80	0.25	0.75	
725240	12			150	1.0	1.50	0.5	0.75	
				30	2.5	0.75	1.0	0.30	

### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Filters Standard Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	- -	●	0.1 – 10 µl	●	0.1 – 10 µl
●	- -	●	0.1 – 10 µl	●	0.1 – 10 µl
●	721008 721018	●	0.5 – 200 µl	●	0.5 – 20 µl
●	721008 721018	●	0.5 – 200 µl	●	2 – 120 µl
		●	5 – 350 µl		
●	721007 721017	●	0.5 – 200 µl	●	5 – 200 µl
		●	5 – 350 µl	●	5 – 300 µl
●	721006 721016	●	10 – 1,000 µl	●	50 – 1,000 µl
●	721005 721015	●	100 – 5,000 µl	-	-
●	721005 721015	●	500 – 10,000 µl	-	-
●	- -	●	0.1 – 10 µl	●	0.1 – 10 µl
●	721008 721018	●	0.5 – 200 µl	●	5 – 200 µl
		●	5 – 350 µl		
●	721007 721017	●	5 – 350 µl	●	5 – 300 µl

<sup>N</sup> Note: The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200 µl. The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.

### □ mLINE® Multipacks - Complete Sets of Pipettes and Accessories

mLINE® Multipacks offer are sets of mechanical pipettes in an affordable package, including a Linear Stand and racks of matching tips.

### □ Ordering Information

Multipack Order Code	mLINE® Pipettes	Sartorius Optifit Tips	Accessories
mLINE® Pipette 3-pack 10 LH-725661	1-channel – 0.5 – 10 µl – 10 – 100 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
mLINE® Pipette 3-pack 20 LH-725662	1-channel – 2 – 20 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
mLINE® Pipette 4-pack LH-725663	1-channel – 0.5 – 10 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
mLINE® Pipette 5-pack LH-725664	1-channel – 2 – 20 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl – 500 – 5,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl Tip Rack (50 tips) – 5,000 µl	Linear Stand
mLINE® Pipette 3+1-pack LH-725665	1-channel – 0.5 – 10 µl – 20 – 200 µl – 100 – 1,000 µl 8-channel – 30 – 300 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 5 – 350 µl – 10 – 1,000 µl	Linear Stand





## ■ Proline® Plus Mechanical Pipettes

### Dependable Durability



Fixed volume Proline® Plus pipette



Proline® Plus has a comfortable handle and an ergonomic finger support for effortless pipetting.



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

The Proline® Plus mechanical pipette family is designed to offer comfort and quality for your everyday manual pipetting. It combines durable construction with ease and lightness of use, and is therefore the perfect choice for liquid-handling professionals and students alike. In addition, it has the widest pipette range, including fixed volume pipettes for when volumes need to be ready-set to avoid errors.

#### Ergonomic Design

Proline® Plus has low pipetting forces, a comfortable handle and an ergonomic finger support for effortless pipetting. Good fit in hand minimizes the grip force needed to hold the pipette, thereby reducing the risk of strain injury.

#### Loading Tips on Multi-channel Pipettes with Minimum Force

Loading and ejecting tips with multi-channel pipettes requires relatively high forces. Proline® Plus multi-channel pipettes have spring loaded tip cones – the Optiload mechanism. Optiload allows tips to be loaded and ejected with minimum force, which reduces the risk of hand injuries. Moreover, it secures even tip sealing onto every individual tip cone.

#### Protect the Pipette with Safe-Cone Filters

The replaceable Safe-Cone Filter located inside the tip-cone prevents aerosols and fluids from penetrating the pipette, also in case of over-aspiration. The use of Safe-Cone Filters lengthens the maintenance interval of the pipette. Safe-Cone Filters are available for all Proline® Plus models greater than 10 µl. They must be replaced regularly, and always in case of over-aspiration.

#### Easy Maintenance and Adjustment

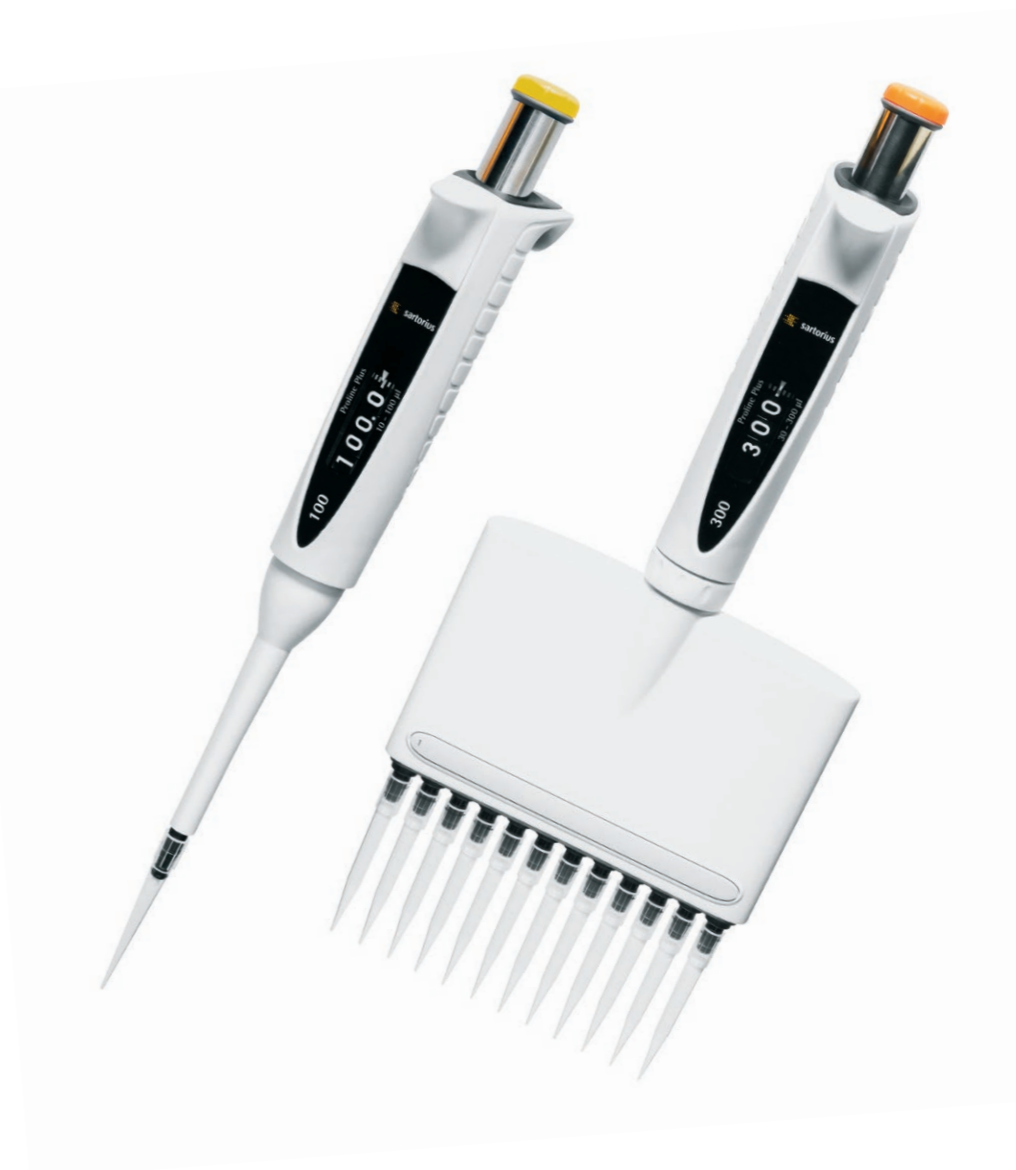
No opening tools are needed for cleaning and maintaining Proline® Plus pipettes, and only three parts need to be cleaned. These pipettes are also easy to adjust using the adjustment tool that is provided with the pipette.



Proline® Plus pipettes have only three parts that need cleaning and maintenance.

### □ Features and Benefits

- Low pipetting forces that prevent WRULD and improve results in long pipetting series
- Ergonomic finger support minimizes the grip force needed to hold the pipette
- Optiload mechanism in multi-channel models for easy and light tip loading with perfect tip sealing
- Wide variety of adjustable single and multi-channel models as well as fixed single-channel models
- Volume range from 3 µl (5 µl for fixed) to 10 ml
- Easy volume setting with click stop mechanism
- Big volume display
- Colour-coding of different volumes to ease the selection of matching pipette tips
- Safe-Cone Filters available for models > 10 µl
- Fully autoclavable without disassembly
- Simple to clean and maintain with only three parts to disassemble
- Materials have high chemical and UV-resistance to secure long life-time of the pipette



### Ordering Information

Proline® Plus Order Code	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Systematic Error <sup>N</sup> Limit ±		Random Error <sup>N</sup> Limit	
					(%)	(µl)	(%)	(µl)
728010	1	0.1–3	0.002	3	1.4	0.042	0.8	0.024
				1.5	2.6	0.039	1.6	0.024
				0.3	10.0	0.030	6.0	0.018
728020	1	0.5–10	0.01	10	1.0	0.100	0.6	0.060
				5	1.5	0.075	1.0	0.050
				1	3.0	0.030	2.0	0.020
728030	1	2–20	0.02	20	1.0	0.200	0.5	0.100
				10	1.4	0.140	0.9	0.090
				2	4.0	0.080	3.0	0.060
728040	1	5–50	0.10	50	1.0	0.500	0.3	0.150
				25	1.4	0.350	0.5	0.125
				5	3.0	0.150	1.5	0.075
728050	1	10–100	0.10	100	0.8	0.80	0.2	0.20
				50	1.0	0.50	0.4	0.20
				10	3.0	0.30	1.0	0.10
728060	1	20–200	0.20	200	0.6	1.20	0.2	0.40
				100	0.8	0.80	0.3	0.30
				20	2.3	0.46	0.9	0.18
728070	1	100–1,000	1.00	1,000	0.7	7.0	0.2	2.0
				500	0.8	4.0	0.2	1.0
				100	2.5	2.5	0.6	0.6
728080	1	500–5,000	10.0	5,000	0.6	30	0.2	10
				2,500	0.7	17.5	0.3	7.5
				500	2.4	12	0.6	3
728090	1	1,000–10,000	20.0	10,000	0.6	60	0.2	20
				5,000	1.2	60	0.3	15
				1,000	3.0	30	0.6	6
728120	8	0.5–10	0.01	10	1.5	0.150	1.0	0.100
728220	12			5	2.5	0.125	2.0	0.100
1	5.5			0.055	4.0	0.040		
728130	8	10–100	0.10	100	0.9	0.90	0.4	0.40
728230	12			50	1.2	0.60	0.7	0.35
10	4.0			0.40	2.0	0.20		
728140	8	30–300	0.20	300	0.6	1.80	0.25	0.75
728240	12			150	1.0	1.50	0.5	0.75
30	2.5			0.75	1.0	0.30		

<sup>N</sup> Note: The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.

### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Standard	Filters Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	721008	721018	●	0.5–200 µl	●	0.5–200 µl
●	721008	721018	●	0.5–200 µl	●	2–120 µl
			●	5–350 µl		
●	721008	721018	●	0.5–200 µl	●	2–120 µl
			●	5–350 µl		
●	721007	721017	●	0.5–200 µl	●	5–200 µl
			●	5–350 µl	●	5–300 µl
●	721006	721016	●	10–1,000 µl	●	50–1,000 µl
●	721005	721015	●	100–5,000 µl	-	-
●	721005	721015	●	500–10,000 µl	-	-
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	721008	721018	●	0.5–200 µl	●	5–200 µl
			●	5–350 µl		
●	721007	721017	●	5–350 µl	●	5–300 µl

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200 µl. The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.

### Ordering Information

#### Proline® Plus FIXED Volume, Single-Channel

Order Code	Channels	Volume ( $\mu\text{l}$ )	Test Volume ( $\mu\text{l}$ )	Systematic Error <sup>N</sup> Limit $\pm$ (%)		Random Error <sup>N</sup> Limit (%)		Pipette Colour-Code	Safe-Cone Standard	Filters Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
				(%)	( $\mu\text{l}$ )	(%)	( $\mu\text{l}$ )							
728515	1	5	5	1.3	0.065	1.2	0.060	●	-	-	●	0.1 – 10 $\mu\text{l}$	●	0.1 – 10 $\mu\text{l}$
728520	1	10	10	0.8	0.080	0.8	0.080	●	-	-	●	0.1 – 10 $\mu\text{l}$	●	0.1 – 10 $\mu\text{l}$
728530	1	20	20	0.6	0.120	0.5	0.100	●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	0.5 – 20 $\mu\text{l}$
728535	1	25	25	0.5	0.125	0.3	0.075	●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	2 – 120 $\mu\text{l}$
728545	1	50	50	0.5	0.250	0.3	0.150	●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	2 – 120 $\mu\text{l}$
728550	1	100	100	0.5	0.50	0.3	0.30	●	721008	721018	● ●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	5 – 200 $\mu\text{l}$
728560	1	200	200	0.4	0.80	0.2	0.40	●	721007	721017	● ●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	● ●	5 – 200 $\mu\text{l}$ 5 – 300 $\mu\text{l}$
728565	1	250	250	0.4	1.00	0.2	0.50	●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
728567	1	500	500	0.3	1.50	0.2	1.00	●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
728570	1	1,000	1,000	0.3	3.0	0.2	2.0	●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
728575	1	2,000	2,000	0.3	6.0	0.15	3.0	●	721005	721015	●	100 – 5,000 $\mu\text{l}$		
728580	1	5,000	5,000	0.3	15	0.15	7.5	●	721005	721015	●	100 – 5,000 $\mu\text{l}$		
728590	1	10,000	10,000	0.6	60	0.2	20	●	721005	721015	●	500 – 10,000 $\mu\text{l}$		

<sup>N</sup> Note: The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.

### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Standard	Filters Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	-	-	●	0.1 – 10 $\mu\text{l}$	●	0.1 – 10 $\mu\text{l}$
●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	0.5 – 20 $\mu\text{l}$
●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	2 – 120 $\mu\text{l}$
●	721008	721018	●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	2 – 120 $\mu\text{l}$
●	721008	721018	● ●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	●	5 – 200 $\mu\text{l}$
●	721007	721017	● ●	0.5 – 200 $\mu\text{l}$ 5 – 350 $\mu\text{l}$	● ●	5 – 200 $\mu\text{l}$ 5 – 300 $\mu\text{l}$
●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
●	721006	721016	●	10 – 1,000 $\mu\text{l}$	●	50 – 1,000 $\mu\text{l}$
●	721005	721015	●	100 – 5,000 $\mu\text{l}$		
●	721005	721015	●	100 – 5,000 $\mu\text{l}$		
●	721005	721015	●	500 – 10,000 $\mu\text{l}$		

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200  $\mu\text{l}$ . The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips



Proline® Plus Fixed  
Volume Pipettes.



### □ Proline® Plus Multipacks – Complete Sets of Pipettes and Accessories

Proline® Plus Multipacks offer are sets of mechanical pipettes in an affordable package, including a Linear Stand and racks of matching tips.

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

### □ Ordering Information

Multipack Order Code	Proline® Plus Pipettes	Optifit Tips	Accessories
Proline® Plus Pipette 3-pack 10 LH-728670	1-channel – 0.5 – 10 µl – 10 – 100 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
Proline® Plus Pipette 3-pack 20 LH-728671	1-channel – 2 – 20 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
Proline® Plus Pipette 4-pack 20 LH-728672	1-channel – 0.5 – 10 µl – 2 – 20 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
Proline® Plus Pipette 4-pack 100 LH-728673	1-channel – 0.5 – 10 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl	Linear Stand
Proline® Plus Pipette 5-pack 10 LH-728674	1-channel – 0.5 – 10 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl – 500 – 5,000 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 10 – 1,000 µl Tip Rack (50 tips) – 100 – 5,000 µl	Linear Stand
Proline® Plus Pipette 5-pack 20 LH-728675	1-channel – 2 – 20 µl – 10 – 100 µl – 20 – 200 µl – 100 – 1,000 µl – 500 – 5,000 µl	Tip Racks (96 tips) – 0.5 – 200 µl – 10 – 1,000 µl Tip Rack (50 tips) – 100 – 5,000 µl	Linear Stand
Proline® Plus Pipette 3+1-pack LH-728676	1-channel – 0.5 – 10 µl – 20 – 200 µl – 100 – 1,000 µl 8-channel – 30 – 300 µl	Tip Racks (96 tips) – 0.1 – 10 µl – 0.5 – 200 µl – 5 – 350 µl – 10 – 1,000 µl	Linear Stand
Proline® Plus Pipette 3-pack max LH-728677	1-channel – 100 – 1,000 µl – 500 – 5,000 µl – 1,000 – 10,000 µl	Tip Racks – 10 – 1,000 µl (96 tips) – 100 – 5,000 µl (50 tips) – 500 – 10,000 µl (35 tips)	Linear Stand

## ■ Proline® Mechanical Pipettes

### Affordable Reliability

The fact that Proline®, our first mechanical pipette, is still in use in many laboratories by over 200 000 users, testifies to its timeless, practical design and reliability. Being the most affordable pipette in Sartorius' range of mechanical pipettes, it is ideal for universities and colleges, or any laboratory seeking a cost-efficient liquid handling tool.

Due to its relatively light weight, high accuracy and precision, it is used by many professionals.

Proline® can be used with many universal tip brands and the range includes also fixed volume models, which makes it a flexible tool for various laboratories.

### □ Features and Benefits

- Wide range of pipettes, both adjustable and fixed volume
- Volume range from 2,5 µl (5 µl for fixed) to 5 ml
- Easy volume setting with click stop mechanism

- Safe-Cone Filters available for models > 10 µl
- User adjustment e.g. for different liquids



### Ordering Information

Proline® Order Code	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Systematic Error <sup>N</sup> Limit ± (%)	Systematic Error <sup>N</sup> (µl)	Random Error <sup>N</sup> Limit (%)	Random Error <sup>N</sup> (µl)
720010	1	0.1–2.5	0.05	2.5 1.25 0.25	2.5 3.0 12.0	0.063 0.038 0.036	2.0 3.0 6.0	0.050 0.038 0.018
720015	1	0.5–10	0.10	10 5 1	1.0 1.5 3.0	0.100 0.075 0.030	0.8 1.5 2.0	0.080 0.075 0.020
720080	1	2–20	0.50	20 10 2	1.0 1.4 4.0	0.200 0.140 0.080	0.5 0.9 3.0	0.100 0.090 0.060
720025	1	5–50	0.50	50 25 5	1.0 1.4 3.0	0.500 0.350 0.150	0.3 0.6 2.0	0.150 0.150 0.100
720050	1	10–100	1.00	100 50 10	0.8 1.0 3.0	0.80 0.50 0.30	0.2 0.4 1.0	0.20 0.20 0.10
720070	1	20–200	1.00	200 100 20	0.6 0.8 2.5	1.20 0.80 0.50	0.2 0.3 0.9	0.40 0.30 0.18
720060	1	100–1,000	5.00	1,000 500 100	0.7 0.8 2.5	7.0 4.0 2.5	0.2 0.25 0.7	2.0 1.25 0.7
720110	1	1,000–5,000	50.0	5,000 2,500 1,000	0.6 0.7 1.2	30 17.5 12	0.2 0.3 0.3	10 7.5 3
720210	8	0.5–10	0.10	10	1.5	0.150	1.5	0.150
720310	12			5	2.5	0.125	2.5	0.125
				1	5.5	0.055	4.0	0.040
720220	8	5–50	0.50	50	1.0	0.500	0.5	0.250
720320	12			25	1.5	0.375	1.0	0.250
				5	3.0	0.150	2.0	0.100
720240	8	50–300	5.00	300	0.7	2.10	0.25	0.75
720340	12			150	1.0	1.50	0.5	0.75
				50	1.5	0.75	0.8	0.40

<sup>N</sup> Note: The listed systematic and random error values can be achieved only under strictly controlled conditions during type tests per ISO 8655. Due to the continuous product development by Sartorius, the systematic and random error values are subject to change without prior notice.



### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Filters Standard	Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	721008	721018	●	0.5–200 µl	●	0.5–20 µl
●	721008	721018	● ●	0.5–200 µl 5–350 µl	●	2–120 µl
●	721007	721017	● ●	0.5–200 µl 5–350 µl	●	2–120 µl
●	721007	721017	● ●	0.5–200 µl 5–350 µl	● ●	5–200 µl 5–300 µl
●	721006	721016	●	10–1,000 µl	●	50–1,000 µl
●	721005	721015	●	100–5,000 µl	-	-
●	-	-	●	0.1–10 µl	●	0.1–10 µl
●	-	-	●	0.1–10 µl Extended	●	0.1–10 µl Extended <sup>FT</sup>
●	721014	-	● ●	0.5–200 µl 5–350 µl	●	2–120 µl
●	721014	-	●	5–350 µl	●	5–300 µl

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200 µl.

The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.



### Ordering Information

#### Proline® FIXED Volume, Single-Channel

Order Code	Channels	Volume Range (µl)	Test Volume (µl)	Systematic Error <sup>N</sup> Limit ±		Random Error <sup>N</sup> Limit	
				(%)	(µl)	(%)	(µl)
722001	1	5	5	1.3	0.065	1.2	0.060
722004	1	10	10	0.8	0.080	0.8	0.080
722010	1	20	20	0.6	0.120	0.5	0.100
722015	1	25	25	0.5	0.125	0.3	0.075
722020	1	50	50	0.5	0.250	0.3	0.150
722025	1	100	100	0.5	0.50	0.3	0.30
722030	1	200	200	0.4	0.80	0.2	0.40
722035	1	250	250	0.4	1.00	0.2	0.50
722040	1	500	500	0.3	1.50	0.2	1.00
722045	1	1,000	1,000	0.3	3.0	0.2	2.0
722050	1	2,000	2,000	0.3	6.0	0.15	3.0
722055	1	5,000	5,000	0.3	15	0.15	7.5

<sup>N</sup> Note: The listed systematic and random error values have been 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 are subject to change without prior notice.

### Tip Selection Guide

Pipette Colour-Code	Safe-Cone Standard	Filters Plus	Optifit Tip <sup>LRT</sup> Colour-Code	Volume	SafetySpace Tip <sup>LRT</sup> Colour-Code	Volume
●	-	-	●	0.1 – 10 µl	●	0.1 – 10 µl
●	-	-	●	0.1 – 10 µl	●	0.1 – 10 µl
●	721008	721018	● ●	0.5 – 200 µl 5 – 350 µl	● ●	0.5 – 20 µl 2 – 120 µl
●	721008	721018	● ●	0.5 – 200 µl 5 – 350 µl	●	2 – 120 µl
●	721008	721018	● ●	0.5 – 200 µl 5 – 350 µl	●	2 – 120 µl
●	721007	721017	● ●	0.5 – 200 µl 5 – 350 µl	● ● ●	2 – 120 µl 5 – 200 µl 5 – 300 µl
●	721007	721017	● ●	0.5 – 200 µl 5 – 350 µl	● ●	5 – 200 µl 5 – 300 µl
●	721006	721016	●	10 – 1,000 µl	●	50 – 1,000 µl
●	721006	721016	●	10 – 1,000 µl	●	50 – 1,000 µl
●	721006	721016	●	10 – 1,000 µl	●	50 – 1,000 µl
●	721005	721015	●	100 – 5,000 µl		
●	721005	721015	●	100 – 5,000 µl		

<sup>LRT</sup> Note: Low Retention Tips are available in volumes up to 1,200 µl. The best compatibility is achieved when combining Sartorius pipettes and Sartorius tips. The systematic error and random error results, in tests, have been achieved using Sartorius Optifit tips.



## ■ Stands and Accessories

### Table of Contents

46	Pipette Stands
47	Elbow Pad
48	Safe-Cone Filters
50	Reagent Vessel
50	Adjustment Tool



## ■ Pipette Stands



Charging Carousel Stand

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.



Charging Stand

### □ 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
LH-725630	Carousel Stand for 6 mechanical pipettes
LH-727650	Adapter for Mechanical Carousel Stand
LH-727640	Holder for one pipette

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



Linear Stand (non-charging)

The Linear Stand is designed for all Sartorius mechanical and electronic pipettes. 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.



Carousel Stand (non-charging)



Pipette Holder for one pipette



Adapter for Mechanical Carousel Stand

## ■ Elbow Pad



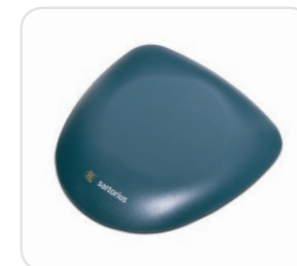
The Elbow Pad provides comfort while pipetting. The visco-elastic material of the pad relieves contact stress, pain and discomfort under the elbow.

### 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



### Why Should You Use Safe-Cone Filters?

These unique and replaceable polyethylene (PE) filters prevent any fluids and liquid vapours from reaching the internal components of the pipette.

- Reduce the risk of contaminating the internal components of our pipettes
- Prolong the pipette's lifetime
- Reduce maintenance intervals
- Are cost-effective compared to filter tips



Built-in filter ejector in Tacta®

### 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.

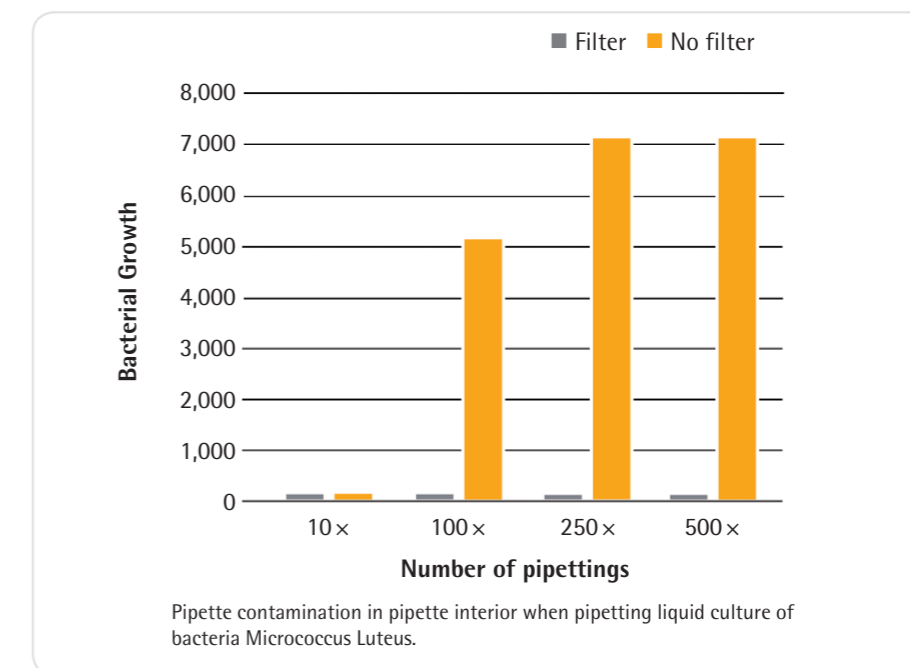
### How to Change?

To ensure that the user is protected from contamination, tweezers should be used when removing used filters from the pipette tip cone. The Tacta® and the mLINE® feature a built-in filter ejectors, so tweezers are unnecessary. In addition, the tip cone should be cleaned with ethanol (70%) prior to the insertion of a new filter.



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

## Contamination in Pipette Interior



## Ordering Information

### Safe-Cone Filters

Order Code	Item	Qty/Unit
721008	Standard Ø 2.51 mm PE	50
721007	Standard Ø 3.15 mm PE	50
721006	Standard Ø 5.33 mm PE	50
721005	Standard Ø 6.73 mm PE	50
721014	Standard Ø 1.83 mm PE	50
721018	Plus Ø 2.51 mm PE	50
721017	Plus Ø 3.15 mm PE	50
721016	Plus Ø 5.33 mm PE	50
721015	Plus Ø 6.73 mm PE	50
721009	Tweezers for Safe-Cone Filters	1

PE=polyethylene

See the pipette ordering information charts for corresponding filters and pipettes.

## ■ Reagent Vessel



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



### □ Ordering Information

#### Reagent Vessel

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

## ■ Adjustment Tool



Adjustment tool is used for adjusting mLINE® and Proline® Plus pipettes.

The Adjustment Tool is used to adjust the pipette in situations where the factory calibration is not applicable.



### □ Ordering Information

#### Adjustment Tool and Colour-coding Caps

Order Code	Item	Qty
726203	Adjustment Tool for mLINE®   Proline® Plus	1
LH-727080	Adjustment Tool for Tacta®	1
721130	Adjustment Tool for Proline®	1



The Adjustment Tool for adjusting the Tacta® pipette.





## ■ Pipette Tips

### Table of Contents

54	Pipette Tips
56	Optifit Tips
57	SafetySpace Filter Tips
58	Low Retention Tips
60	Packaging Options



# Pipette Tips

The Perfect Match for Your Pipette



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

Sartorius pipette tips meet the highest quality and purity standards. Sartorius tips are designed and manufactured to fit Sartorius pipettes perfectly, enabling maximum tip sealing and accuracy. This combination guarantees the highest performance and precision for your pipetting needs. Moreover, correctly fitting tips protect the pipette's tip cone from wear and tear.

Sartorius tip packages are designed to make the daily work of lab professionals easier. Our offering covers a variety of



## 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.

functional tip package options with various purity ratings. The high purity and consistent quality of Sartorius tips provide your valuable samples with the ultimate protection from contamination. We adhere to strict quality standards and control procedures – from raw material to automated manufacturing and packaging.

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

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 every tip lot of Single Tray and Refill Pack for RNase, DNase and endotoxins. Lot-specific purity certificates can be downloaded from [www.sartorius.com](http://www.sartorius.com).



### Definitions:

<b>DNase</b>	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 <sup>-5</sup> U/μl when DNase I is used as a standard.
<b>RNase</b>	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 <sup>-9</sup> U/μl, when RNase A is used as a standard.
<b>Endotoxins</b>	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 0.005 IU/ml (EU/ml).
<b>Sterilization</b>	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®, Tacta®, 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)					✓

## Optifit Tips

### Standard Tips for Various Needs



Sartorius Optifit tips are an excellent choice for various laboratories and pipetting tasks with their wide range of 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® pack is 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 bag



### 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®, Tacta®, 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, at 1 bar, for 20 minutes



Optifit tips provide excellent tip sealing

## 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
- Volume of air between the sample and filter reduces the risk of contaminating the internal components of our pipettes
- Covers tip volumes from 10 µl to 1,200 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 1,200 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, at 1 bar, for 20 minutes



## ■ 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](http://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)



Refill Towers

### □ Refill Tips

#### Refill Tower

- Space-saving with 10 x 96 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, at 1 bar, for 20 minutes
- 100% recyclable cardboard packaging, and plastic (PP) trays and tips



Single refill packs

#### Single Refill Packs

- Individually packed air-tight tip trays for maximum purity with less packaging material compared to racked tips
- 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](http://www.sartorius.com)
- 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 1,200 µl
- Trays and tips are fully autoclavable at 121°C, at 1 bar, for 20 minutes
- 100% recyclable trays and tips (PP). Container lid is regular waste.



FlexiBulk®

### □ Bulk Tips

#### FlexiBulk®

- Tips made to the Sartorius quality standard in economical packaging
- Packed orderly in compact re-sealable plastic packages (480 or 960 pcs depending on tip volume)
- Covers a large range of tip volumes from 200 µl to 1,200 µl

- Lot-specific purity certificates can be downloaded from [www.sartorius.com](http://www.sartorius.com)
- Tips are fully autoclavable at 121°C, at 1 bar, for 20 minutes
- 100% recyclable tips (PP) and package (PET)



Bulk in a bag

#### Bulk in a Bag

- Tips made to the Sartorius quality standard in economical packaging
- Packed in re-sealable bags in cardboard boxes (100, 250 or 1,000 pcs depending on tip volume)
- Covers tip volumes 10 µl, 5 ml and 10 ml
- Tips are fully autoclavable at 121°C, at 1 bar, for 20 minutes
- 100% recyclable tips and package

Ordering Information

Optifit Tips

Volume Range	Length	Packaging	Low Retention	Purity Level		Tips/Unit	Order Code
				Free of RNase, DNase, endotoxins	Pre-sterilised		
● 0.1 – 10 µl	31.5 mm	Single Tray	●	●	●	10×96	790010
		Single Tray		●		10×96	LH-L790010
		Single Tray		●		10×96	790011
		Refill Tower		●		10×96	790012
		Refill Tower		●		10×96	LH-L790012
		Refill Pack		●		20×96	790013
● 0.5 – 200 µl	51 mm	Bulk in Bag	●	●	●	1,000	790014
		Single Tray		●		10×96	790200
		Single Tray		●		10×96	LH-L790200
		Single Tray		●		10×96	790201
		Refill Tower		●		10×96	790202
		Refill Tower		●		10×96	LH-L790202
● 5 – 350 µl	54 mm	Refill Pack	●	●	●	15×96	790203
		FlexiBulk®		●		960	LH-B790204
		Single Tray		●		10×96	790350
		Single Tray		●		10×96	LH-L790350
		Single Tray		●		10×96	790351
		Refill Tower		●		10×96	790352
● 10 – 1,000 µl	71.5 mm	Refill Tower	●	●	●	10×96	LH-L790352
		Refill Tower		●		10×96	LH-L790352
		Refill Pack		●		15×96	790353
		FlexiBulk®		●		960	LH-B790354
		Single Tray		●		10×96	791 000
		Single Tray		●		10×96	LH-L791000
● 10 – 1,000 µl	71.5 mm	Single Tray	●	●	●	10×96	791001
		Single Tray		●		10×96	791002
		Refill Pack		●		10×96	791003
		Refill Pack		●		10×96	791003
		Refill Pack		●		480	LH-B791004
		FlexiBulk®		●		480	LH-B791004

For your guidance the tips are shown here 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	1,000, 1,200 µl	10	790920








Volume Range	Length	Packaging	Low Retention	Purity Level		Tips/Unit	Order Code
				Free of RNase, DNase, endotoxins	Pre-sterilised		
● 10 – 1,000 µl	Wide bore tip 68.5 mm	Single Tray	●	●	●	10×96	791020
		Single Tray		●		10×96	791021
		FlexiBulk®		●		480	LH-B791024
● 50 – 1,200 µl	71.5 mm	Single Tray	●	●	●	10×96	791 200
		Single Tray		●		10×96	LH-L791200
		Single Tray		●		10×96	791201
		Refill Pack		●		10×96	791202
		Refill Pack		●		10×96	791203
		FlexiBulk®		●		480	LH-B791204
● 100 – 5,000 µl	150 mm	Single Tray	●	●	●	50	780304
		Single Tray		●		50	780305
		Bulk in Bag		●		100	780300
		Bulk in Bag		●		1,000	780308
● 100 – 10,000 µl	155 mm	Single Tray	●	●	●	35	LH-780314
		Bulk in Bag		●		250	LH-780316

Note: The ordering information for 10,000 µl tip for Midi Plus can be found on page 69.







## Ordering Information

### SafetySpace Filter Tips




Volume Range	Length	Packaging	Low Retention	Purity Level		Tips/Unit	Order Code
				Free of RNase, DNase, endotoxins	Pre-sterilised		
● 0.1 – 10 µl	31.5 mm	Single Tray Single Tray	•	•	•	10×96 10×96	790011F LH-LF790011
							
● 0.5 – 20 µl	51 mm	Single Tray Single Tray	•	•	•	10×96 10×96	790021F LH-LF790021
							
● 2 – 120 µl	51 mm	Single Tray Single Tray	•	•	•	10×96 10×96	790101F LH-LF790101
							
● 5 – 200 µl	52.5 mm	Single Tray Single Tray	•	•	•	10×96 10×96	790201F LH-LF790201
							
● 5 – 300 µl	52.5 mm	Single Tray Single Tray	•	•	•	10×96 10×96	790301F LH-LF790301
							
● 50 – 1,000 µl	78 mm	Single Tray Single Tray	•	•	•	10×96 10×96	791001F LH-LF791001
							
● 50 – 1,200 µl	90 mm	Single Tray Single Tray	•	•	•	10×96 10×96	791211F LH-LF791211
							

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

### Extended Standard Tips

Volume Range	Length	Packaging	Low Retention	Purity Level		Tips/Unit	Order Code
				Free of RNase, DNase, endotoxins	Pre-sterilised		
● 0.1 – 10 µl	46 mm	Single Tray Single Tray	•	•	•	10×96 10×96	783210 783211
							
● 0.5 – 200 µl	77.5 mm	Single Tray Single Tray	•	•	•	10×96 10×96	LH-X780200 LH-X780201
							
● 10 – 1,000 µl	102 mm	Single Tray Single Tray	•	•	•	8×96 8×96	LH-X781000 LH-X781001
							
● 50 – 1,200 µl	90 mm	Single Tray Single Tray Single Tray Refill Pack Refill Pack	•	•	•	10×96 10×96 10×96 10×96 10×96	791210 LH-L791210 791211 791212 791213
							

### Extended Filter Tips

● 0.1 – 10 µl	46 mm	Single Tray	•	•	•	10×96	783201
							
● 0.5 – 200 µl	77.5 mm	Single Tray	•	•	•	10×96	LH-XF780201
							
● 10 – 1,000 µl	102 mm	Single Tray	•	•	•	8×96	LH-XF781001
							

For your guidance the tips are shown here in the actual size.  
Extended filter tips are not recommended to be used simultaneously with Safe-Cone Filters.  
The liquid handling properties of extended tips might differ from standard Optifit tips.



## ■ Maxi-volume Liquid Handling

### Table of Contents

68	Midi Plus Pipetting Controller
70	Prospenser Plus and Prospenser
72	Biotrate Digital Burettes



## ■ 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.

### □ 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

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

### □ Ordering Information

Order Code	Item	Qty/Unit
710931	Midi Plus Pipetting Controller with Universal Charger <sup>1</sup>	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)	1,000
780310	Midi Plus Tip 10 ml (length 242 mm)	100

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



## ■ Prospenser Plus and Prospenser

Dispensing Made Easy



### Chemical Resistance

Prospenser and Prospenser Plus offer excellent chemical resistance thanks to their high quality materials. The ceramic piston is chemically stable and compatible with an extremely wide range of liquids.

### Light to Use

The operating handle is designed to be comfortable to hold while aspirating and light to press while dispensing. The piston moves smoothly, guaranteeing excellent results in everyday use.

### Easily Replaceable Valves

Valves can be easily replaced by the user so there is no need to send the unit to be serviced.

### Easy to Attach Aspiration Tube

The aspiration tube is easy to attach with a secure threaded connection. This prevents air entering the system and ensures consistent results.

### Volume Setting

Prospenser and Prospenser Plus have an incremental volume setting enabling you to set the exact volume every time.

### Versatile Accessories

There is a wide range of accessories available including bottle adapters, dispensing heads, and aspiration tubes.

### Fully Autoclavable

Prospenser and Prospenser Plus are easy to disassemble for cleaning and are fully autoclavable.



## □ Prospenser Plus – Advanced Features

### Media Recirculation System

Prospenser Plus is equipped with a media recirculation system that allows unused media to be recovered from the device and returned to the bottle. This ensures easy priming and minimizes media loss.

### Smart 360° Rotating Dispensing Head

The dispensing head can be turned to the required position without needing to turn the bottle. This ensures the bottle label is always visible to the user.

### Connector for Drying Tube and Filters

Prospenser Plus has a luer connection at the back of the unit for drying tubes and filters. Drying tubes are recommended for humidity sensitive liquids.



## ■ Biotrate Digital Burette

for Convenient Titration



Sartorius Biotrate is a premium digital burette equipped with sophisticated functions for easy titration. Biotrate offers high chemical resistance and it is a smart solution for titrating various liquids accurately and safely. Biotrate is easy and convenient to use due to its large and clear electronic display, smooth operating wheels, and 360° rotating dispensing head.

### High Chemical Resistance

- Highly resistant parts in the liquid pathway guarantee excellent chemical resistance.
- The softly-moving piston ensures reliable results.

### Premium Quality

- High quality parts and materials guarantee highly accurate and precise results as well as long lifetime.

### Convenient to Use

- Biotrate is comfortable to use due to soft touch operating wheels and 360° rotating dispensing head.
- Extremely smooth and light to operate.
- Ordering Information and Performance Specifications Chemical Resistance
- Biotrate offers excellent chemical resistance due to its high-quality materials, allowing the use of wide variety of liquids.

### Light to Use

- The operating wheels are light and comfortable to use due to the soft touch surface and smoothly moving piston. These guarantee good ergonomics and excellent results in everyday use.

### Long Life Battery

- Biotrate is powered with a long life battery so there is no need to plug in or re-charge the unit. The battery is also easy to replace by the user.

### Large and Clear Display

- The display indicates clearly the measured volume, and shows whether you are measuring an aspirated or titrated volume.

### Easy to Clean

- Biotrate is easy to disassemble for cleaning and autoclaving. The liquid pathway is fully autoclavable.

### User Adjustment

- Biotrate can be adjusted for various liquids and it is easy to revert to factory settings. The display also indicates when a custom adjustment is in use.

## □ Ordering Information

### Prospenser Plus

Order Code	Item	Volume Range	Increment	Systematic Error (%)	Systematic Error (ml)	Random Error (%)	Random Error (ml)
LH-723070	Prospenser Plus	0.2 – 1 ml	0.05 ml	0.6	0.006	0.2	0.002
LH-723071	Prospenser Plus	0.4 – 2 ml	0.05 ml	0.6	0.012	0.2	0.004
LH-723072	Prospenser Plus	1 – 5 ml	0.10 ml	0.6	0.03	0.2	0.01
LH-723073	Prospenser Plus	2 – 10 ml	0.25 ml	0.6	0.06	0.2	0.02
LH-723074	Prospenser Plus	5 – 30 ml	0.50 ml	0.6	0.18	0.2	0.06
LH-723075	Prospenser Plus	10 – 60 ml	1.00 ml	0.6	0.36	0.2	0.02

Note: All Prospenser Plus models have A45 thread as a default and they are supplied with A32, A38, and S40 bottle adapters. Bottle not included.

### Prospenser

Order Code	Item	Volume Range	Increment	Systematic Error (%)	Systematic Error (ml)	Random Error (%)	Random Error (ml)
LH-723060	Prospenser	0.2 – 1 ml	0.05 ml	0.6	0.006	0.2	0.002
LH-723061	Prospenser	0.4 – 2 ml	0.05 ml	0.6	0.012	0.2	0.004
LH-723062	Prospenser	1 – 5 ml	0.10 ml	0.6	0.03	0.2	0.01
LH-723063	Prospenser	2 – 10 ml	0.25 ml	0.6	0.06	0.2	0.02
LH-723064	Prospenser	5 – 30 ml	0.50 ml	0.6	0.18	0.2	0.06
LH-723065	Prospenser	10 – 60 ml	1.00 ml	0.6	0.36	0.2	0.02

Note: All Prospenser models have A32 thread as a default and they are supplied with A28, S40, and A45 bottle adapters. Bottle not included.

### Biotrate Digital Burette

Order Code	Item	Nominal Volume	Readability	Systematic Error (%)	Systematic Error (ml)	Random Error (%)	Random Error (ml)
LH-723080	Biotrate	10 ml	0.01 ml	0.3	0.03	0.1	0.01
LH-723081	Biotrate	20 ml	0.01 ml	0.2	0.04	0.1	0.02
LH-723082	Biotrate	50 ml	0.01 ml	0.2	0.10	0.1	0.05

Note: All Biotrate models have A45 thread as a default and they are supplied with A32, A38, and S40 bottle adapters. Bottle not included.





UV-Protection Window  
Biotrate is supplied with an amber coloured replacement window for protecting light sensitive media.



Bottle support, for bottles  
75 – 120 mm



Aspiration tube, 310 mm



Dispensing head,  
1.5 mm spiral

## Accessories

### Biotrate

Order Code	Item	Material	Biotrate
LH-721650	Dispensing head, standard	FEP	✓
LH-721651	Dispensing head, fine tip	FEP	✓
LH-721648	Dispensing head, 1.5 mm spiral	FEP	✓
LH-721652	Dispensing head, 0.4 m adjustable	FEP	✓
LH-721653	Dispensing head, luer lock	FEP   PP	✓
LH-721654	Dispensing head, luer lock	FEP   PFA	✓
LH-721678	Aspiration tube, 310 mm	FEP	✓
LH-721679	Aspiration tube, 400 mm	FEP	✓
LH-721682	Recirculation tube, 70 mm	FEP	✓
LH-721689	Bottle adapter, A28	ETFE	✓
LH-721684	Bottle adapter, A28	PP	✓
LH-721683	Bottle adapter, A32	PP	✓
LH-721688	Bottle adapter, A32	ETFE	✓
LH-721686	Bottle adapter, A38	PP	✓
LH-721733	Bottle adapter, A38	ETFE	✓
LH-721685	Bottle adapter, A38   430	PP	✓
LH-721732	Bottle adapter, A38   430	ETFE	✓
LH-721687	Bottle adapter, S40	PP	✓
LH-721734	Bottle adapter, S40	ETFE	✓
LH-721735	Bottle adapter, NS29   32	Silicone	✓
LH-721743	Bottle support, for bottles 75 – 120 mm	Silicone	✓

### Prospenser Plus and Prospenser

Order Code	Item	Material	Prospenser Plus	Prospenser	Prospenser
			All models	1, 2, 5 & 10 ml	30 & 60 ml
LH-721647	Dispensing head, standard	FEP	✓		
LH-721655	Dispensing head, standard	FEP		✓	
LH-721656	Dispensing head, standard	FEP			✓
LH-721648	Dispensing head, 1.5 mm spiral	FEP	✓		
LH-721649	Dispensing head, 3.0 mm spiral	FEP	✓		
LH-721657	Dispensing head, spiral	FEP		✓	
LH-721658	Dispensing head, spiral	FEP			✓
LH-721653	Dispensing head, luer lock	FEP   PP	✓		
LH-721654	Dispensing head, luer lock	FEP   PFA	✓		
LH-721659	Dispensing head, luer lock	FEP   PP			✓
LH-721660	Dispensing head, luer lock	FEP   PFA			✓
LH-721678	Aspiration tube, 310 mm	FEP	✓		✓
LH-721680	Aspiration tube, 310 mm	FEP		✓	
LH-721679	Aspiration tube, 400 mm	FEP	✓		✓
LH-721681	Aspiration tube, 400 mm	FEP		✓	
LH-721682	Recirculation tube, 70 mm	FEP	✓		
LH-721736	Bottle adapter, A25	PP		✓	✓
LH-721737	Bottle adapter, A28	PP		✓	✓
LH-721689	Bottle adapter, A28	ETFE	✓		
LH-721684	Bottle adapter, A28	PP	✓		
LH-721683	Bottle adapter, A32	PP	✓		
LH-721688	Bottle adapter, A32	ETFE	✓		
LH-721686	Bottle adapter, A38	PP	✓		
LH-721733	Bottle adapter, A38	ETFE	✓		
LH-721738	Bottle adapter, A38	PP		✓	✓
LH-721685	Bottle adapter, A38   430	PP	✓		
LH-721732	Bottle adapter, A38   430	ETFE	✓		
LH-721741	Bottle adapter, A45	ETFE		✓	✓
LH-721739	Bottle adapter, A45	PP		✓	✓
LH-721687	Bottle adapter, S40	PP	✓		
LH-721734	Bottle adapter, S40	ETFE	✓		
LH-721740	Bottle adapter, S40	PP		✓	✓
LH-721742	Bottle adapter, S40	ETFE		✓	✓
LH-721735	Bottle adapter, NS29   32	Silicone	✓		
LH-721743	Bottle support, for bottles 75 – 120 mm	Silicone	✓	✓	✓



## ■ Pipetting Academy

### Table of Contents

- 78 Pipetting Academy
- 80 Pipetting Recommendations

## ■ Pipetting Academy

Training for Better Performance, Ergonomics and Safety



Sartorius Pipetting Academy offers insight and training for pipetting related topics. It's a comprehensive combination of theory and practice that provides you with useful knowledge and tips for your daily work. Thousands of laboratory professionals around the globe have been trained at the Pipetting Academy over the last two decades.

### Pipetting Academy Training Modules

#### Basics of Pipetting Module

Basics module brings together the essentials of pipetting techniques, ergonomics, and calibration. It is an excellent package for anyone who is new to pipetting or feels a need to polish pipetting practices. In basic module you will learn:

- to choose the right equipment
- the basics of pipetting techniques
- the best practices in lab ergonomics
- daily maintenance and checking of pipettes



#### Ergonomics Module

The ergonomics module is intended for laboratory personnel and occupational and health professionals who are interested in improving the work ergonomics, minimizing ergonomic risk factors and preventing musculoskeletal disorders. In the ergonomics module you will learn:

- to recognize the ergonomic risk factors in pipetting and lab work
- to select the right tools and working postures
- to apply the best ergonomics and make your work more enjoyable

#### Pipetting Techniques Module

Pipetting is a precision task influenced by multiple factors such as equipment, pipetting techniques, liquids, and environmental conditions. In pipetting techniques module you will learn:

- to understand the influence of pipetting techniques on pipetting results
- to identify the influence of different error sources on pipetting results
- how to select pipetting tools and techniques for different liquids and conditions

#### Pipetting in Cell Culture Applications Module

Working in cell culture lab has special requirements in terms of techniques and the purity of equipment. In the cell culture module you will learn:

- how to avoid contamination
- the best pipetting practices for cell culture work
- to recognize the factors affecting your results



#### Pipetting Standards and Maintenance Module

Regular pipette maintenance and calibration ensures reliable results and conformance to regulation. In Pipetting Standards and Maintenance Module you will learn:

- to define your pipette maintenance program according to ISO 8655 standard
- to handle pipettes as precision instruments
- to ensure reliable performance of your pipettes

#### Best Practices for Working with Proteins

To achieve the best results, protein samples should have a high concentration and maintain a high biological activity. In this Pipetting Academy Module you will learn:

- best pipetting practices for protein work
- how to ensure your sample quality and yield

#### Best Pipetting Practices for Nucleic Acid Work

DNA and RNA extraction and qPCR assays are the cornerstones of many research in life science. In Best Pipetting Practices for Nucleic Acid Work you will learn

- to maintain sample quality and purity
- to avoid contamination
- to recognize the factors affecting your results

#### Best Practices for Cell-based Sample Preparation

Have you ever wondered if sample preparation could be the source of variance you see in your cell-based assays? In Best practices for Cell-based Sample Preparation Pipetting Academy you will learn:

- the aspects that affect your cell-based assays with Incucyte or IQue screener
- how to reduce variability between experiments
- how to speed up the workflow and improve your cell health with smart pipetting practices

### Contact Sartorius to Set Up Your Tailored Pipetting Academy

- 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 participant will receive a certificate of participation after the seminar

### See You at the Pipetting Academy!



## ■ Pipetting Recommendations



Hold the pipette in a vertical position during aspiration.



Avoid contamination with Safe-Cone Filters.



Tacta® volume lock can be used in two ways, by pressing it while changing the volume, or by sliding it up to open it, and back to lock it.

### 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.
- Use racked tips when possible for best ergonomics

### While Pipetting

- Hold the pipette in a vertical position, while aspirating. 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 laying the pipette on its side while there is liquid in the tip. It may seep up 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 page 46, 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

### Table of Contents

- 84 Pipette Calibration and Maintenance Services
- 85 Pipette Decontamination Procedure
- 86 Autoclaving Instructions



## ■ Pipette Calibration and Maintenance Services



### Why is Calibration and Maintenance Needed?

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.

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.



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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.

## ■ Pipette Decontamination Procedure

### Mechanical Pipettes (Tacta®, mLINE® and Proline® Plus)



1. Unscrew the tip ejector collar counter clockwise and remove it. Remove the Safe-Cone Filter if fitted.



2. Unscrew the tip cone holder counter clockwise and carefully remove it along with the tip cone.



3. The piston is left on the mechanical 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. Remove the Safe-Cone Filter if fitted.



2. Unscrew the tip cone holder counter clockwise and carefully remove the tip cone holder, tip cone and spring.



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 opening pipette lower parts, as a matter of routine the parts should be inspected for possible wear. Always check the pipette performance after opening the lower parts.

## ■ Autoclaving Instructions



### Tacta<sup>®</sup>, mLINE<sup>®</sup> and Proline<sup>®</sup> Plus Mechanical Pipettes

The entire Tacta<sup>®</sup>, mLINE<sup>®</sup> and Proline<sup>®</sup> Plus mechanical pipette can be steam sterilized by autoclaving at 121°C (252°F), at 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)
- Place 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<sup>®</sup> and Picus<sup>®</sup> NxT 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 1,200 µl) can be autoclaved (121°C, at 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, at 1 bar, for 20 minutes at a temperature of 121°C
- Cool before use

### Note:

- Excessive heat or length of time may damage the products. Never place the handle part of the Picus<sup>®</sup>, Picus<sup>®</sup> NxT or eLINE<sup>®</sup> 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



## ■ Sales and Service Contacts

For further contacts, visit [www.sartorius.com](http://www.sartorius.com)

### □ Europe

#### Germany

Sartorius Lab Instruments  
GmbH & Co. KG  
Otto-Brenner-Strasse 20  
37079 Goettingen  
Phone +49.551.308.0  
Fax +49.551.308.3289

#### France & Suisse Romande

Sartorius France  
2, rue Antoine Laurent de Lavoisier  
ZA de la Gaudrée  
91410 Dourdan  
Phone +33.1.70.62.50.00  
Fax +33.1.64.59.76.39

#### Austria

Sartorius Austria GmbH  
Modecenterstrasse 22  
1030 Vienna  
Phone +43.1.7965760.0  
Fax +43.1.7965760.24

#### Belgium

Sartorius Belgium N.V.  
Rue Colonel Bourg 105  
1030 Bruxelles  
Phone +32.2.756.06.90  
Fax +32.2.481.84.11

#### Finland & Baltics

Sartorius Biohit Liquid Handling Oy  
Laippatie 1  
00880 Helsinki  
Phone +358.9.755.951  
Fax +358.9.755.95.200

#### Hungary

Sartorius Hungária Kft.  
Kagyló u. 5.  
2092 Budakeszi  
Phone +3623.457.227  
Fax +3623.457.147

#### Ireland

Sartorius Ireland Ltd.  
Unit 41, The Business Centre  
Stadium Business Park  
Ballycoolin Road  
Dublin 11  
Phone +353.1.8089050  
Fax +353.1.8089388

#### Italy

Sartorius Italy S.r.l.  
Via Torino 3/5  
20814 Varedo (MB)  
Phone +39.0362.5557.11  
Fax +39.0362.5557.99

#### Netherlands

Sartorius Netherlands B.V.  
Phone +31.30.60.53.001  
Fax +31.30.60.52.917  
[info.netherlands@sartorius.com](mailto:info.netherlands@sartorius.com)

#### Poland

Sartorius Poland sp.z o.o.  
ul. Wrzesinska 70  
62-025 Kostrzyn  
Phone +48.61.6473830  
Fax +48.61.6473839

#### Russian Federation

LLC "Sartorius RUS"  
Vasilyevsky Island  
5th line 70, Lit. A  
199178 St. Petersburg  
Phone +7.812.327.53.27  
Fax +7.812.327.53.23

#### Spain & Portugal

Sartorius Spain, S.A.  
Avda. de la Industria, 32  
Edificio PAYMA  
28108 Alcobendas (Madrid)  
Phone Spain +34.913.586.095  
Phone Portugal +351.800.855.800  
Fax Spain +34.913.589.623  
Fax Portugal +351.800.855.799

#### Switzerland

Sartorius Mechatronics Switzerland AG  
Ringstrasse 24a  
8317 Tagelswangen (ZH)  
Phone +41.44.746.50.00  
Fax +41.44.746.50.50

#### U.K.

Sartorius UK Ltd.  
Longmead Business Centre  
Blenheim Road, Epsom  
Surrey KT19 9QQ  
Phone +44.1372.737159  
Fax +44.1372.726171

#### Ukraine

LLS "Sartorius RUS"  
Post Box 440 "B"  
01001 Kiev, Ukraine  
Phone +380.44.411.4918  
Fax +380.50.623.3162

### □ Americas

#### USA

Sartorius Corporation  
5 Orville Drive, Suite 200  
Bohemia, NY 11716  
Phone +1.631.254.4249  
Toll-free +1.800.635.2906  
Fax +1.631.254.4253

#### Argentina

Sartorius Argentina S.A.  
Int. A. Ávalos 4251  
B1605ECS Munro  
Buenos Aires  
Phone +54.11.4721.0505  
Fax +54.11.4762.2333

#### Brazil

Sartorius do Brasil Ltda  
Avenida Senador Vergueiro 2962  
São Bernardo do Campo  
CEP 09600-000 - SP- Brasil  
Phone +55.11.4362.8900  
Fax +55.11.4362.8901

#### Canada

Sartorius Canada Inc  
1173 North Service Road West, D4  
Oakville, ON L6M 2V9  
Phone +1.905.569.7977  
Toll-Free +1.800.668.4234  
Fax +1.905.569.7021

#### Mexico

Sartorius de México, S.A. de C.V.  
Libramiento Norte de Tepotzotlan s/n,  
Colonia Barrio Tlacateco,  
Municipio de Tepotzotlan,  
Estado de México,  
C.P. 54605  
Phone +52.55.5562.1102  
Fax +52.55.5562.2942  
[leadsmex@sartorius.com](mailto:leadsmex@sartorius.com)

#### Peru

Sartorius Peru S.A.C.  
Avenue Alberto del Campo 411  
Floor 12 – The Office  
15076 – San Isidro, Lima  
Phone +51.1.441 0158  
Fax +51.1.422 6100

### □ Asia | Pacific

#### Australia

Sartorius Australia Pty. Ltd.  
Unit 5, 7-11 Rodeo Drive  
Dandenong South Vic 3175  
Phone +61.3.8762.1800  
Fax +61.3.8762.1828

#### China

Sartorius (Shanghai) Trading Co., Ltd.  
3rd Floor, North Wing, Tower 1  
No. 4560 Jinke Road  
Zhangjiang Hi-Tech Park  
Pudong District  
Shanghai 201210, P.R. China  
Phone +86.21.6878.2300  
Fax +86.21.6878.2882

#### Hong Kong

Sartorius Hong Kong Ltd.  
Unit 1012, Lu Plaza  
2 Wing Yip Street  
Kwun Tong  
Kowloon, Hong Kong  
Phone +852.2774.2678  
Fax +852.2766.3526

#### India

Sartorius Weighing India Pvt. Ltd.  
#69/2-69/3, NH 48, Jakkasandra,  
Nelamangala Tq  
562 123 Bangalore, India  
Phone +91.80.4350.5250  
Fax +91.80.4350.5253

#### Japan

Sartorius Japan K.K.  
4th Fl., Daiwa Shinagawa North Bldg.  
8-11, Kita-Shinagawa 1-chome  
Shinagawa-ku, Tokyo, 140-0001 Japan  
Phone +81.3.3740.5408  
Fax +81.3.3740.5406

#### Malaysia

Sartorius Malaysia Sdn. Bhd  
Lot L3-E-3B, Enterprise 4  
Technology Park Malaysia  
Bukit Jalil  
57000 Kuala Lumpur, Malaysia  
Phone +60.3.8996.0622  
Fax +60.3.8996.0755

#### Singapore

Sartorius Singapore Pte. Ltd  
10 Science Park Rd  
The Alpha #02-13/14  
Singapore Science Park II  
Singapore 117684  
Phone +65.6872.3966  
Fax +65.6778.2494

#### South Korea

Sartorius Korea Ltd.  
8th Floor, Solid Space B/D,  
PanGyoYeok-Ro 220, BunDang-Gu  
SeongNam-Si, GyeongGi-Do, 463-400  
Phone +82.31.622.5700  
Fax +82.31.622.5799

#### Thailand

Sartorius (Thailand) Co. Ltd.  
129 Rama 9 Road,  
Huaykwang  
Bangkok 10310  
Phone +66.2643.8361-6  
Fax +66.2643.8367

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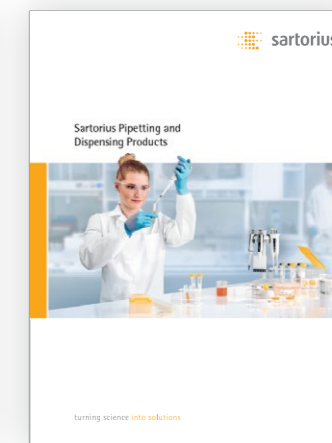
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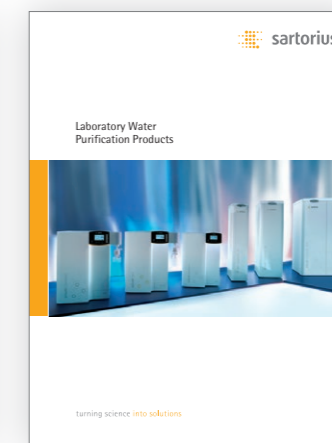
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## Contact Details

### **Sartorius Biohit Liquid Handling Oy**

Laippatie 1

00880 Helsinki, Finland

Phone +358.9.755.951

linfo.finland@sartorius.com

### **Sartorius Lab Instruments GmbH & Co. KG**

Otto-Brenner-Strasse 20

37079 Goettingen, Germany

Phone +49.551.308.0

Fax +49.551.308.3289

www.sartorius.com

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