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Mechanical Pipette

Eppendorf Research® 3 neo

Operating Manual

3171 900 010-00/2025-08

Table of contents

1 About this manual

1.1 Notes on this manual

The dates in this manual correspond to the international date format as specified in the ISO 8601 standard. All dates are shown in the format YYYY-MM-DD or YYYY-MM.

1. Read this manual completely before using the product.
2. Please ensure that you have the manual available while using the product.

The current version of the manual can be found at www.eppendorf.com/manuals.
- Contact Eppendorf SE to obtain another version of the manual.

1.2 Warning notice structure

HAZARD LEVEL! Type of danger

Source of danger
Consequences of disregarding the danger

– Measures to avoid the danger

Symbol	Hazard level	Type of danger	Meaning
	**DANGER**	Personal injury	Will lead to severe injuries or death.
	**WARNING**	Personal injury	May lead to severe injury or death.
	**CAUTION**	Personal injury	May lead to minor or moderate injuries.
	**NOTE**	Material damage	May lead to material damage.

1.3 Graphics

Depiction	Meaning
1. 2.	Work steps
•	Bullet point

Depiction	Meaning
Text	Display text
Key	Name for port, button, status lamp, or key
	Important information
	Tip

1.4 Other applicable documents

The following documents supplement this manual:

- Instructions for use for epT.I.P.S. pipette tips
- Instructions for use for epT.I.P.S. 384 pipette tips
- Instructions for use for epT.I.P.S. Box 2.0 reusable box
- SOP – Standard Testing Procedure For Manual Dispensing Systems
- The Science of Pipetting to Perfection - A guide to expert pipetting
  Free eBook available for download: https://www.eppendorf.link/pipetting-ebook

Video tutorials

You can watch video tutorials using the following QR codes.

Topic	QR code	Link
Attaching the pipette tip		http://www.eppendorf.link/r3neo-tip1
Setting the volume		http://www.eppendorf.link/r3neo-vol
Ejecting the pipette tip		http://www.eppendorf.link/r3neo-tip2

1.5 Certificates

Declarations of conformity, certificates, Safety Data Sheets etc. on the product can be found on the respective product page at www.eppendorf.com.

2 Safety

2.1 Intended use

The Eppendorf Research 3 neo pipette is a product for general laboratory use. In combination with the corresponding tips, the pipette is used to transfer liquids in the specified volume range. It is not intended for in vivo use (in or on the human body). The Eppendorf Research 3 neo pipette may only be used by users who have been trained in accordance with the operating manual. Users must read the operating manual carefully and familiarize themselves with how the device works.

2.2 Residual risks when used as intended

If the product is not used as intended, the installed safety devices may not function correctly. To reduce the risk of personal injury and material damage and to avoid dangerous situations, please observe the general safety instructions.

2.2.1 Personal injury

2.2.1.1 Biological hazards

Improper pipetting of infectious liquids and pathogenic germs can damage your health.

- Observe the national regulations and the biosafety level of your laboratory.
- Wear personal protective equipment.
- Observe the Safety Data Sheets and instructions for use for the accessories.
- Read the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, in its current version) about handling germs or biological material of risk group II or higher.

2.2.1.2 Chemical hazards

Improper pipetting of radioactive, toxic and aggressive liquids can cause serious damage to health.

- Observe the national regulations of your laboratory.
- Wear personal protective equipment.
- Observe the Safety Data Sheets for the accessories.

2.2.1.3 Incorrect handling

If you point the opening of the dispensing device towards yourself or others, persons can be injured.

- Only initiate liquid dispensing if it is safe to do so.
- For all dispensing tasks, make sure that you are not endangering yourself or anyone else.

2.2.2 Material damage

2.2.2.1 Chemical hazards

Aggressive substances may damage components, consumables and accessories.

- Check chemical resistance before using organic solvents and aggressive chemicals.
- Check compatibility with the materials used.
- Only use liquids whose vapors do not attack the materials used.

2.2.2.2 Incorrect handling

The use of accessories and spare parts other than those recommended by Eppendorf SE may impair the safety, functioning, and precision of the device. Eppendorf SE cannot be held liable or accept any liability for damage resulting from the use of accessories and spare parts other than those recommended.

- Only use the accessories and spare parts recommended by Eppendorf SE.
- Only use accessories and spare parts that are in perfect technical condition.

If the pipette tips or the packing are not in perfect condition or are damaged, the pipette and the liquid sample can become contaminated.

- Only use pipette tips that are in perfect condition.
- If the packing is damaged, do not use the pipette tips.

If you use pipette tips more than once, carry-over, contamination and incorrect dispensing results can occur.

- Only use pipette tips once.

If liquid sample reaches the inside of the pipette, the pipette may become damaged.

- Only immerse the pipette tip when aspirating liquid.
- Do not put down the pipette when the pipette tip is full.

If liquid sample is dispensed when there is a marked difference between temperatures, the dispensing result may be distorted.

- Make sure the pipettes, pipette tips and liquid sample are the same temperature.

The physical properties of non-aqueous solutions may differ significantly from water. When working with non-aqueous solutions, the dispensing result may be distorted.

- Temporarily adjust the pipette to the non-aqueous solution.

2.3 Target groups

This manual is intended for the following target groups, who have different qualifications and levels of knowledge.

Owner

The owner is any natural or legal person who operates or owns the device.

The owner provides the product and the necessary infrastructure. The owner has a special responsibility to ensure the safety of all persons working on the product.

User

The user operates the product and works with it. The user must be instructed in the use of the product. The user must have read and fully understood the manual.

Any tasks that go beyond operation may only be performed by the user if this is specified in this manual. The owner must explicitly assign these tasks to the user.

Authorized service technician

The authorized service technician is trained and certified by Eppendorf SE to service, maintain and repair the product.

2.4 Information for the owner

The owner must ensure the following:

- The product is in a safe operating condition.
- The safety devices are all available and functional.
- The product is serviced and cleaned according to the information in this manual.
- The product is disposed of in accordance with local regulations.
- All work on the product is carried out by users, technical personnel or authorized service technicians who are suitably qualified.
- Personal protective equipment is available and is worn.
- The manual is available during the use of the product.
- The manual is part of the product. The product will only be passed on to others with its manual.

2.5 Personal protective equipment

Personal protective equipment serves to ensure the safety and protection of the user when working with the product.

Personal protective equipment must comply with country-specific regulations and the regulations of the laboratory.

Protective goggles

The protective goggles protect your eyes from splashes and foreign bodies.

2.6 Information on product liability

The owner of the device will be held liable for personal and material damage in the following cases:

- The device is used outside of its intended use
- The device is not used in accordance with the operating manual
- Manipulation of safety devices
- The device has spare parts installed that are not authorized by Eppendorf SE
- The device is used with accessories or consumables that are not recommended by Eppendorf SE
- Cleaning agents are used that are not recommended by Eppendorf SE
- Chemicals are used that are not recommended by Eppendorf SE
- Shipment not in original packing or in improper substitute packing
- The device is maintained or repaired by persons not authorized by Eppendorf SE
- Unauthorized modifications

3 Product description

3.1 Features

The pipette has the following features:

- Mechanical dispensing system
- Control button with nominal volume color coding
- Ejector button with nominal volume color coding
- Volume display window
- Volume catch
- Viewing window for making temporary adjustments
- Adjustment opening with *ADJ* (Adjustment) cover for temporary adjustments
- Adjustment opening with adjustment seal for making factory adjustments
- Ejector sleeve
- Tip cone with form fit for Eppendorf pipette tips
- Ergonomic handling
- Easy access to the control knob with a large contact surface
- Finger hook
- Low maintenance requirements
- High chemical resistance
- UV resistance
- Calibrated as standard for use at 20 °C and 101 kPa

Pipette models

The following models are available:

- Single-channel pipettes with variable volume setting

3.2 Product overview

Single-channel pipette

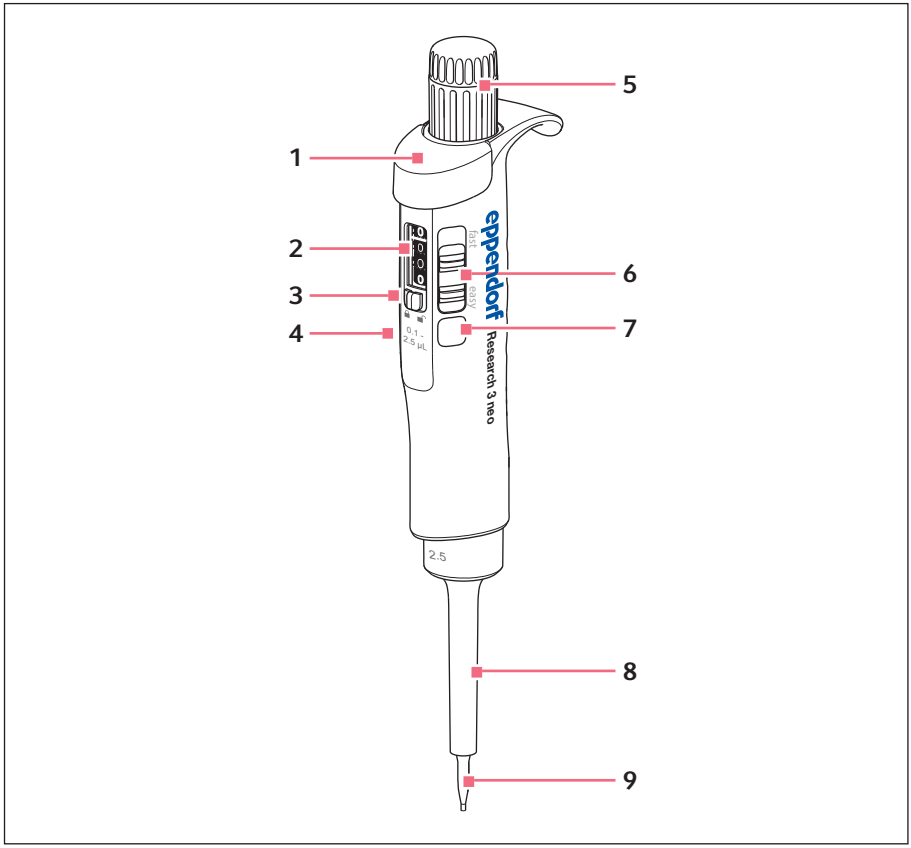


Fig. 3-1: Single-channel pipette – front view

1 Ejector button
2 Four-digit volume display
3 Volume catch
4 Volume range (minimum volume to nominal volume)
5 Control button
6 Speed adjustment for volume setting
7 Adjustment seal for factory settings and service - cover for permanent adjustment
8 Ejector sleeve
9 Tip cone for picking up the pipette tip

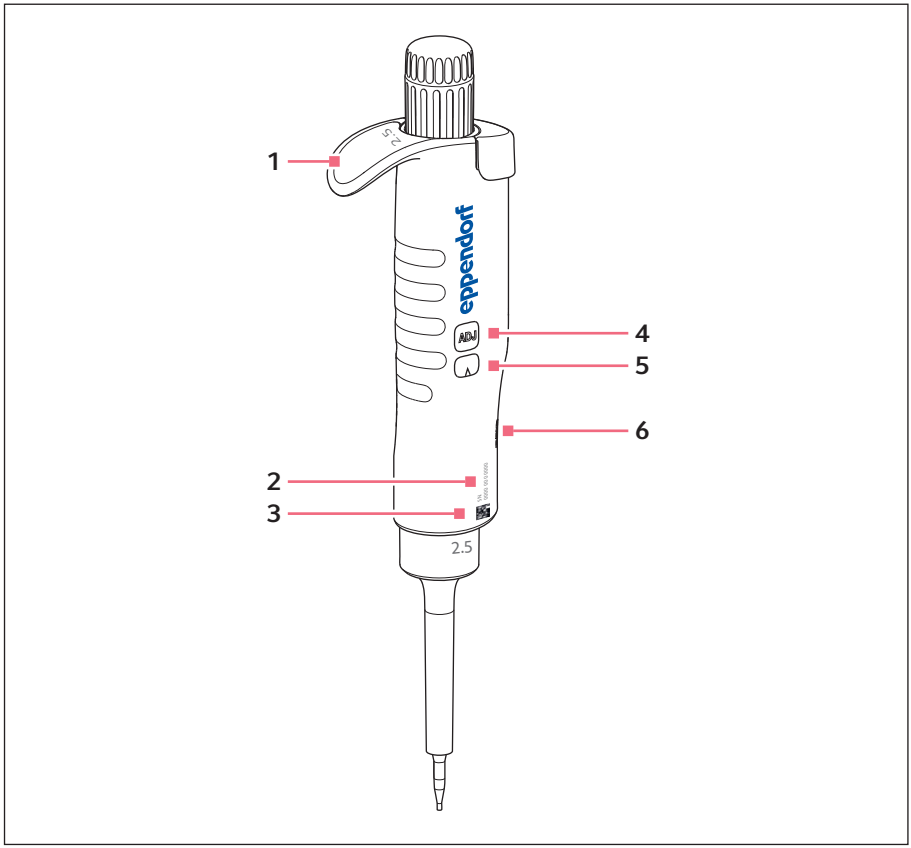


Fig. 3-2: Rear view

1 Finger hook with nominal volume

2 Serial number

3 Data matrix code

4 *ADJ* – Adjustment cover – cover for temporary adjustments

5 Adjustment window with adjustment display

6 *RFID* chip

3.3 Product components

Control button

The control button is used to carry out the following functions:

- Volume setting
- Liquid aspiration
- Liquid dispensing

Color coding

Every nominal volume of the pipette is color-coded. The corresponding pipette tips are marked with the same color code.

Ejector

When the ejector button is pressed, it pushes the ejector sleeve downwards and ejects the pipette tip.

Volume display

The four-digit counter shows the set volume. The white separator on the volume display marks the decimal place. The volume is read from top to bottom.

Volume catch

The catch on the control button prevents the volume from being adjusted unintentionally. The slider is moved to the 🔒 symbol for this purpose. If the slider is moved to the 🔓 symbol, the control button will be released again.

Speed adjustment

The speed adjustment slider changes the gear ratio for adjusting the volume. The *fast* setting is the coarse adjustment. The volume is changed quickly with just a few turns of the control button. The *easy* setting is the fine adjustment. The volume is changed slowly with little effort..

ADJ adjustment cover

The adjustment cover is connected to the pipette housing and is the cover for making temporary adjustments to the pipette.

Adjustment display

Temporary changes can be made to the pipette adjustment. The viewing window of the adjustment display shows a scale of -8 to +8. The value 0 indicates factory settings.

Adjustment seal

A red adjustment seal indicates that the factory settings have been changed by the user. A blue adjustment seal indicates that the factory settings have been changed by an authorized service provider.

Adjustment tool

The adjustment tool is used for setting temporary adjustments. One side of the adjustment tool is used to open the adjustment seal or the *ADJ* adjustment cover. The other side is a socket wrench for making adjustments.

Locking ring

The locking ring is inserted into the lower part of the pipette and deactivates the spring-loading action of the tip cone. The spring-loading action is activated again by removing the locking ring. Deactivating spring-loading action may be necessary for third-party pipette tips that require higher attachment forces.

4 Functional description

Air-cushion principle

With piston-stroke pipettes, a cushion of air separates the piston from the liquid sample. The air cushion is moved by the piston and ensures the liquid is aspirated and dispensed.

Forward pipetting

Forward pipetting is the standard procedure for aspirating and dispensing liquid. The aspirated sample volume corresponds to the dispensing volume.

Reverse pipetting

An additional volume is aspirated when performing reverse pipetting. This can improve dispensing results for viscous or foaming liquid samples. The additional volume is not part of the dispensing volume.

Factory adjustment

A factory adjustment is a permanent change to the dispensing volume of an adjustable-volume pipette. The dispensing volume is changed by approximately the same amount across the entire volume range of the pipette.

If the set volume compared to the dispensed volume is outside the permitted thresholds, the counter and the piston stroke are decoupled and readjusted. The changed volume must be checked gravimetrically.

Temporary adjustment

A temporary adjustment is an active, reversible change to the dispensing volume of a pipette. The dispensing volume is changed by approximately the same amount across the entire volume range of the pipette.

Temporary adjustments may be necessary to adjust the pipette to the following conditions:

- Changes in atmospheric pressure at the location
- Non-aqueous solutions with a density, viscosity, surface tension or vapor pressure different from water
- Use of special pipette tips (e.g., long pipette tips with a modified air cushion volume)
- Different pipetting techniques (reverse pipetting)

ColorTag pipette marking ring

The colored pipette marking ring is a tool for labeling a pipette. The pipette marking ring can be written on with a ballpoint pen or a permanent marker. The labeling is used to individually identify pipettes or to mark them for specific applications such as DNA or RNA work.

The pipette marking ring is an optional accessory and is not included in the scope of delivery. The pipette marking ring is available in 6 different sizes and is suitable for single-channel and multi-channel pipettes.

The pipette marking ring can be autoclaved with the pipette.

Sizes (inner diameter) for single-channel lower parts, single-channel upper parts, and multi-channel upper parts:

- 19 mm – suitable for single-channel lower parts up to 1000 µL
- 24 mm – suitable for single-channel lower parts 2 mL and for pipette upper parts (single-channel and multi-channel)
- 27 mm – suitable for single-channel lower parts 5 mL
- 34 mm – suitable for single-channel lower parts 10 mL

Sizes for multi-channel lower parts

- 50 mm – suitable for 8- and 16-channel lower parts
- 73 mm – suitable for 12- and 24-channel lower parts

4.1 Good pipetting practice

Volume setting

Set the volume from a high to a low value. If necessary, increase the volume beyond the preferred setting and then lower it again.

Pipette selection

Select a pipette with a nominal volume close to the preferred dispensing volume. This will reduce any pipetting inaccuracies.

Presaturation

Presaturate the air cushion in the pipette tip with the liquid sample. The presaturation reduces evaporation and increases the precision and accuracy of the dispensed volume.

Decreasing filling level in sample tube

In order to prevent an absorption of air and splashing of liquids in the tip cone, follow the filling level when removing liquid from narrow tubes.

4.2 Optimum immersion depths

Volume	Immersion depth in liquid
0.1 µL – 1 µL	1 mm – 2 mm
1 µL – 100 µL	2 mm – 3 mm

Volume	Immersion depth in liquid
100 µL – 1000 µL	2 mm – 4 mm
1 mL – 10 mL	3 mm – 6 mm

5 Installation

5.1 Checking the delivery and packing

1. Check whether the packages indicated on the delivery note match the packages actually delivered.
2. Check the packing for transport damage.
3. Report any visible damage to your Eppendorf partner.

5.2 Checking the delivery package

1. Check that the supplied components match the specifications of the delivery package.
2. If any parts are missing, contact your Eppendorf partner.

Scope of delivery of the Research 3 neo 2.5 µL – 1000 µL

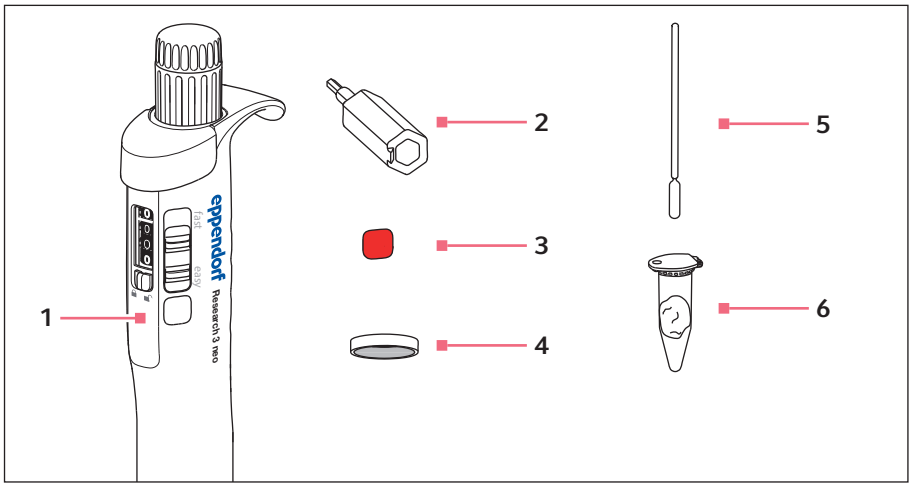


Fig. 5-1: Overview of supplied parts

1	Research 3 neo mechanical pipette	4	Locking ring
2	Adjustment tool (double-sided)	5	Grease stick
3	Red adjustment seal	6	Pipette grease

Single-channel pipettes 2.5 µL – 1000 µL

Quantity	Description
1	Single-channel pipette
2	96 pipette tips
1	Adjustment tool
1	Red adjustment seal (factory adjustment)
1	Pipette grease
2	Grease stick
1	Locking ring (deactivate tip spring)

Scope of delivery of the Research 3 neo 2 mL – 10 mL

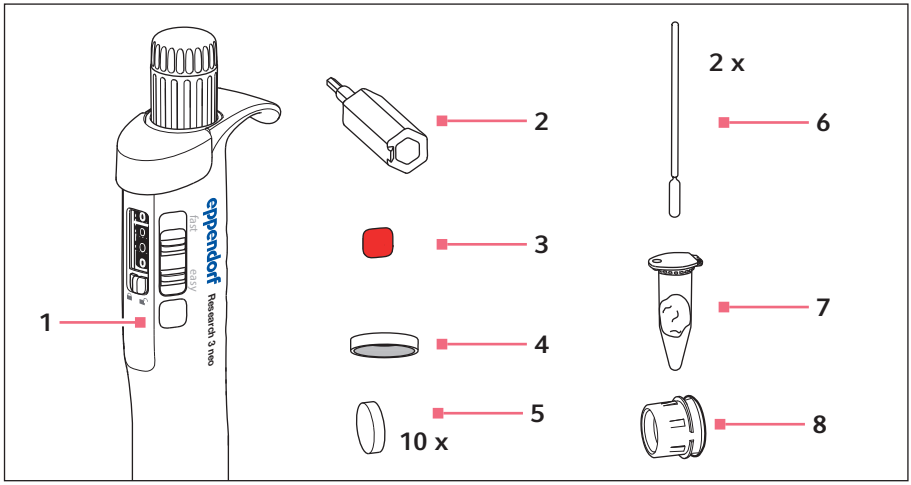


Fig. 5-2: Overview of supplied parts

1 Research 3 neo mechanical pipette
2 Adjustment tool (double-sided)
3 Red adjustment seal
4 Locking ring
5 Protection filter
6 Grease stick
7 Pipette grease
8 Filter sleeve

Single-channel pipettes 2 mL – 10 mL

Quantity	Description
1	Single-channel pipette
10	Pipette tips
1	Adjustment tool
1	Locking ring (installed on 10 mL pipettes)
1	Red adjustment seal (factory adjustment)
1	Pipette grease
2	Grease stick
10	Protection filter
1	Filter sleeve

6 Operation

6.1 Selecting a pipette

1. Select a pipette with a nominal volume close to the desired dispensing volume.
   This will reduce pipetting inaccuracies.

6.2 Attaching the pipette tip

The pipette control button and the Trays are color-coded. The color indicates the corresponding pipette and the volume of the pipette tips (epT.I.P.S.).

Depending on the pipetting volume, the use of extra-long pipette tips compared to regular-length pipette tips may have a negative effect on the accuracy and correctness of dispensing.

A temporary adjustment must be made for the following pipette tips:

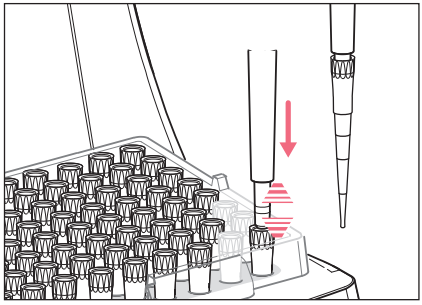
- epT.I.P.S. 50 — 1250 µL L, dark green, 103 mm
- epT.I.P.S. 0.2 — 5 mL L, violet, 175 mm
- epT.I.P.S. 0.5 — 10 mL L, turquoise, 243 mm

Attaching pipette tips to single-channel pipettes

With spring-loaded tip cones, the tip cone must be pressed into the pipette tip until the edge of the pipette tip touches the ejector of the pipette. This is the only way to ensure that the pipette tip sits firmly and tightly on the tip cone.

Prerequisites:

- A single-channel pipette suitable for the pipette tip is available.

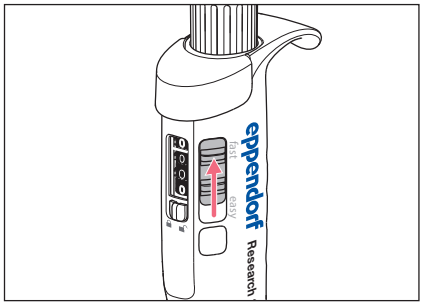


1. Open the lid by pressing the release button.
2. Insert the tip cone of the pipette by lowering it vertically into the pipette tip using firm pressure.

   The connection between tip cone and pipette tip must be sufficiently strong to ensure the dispensing results are not affected.
3. After removing the pipette tip, close the box to protect the other pipette tips.

6.3 Changing the volume setting speed

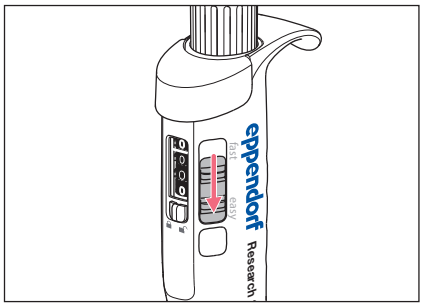
Setting the fast volume setting



1. Move the slider to the *fast* position.
2. Set the desired volume.

   The counter rotates quickly.
   The control button rotates with greater resistance.

Setting the easy volume setting

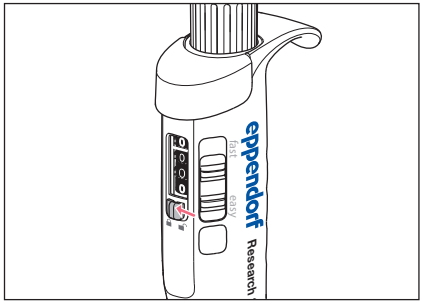


1. Move the slider to the *easy* position.
2. Set the desired volume.

   The control button rotates with less resistance.
   The counter rotates more slowly.

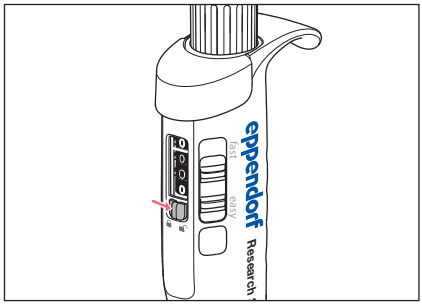
6.4 Locking the volume setting

Locking the volume setting



1. Move the slider to the 🔒 symbol.
   The control button is locked. The set volume cannot be accidentally changed.

Unlocking the volume setting



1. Move the slider to the 🔓 symbol.
   The control button is unlocked. The volume can be changed.

6.5 Adjusting the volume

Adjust the volume from high to low. To adjust from a lower volume to a higher volume, turn the volume setting ring slightly beyond the target volume. Then turn it back to the target volume.

NOTICE! Component damage

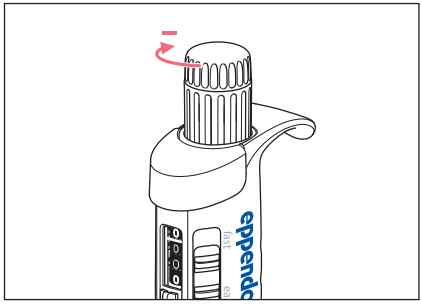
If you turn the volume setting ring beyond the end stop, the counter gears may jam.

- If you hear clicking noises, do **not** turn the control button any further.
- Move the speed adjustment slider to *easy*.
- Carefully turn the control button back.
- If you cannot turn the control button back, contact your Eppendorf partner.

Setting a lower volume

Prerequisites:

- The volume catch is unlocked.

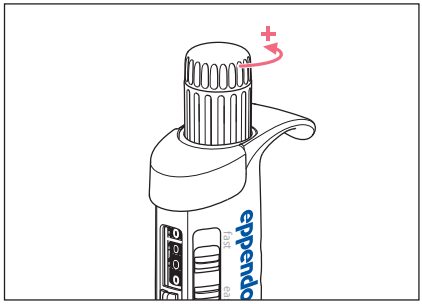


1. To decrease the value, turn the control button clockwise.
2. Lock the volume setting ring.

Setting a higher volume

Prerequisites:

- The volume catch is unlocked.

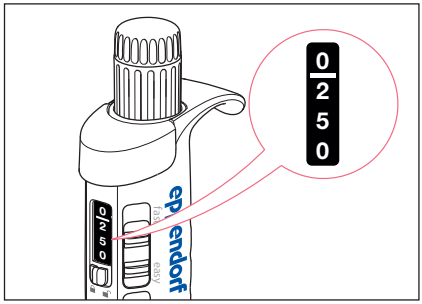


1. To increase the value, turn the control button counterclockwise.
2. Lock the volume setting ring.

6.6 Reading the set volume

Prerequisites:

- The desired volume has been set.



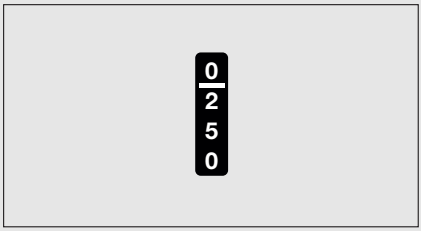
1. Read the set volume from top to bottom.

   The decimal place is below the white separator line.

Example with a 2.5 µL pipette: Read 0.25 µL

Prerequisites:

- The volume of 0.25 µL has been set.

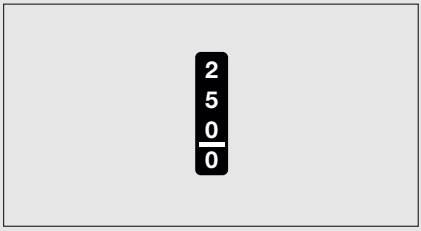


1. Read the set volume of 0.25 µL on the volume display.

Example with a 300 µL pipette: Read 250.0 µL

Prerequisites:

- The volume of 250.0 µL has been set.



1. Read the set volume of 250.0 µL on the volume display.

Lock the volume setting ring after you have set and read the volume. This prevents accidental adjustment of the volume when working with the pipette.

6.7 Forward pipetting of liquid sample

Aspirating liquid sample

For maximum precision and accuracy, pre-saturate the air cushion in the pipette tip by aspirating and dispensing the liquid sample one to three times.

To prevent air from being sucked in and thus liquids from splashing up into the tip cone, follow the filling level with the pipette tip when removing liquid from narrow vessels.

Prerequisites:

- The pipette tip has been attached.
- The volume has been set.
- A source vessel with liquid sample is available.

1. Press the control button down to the first stop.
2. Immerse the pipette tip vertically into the liquid sample.
3. Maintain the immersion depth and let the control button slide back slowly.
   The liquid sample is aspirated into the pipette tip.
4. Wait until the liquid sample is aspirated.
5. Withdraw the pipette tip from the liquid sample.
6. Wipe the pipette tip against the tube inner wall if necessary.

Dispensing liquid sample

Prerequisites:

- The liquid sample has been aspirated.
- A destination vessel is available.

1. Place the pipette tip at an angle against the tube inner wall.
2. Slowly press the control button down to the first stop.
   The liquid sample is dispensed.
3. Wait until no more liquid sample flows out.
4. Press the control button down to the second stop.
   The pipette tip is completely emptied.
5. Keep the control button pressed and wipe the pipette tip against the tube inner wall.

6.8 Reverse pipetting liquid sample

Volume limits may occur when using filter tips.

Aspirating liquid sample

Prerequisites:

- The pipette tip has been attached.
- The volume has been set.
- A source vessel with liquid sample is available.

1. Keep pressing down the control button until it is stopped again.
2. Immerse the pipette tip vertically in the liquid sample.
3. Maintain the immersion depth and allow the control button to slide back slowly.
   The liquid sample is aspirated into the pipette tip.
4. Wait until the liquid sample has been aspirated.
5. Pull the pipette tip out of the liquid sample.
6. If necessary, wipe the pipette tip against the tube wall.

Dispensing liquid sample

The additional volume is not part of the dispensing volume.

Prerequisites:

- The liquid sample has been aspirated.
- A destination vessel is available.

1. Place the pipette tip at a sharp angle to the tube wall.
2. Slowly press the control button down until it meets resistance.
   The liquid sample is dispensed.
3. Wait until the flow of liquid sample stops.
4. Press and hold the control button and wipe the pipette tip on the tube wall.
   Residual liquid from the additional volume remains in the pipette tip.

6.9 Ejecting the pipette tip

Discarding the pipette tip when forward pipetting

1. Press the ejector button.
   The pipette tip has been ejected.

Discarding the pipette tip when reverse pipetting

Prerequisites:

- A waste container is available.

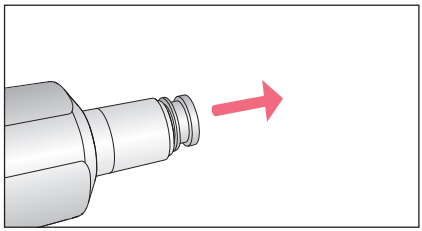
1. Keep pressing down the control button until it meets resistance again.
   The residual liquid from the additional volume is ejected and can be discarded.
2. Press the ejector button.
   The pipette tip is ejected.

6.10 Replacing the protection filter

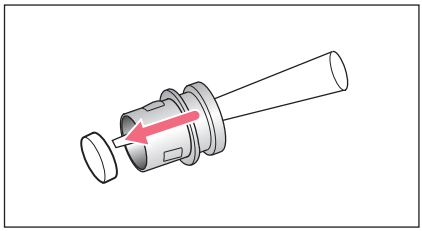
Valid for the following volumes:

- 2 mL
- 5 mL
- 10 mL

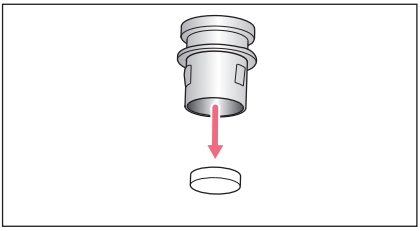
The protection filter in the tip cone must be replaced after each contact with liquid.



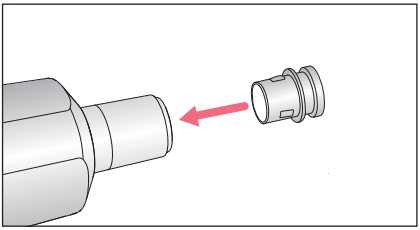
1. Pull out the filter sleeve.



2. Press out the used protection filter with a pipette tip.
3. Clean the filter sleeve.



4. Place the new protection filter on a flat surface.
5. Place the filter sleeve onto the protection filter from above.



6. Insert the filter sleeve into the tip cone.

6.11 Storing the pipette

Prerequisites:

- The pipette tip has been ejected.

1. Store the pipette properly:
   - In a pipette carousel
   - In a wall mount
   - In a horizontal position

6.12 Changing the temporary adjustment of the pipette

Checking the requirements for adjustment

With adjustment, the dispensing volume is set so that the systematic error is minimized for the intended application. The dispensing volume is changed by approximately the same volume across the entire volume range.

A deviation between the actual volume and the set volume can have various causes.

1. Before changing the adjustment, rule out the following causes:
   - The air cushion is not sufficiently pre-saturated.
   - The liquid, the pipette, and the ambient air are not at the same temperature.
   - The pipetting speed is too fast.
   - The working method deviates from the standard working method (forward pipetting).
   - The pipette is leaking.
   - The pipette tip is not compatible with the pipette.
   - The size of the pipette tip does not match the volume variant of the pipette.
   - The attachment force with a spring-loaded tip cone is insufficient for third-party tips.
   - The tip cone is defective.
2. Rule out the following calculation errors during calibration:
   - The resolution of the analytical balance is too inaccurate.
   - The weighing location does not meet the required parameters (temperature, draft-free, vibration-free).
   - The gravimetric measured value is incorrectly converted into the liquid volume (see SOP – Standard Testing Procedure For Manual Dispensing Systems).

6.12.1 Table with theoretical setting values

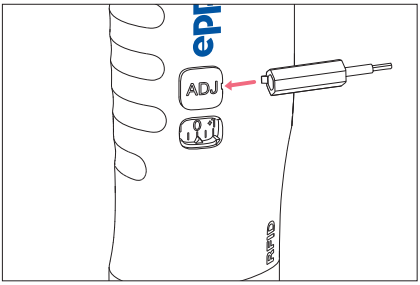
The predefined table values are used to adjust the pipette to the specific requirements (e.g., long pipette tips), thus increasing dispensing accuracy.

Table 1: Theoretical volume changes for single-channel pipettes

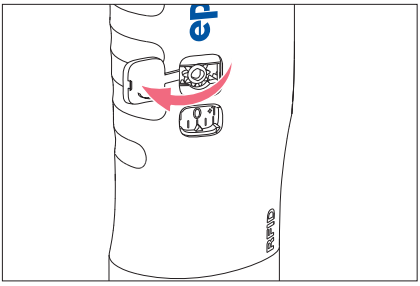
Pipette model	ADJ adjustment value							
	-8	-6	-4	-2	+2	+4	+6	+8
	Volume change in µL							
0.1 µL – 2.5 µL dark gray	-0.05	-0.037	-0.025	-0.012	+0.012	+0.025	+0.037	+0.05
0.5 µL – 10 µL medium gray	-0.2	-0.15	-0.1	-0.05	+0.05	+0.1	+0.15	+0.2
1 µL – 20 µL light gray	-0.4	-0.3	-0.2	-0.1	+0.1	+0.2	+0.3	+0.4
1 µL – 20 µL yellow	-0.4	-0.3	-0.2	-0.1	+0.1	+0.2	+0.3	+0.4
5 µL – 100 µL yellow	-2	-1.5	-1	-0.5	+0.5	+1	+1.5	+2
10 µL – 200 µL yellow	-4	-3	-2	-1	+1	+2	+3	+4
15 µL – 300 µL orange	-6	-4.5	-3	-1.5	+1.5	+3	+4.5	+6
50 µL – 1000 µL blue	-20	-15	-10	-5	+5	+10	+15	+20
0.1 mL – 2 mL red	-40	-30	-20	-10	+10	+20	+30	+40

Pipette model	ADJ adjustment value							
	-8	-6	-4	-2	+2	+4	+6	+8
	Volume change in µL							
0.25 mL – 5 mL violet	-100	-75	-50	-25	+25	+50	+75	+100
0.5 mL – 10 mL turquoise	-200	-150	-100	-50	+50	+100	+150	+200

6.12.2 Setting the temporary adjustment of the pipette



1. Place the flat side of the adjustment tool on the *ADJ* adjustment cover.



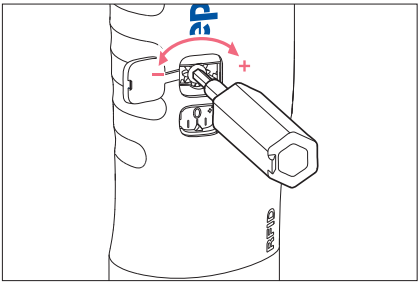
2. Pry open the adjustment cover.

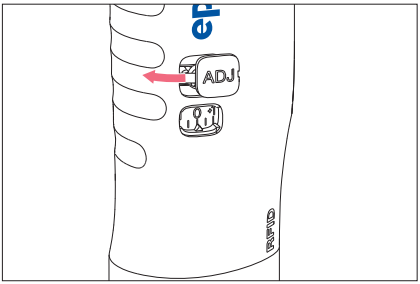
   The adjustment cover is connected to the housing with a hinge.

3. Pull the adjustment cover out as far as it will go.

4. Push the adjustment cover back with your thumb.

   The hinge of the adjustment cover folds all the way back against the housing.





5. Insert the adjustment tool with the hexagonal wrench into the white gear wheel.
6. Turn the adjustment tool until the scale shows the desired value.
7. Close the adjustment cover.
8. Check the volume gravimetrically.
9. Adjust the adjustment value if necessary.
10. Fold back the adjustment cover and push the tab flat into the housing.
11. Press the adjustment cover shut.

Note the validity range of the temporary adjustment on the pipette (e.g., on a pipette marking ring.

- Adjustment adjusted for:
- Adjustment valid for volume range:

6.12.3 Setting the adjustment with predefined values when using long epT.I.P.S.

When using longer pipette tips than the test tip, too little liquid tends to be pipetted. To compensate for this, it is recommended to adjust the ADJ adjustment value to the positive range.

The adjustment values apply to the following conditions:

- Use of demineralized water
- Pipetting at ambient temperature
- The air cushion in the pipette tip is pre-saturated
- Liquid aspiration and liquid dispensing using the forward pipetting method

Setting the adjustment value

The predefined adjustment values can be taken from the table. The dispensing results can be checked gravimetrically. See SOP - Standard Testing Procedure for Manual Dispensing Systems; chapter "Converting gravimetric measured values to volumes" (www.eppendorf.com/manuals).

1. Open the ADJ adjustment cover.
2. In the table, find the row with the corresponding pipette model, see *Table 2 "Predefined adjustment values for long pipette tips for single-channel pipettes" on page 40*.
3. Find the adjustment value that is closest to your desired pipetting volume.
4. In the table, find the volume change for the appropriate pipette model, see *Chapter 6.12.1 "Table with theoretical setting values" on page 36*.
5. Insert the adjustment tool.
6. Set the selected adjustment value.

Table 2: Predefined adjustment values for long pipette tips for single-channel pipettes

Pipette model	**Pipette tip epT.I.P.S.**	**Pipetting volume**	**ADJ adjustment value**		
			-	**0**	**+**
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL L light gray 46 mm	1 µL		0	
		5 µL		0	
		10 µL		0	
1 µL – 20 µL yellow	20 µL – 300 µL orange 55 mm	2 µL			+5
		10 µL			+5
		20 µL			+5
5 µL – 100 µL yellow	20 µL – 300 µL orange 55 mm	10 µL			+1
		50 µL			+1
		100 µL			+1
10 µL – 200 µL yellow	20 µL – 300 µL orange 55 mm	20 µL		0	
		100 µL		0	
		200 µL		0	
50 µL – 1000 µL blue	50 µL – 1250 µL green 76 mm	100 µL		0	
		500 µL		0	
		1000 µL		0	
50 µL – 1000 µL blue	50 µL – 1250 µL L dark green 103 mm	100 µL			+1.5
		500 µL			+3
		1000 µL			+3
0.25 mL – 5 mL violet	0.2 mL – 5 mL L violet 175 mm	0.5 mL			+1
		2,5 mL			+2
		5 mL			+4.5
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL L turquoise 243 mm	1 mL		0	
		5 mL			+1
		10 mL			+4.5

6.12.4 Setting the adjustment with predefined values for reverse pipetting

When using the reverse pipetting method, too much liquid tends to be pipetted. To compensate for this, it is recommended to adjust the ADJ adjustment value to the negative range.

The adjustment values apply to the following conditions:

- Use of demineralized water
- Pipetting at ambient temperature
- The air cushion in the pipette tip is pre-saturated
- Liquid aspiration and liquid dispensing using the reverse pipetting method

Setting the adjustment value

The predefined adjustment values can be taken from the table. The dispensing results can be checked gravimetrically. See SOP - Standard Testing Procedure for Manual Dispensing Systems; chapter "Converting gravimetric measured values to volumes" (www.eppendorf.com/manuals).

1. Open the ADJ adjustment cover.
2. In the table, find the row with the corresponding pipette model, see ↳ *Further information on page 42*.
3. Find the adjustment value that is closest to your desired pipetting volume.
4. In the table, find the volume change for the appropriate pipette model, see ↳ *Chapter 6.12.1 “Table with theoretical setting values” on page 36*.
5. Insert the adjustment tool.
6. Set the selected adjustment value.

Table 3: Setting the adjustment with predefined values for reverse pipetting

Pipette model	Pipette tip	Pipetting volume	ADJ adjustment value		
			-	0	+
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	0.25 µL	-8		
		1.25 µL	-8		
		2.5 µL	-8		
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	1 µL	-3		
		5 µL	-3		
		10 µL	-3		
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	2 µL	-4		
		10 µL	-4		
		20 µL	-4		
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	2 µL	-6		
		10 µL	-6		
		20 µL	-6		
5 µL – 100 µL yellow	2 µL – 200 µL yellow 53 mm	10 µL	-3		
		50 µL	-3		
		100 µL	-3		
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	20 µL	-3		
		100 µL	-3		
		200 µL	-3		
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	30 µL	-2		
		150 µL	-2		
		300 µL	-2		
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	100 µL	-3		
		500 µL	-3		
		1000 µL	-3		
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red	0.2 mL	-2		
		1.0 mL	-2		

Pipette model	Pipette tip	Pipetting volume	ADJ adjustment value		
			-	0	+
	115 mm	2.0 mL	-2		
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	0.5 mL	-2		
		2.5 mL	-2		
		5.0 mL	-2		
1 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	1.0 mL	-2		
		5.0 mL	-2		
		10.0 mL	-2		

6.12.5 Setting the adjustment with self-determined values

Setting the adjustment value

The specified adjustment values are guidelines and must be checked by the user. See SOP - Standard Testing Procedure for Manual Dispensing Systems, chapter "Converting gravimetric measured values to volumes" (www.eppendorf.com/manuals).

Tool:

- Analytical balance

Prerequisites:

- A single-channel pipette suitable for the pipette tip is available.
- The SOP - Standard Testing Procedure for Manual Dispensing Systems document is available.
- The density of the liquid is known.

1. Determine the dispensed volume gravimetrically.
2. Calculate the volume from the weight value.
3. Determine the difference between the set volume and the calculated volume.
4. In the table, find the volume change for the appropriate pipette model, see *Chapter 6.12.1 "Table with theoretical setting values" on page 36*.
5. Set the ADJ temporary adjustment according to the table value.
6. Determine the dispensed volume gravimetrically.
7. If the temporary adjustment is not suitable, repeat the process.

The following sections provide examples of values determined for non-aqueous liquids. The adjustment values are guidelines and must be adjusted for each different liquid.

Example: Setting the adjustment value when using iodixanol

The adjustment values apply to the following conditions:

- Concentration 60 % w/v
- Density 1.32 g/mL
- Temperature 21 °C
- Very slow liquid dispensing onto the tube inner wall
- Dispensing of residual liquid (Blow-out) approx. 3 s after liquid dispensing
- The air cushion in the pipette tip is not pre-saturated
- Liquid aspiration and liquid dispensing using the forward pipetting method
- Use of a new pipette tip for each liquid dispensing

Table 4: Adjustment values for iodixanol

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	2.5 µL			+8 (1)
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	10 µL			+8 (2)
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	20 µL			+8 (2)
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	20 µL			+8
5 µL – 100 µL yellow	2 µL – 200 µL yellow 53 mm	100 µL			+8 (2)

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	200 µL			+8
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	300 µL			+8
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	1000 µL			+4.5
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red 115 mm	2 mL			+8
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	5 mL			+8
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	10 mL			+8

(1)	The dispensing results have been improved. The pipette operates outside of the specified errors of measurements (see *"Single-channel pipettes with adjustable volume" on page 82*). Setting better adjustment values is not possible.
(2)	The dispensing results have been improved. The pipette operates outside of the specified errors of measurement and those required by standards (DIN EN ISO 8655). Setting better adjustment values is not possible.

Example: Setting the adjustment value when using Dodecan

The adjustment values apply to the following conditions:

- Concentration > 99 %
- Density 0.75 g/mL
- Temperature 21 °C
- Liquid dispensing onto the tube inner wall
- Dispensing of residual liquid (Blow-out) approx. 3 s after liquid dispensing
- The air cushion in the pipette tip is not pre-saturated
- Liquid aspiration and liquid dispensing using the forward pipetting method
- Use of a new pipette tip for each liquid dispensing

Table 5: Adjustment values for Dodecan

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	2.5 µL			0
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	10 µL			0
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	20 µL			+6
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	20 µL			0
5 µL – 100 µL yellow	2 µL – 200 µL yellow 53 mm	100 µL			+5

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	200 µL			+6
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	300 µL			+3
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	1000 µL			0
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red 115 mm	2 mL			+4
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	5 mL			+5
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	10 mL			+3.5

Example: Setting the adjustment value when using Dimethyl sulfoxide (DMSO)

The adjustment values apply to the following conditions:

- Concentration 100 %
- Density 1.099 g/mL
- Temperature 21 °C
- Liquid dispensing onto the tube inner wall
- Dispensing of residual liquid (Blow-out) approx. 3 s after liquid dispensing
- The air cushion in the pipette tip is not pre-saturated
- Liquid aspiration and liquid dispensing using the forward pipetting method
- Use of a new pipette tip for each liquid dispensing

Table 6: Adjustment values for Dimethyl sulfoxide

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	2.5 µL	-8 (2)		
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	10 µL	-8		
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	20 µL	-5		
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	20 µL	-8 (2)		
5 µL – 100 µL yellow	2 µL – 200 µL yellow 53 mm	100 µL	-4		

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	200 µL	-2		
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	300 µL	-4		
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	1000 µL	-3.5		
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red 115 mm	2 mL		0	
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	5 mL		0	
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	10 mL		0	

(1)	The dispensing results have been improved. The pipette operates outside of the specified errors of measurements (see *"Single-channel pipettes with adjustable volume" on page 82*). Setting better adjustment values is not possible.
(2)	The dispensing results have been improved. The pipette operates outside of the specified errors of measurement and those required by standards (DIN EN ISO 8655). Setting better adjustment values is not possible.

Setting the adjustment value when using Sodium hydroxide

The adjustment values apply to the following conditions:

- Concentration 40 % w/w
- Density 1.437 g/mL
- Temperature 21 °C
- Liquid dispensing onto the tube inner wall
- Dispensing of residual liquid (Blow-out) approx. 3 s after liquid dispensing
- The air cushion in the pipette tip is not pre-saturated
- Liquid aspiration and liquid dispensing using the forward pipetting method
- Use of a new pipette tip for each liquid dispensing

Table 7: Adjustment values for Sodium hydroxide

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	2.5 µL		0	
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	10 µL		0	
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	20 µL		0	
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	20 µL		0	
5 µL – 100 µL yellow	2 µL – 200 µL yellow 53 mm	100 µL		0	

Pipette model	Pipette tip	Pipetting volume 100 %	ADJ adjustment value		
			-	0	+
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	200 µL			+5
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	300 µL		0	
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	1000 µL		0	
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red 115 mm	2 mL			+5.5
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	5 mL			+5.5
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	10 mL			+6

7 Maintenance

7.1 Maintenance

Eppendorf SE recommends having your device inspected and maintained at regular intervals by trained and skilled personnel.

Eppendorf SE offers customized service solutions for preventive maintenance, qualification and calibration of your device. For information, offers and contact options, visit our website www.eppendorf.com/epservices.

7.1.1 Maintenance plan

Interval	Maintenance work
As required	*"Cleaning the pipette upper part and pipette lower part" on page 71*
	Chapter 7.2.2 "Cleaning pipettes" on page 70
	Chapter 7.2.3 "Disinfecting the pipette" on page 72
	Chapter 7.2.4 "Sterilizing the pipette" on page 74
	Chapter 7.2.6 "Autoclaving the pipette" on page 74
Daily	*Chapter 7.1.2 "Checking the pipette for damage" on page 53*
Yearly	*Chapter 7.1.9 "Calibrating the pipette" on page 66*

7.1.2 Checking the pipette for damage

1. Check whether the pipette is damaged on the outside.
   If the pipette is damaged on the outside, stop using it.
2. Check whether the pipette is free of contamination.
   If the pipette is contaminated, clean it.

7.1.3 Disassembling the lower part of the single-channel pipette ≤ 1000 µL

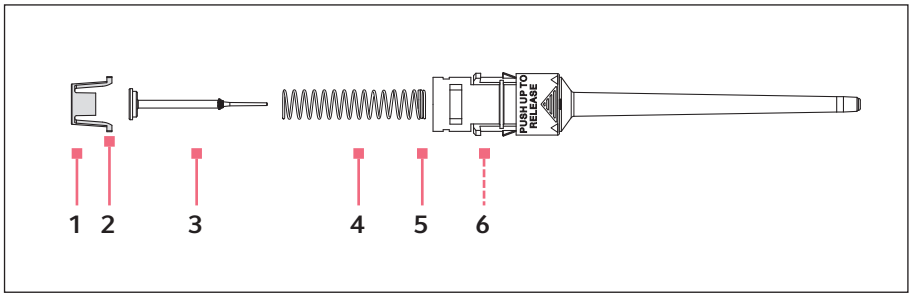


Fig. 7-1: Lower part of the single-channel pipette ≤ 1000 µL

1	Piston mount	4	Piston spring
2	Locking tabs	5	Double coil
3	Piston	6	Inner cylinder

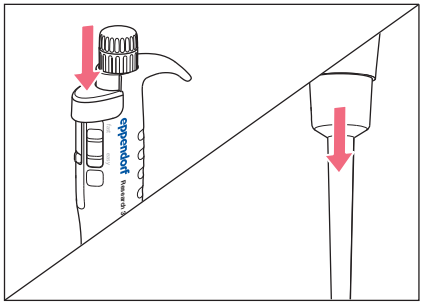
CAUTION! Damage to eyes

During disassembly, a spring may pop out uncontrollably. The spring and other components may hit the eye and cause injury.

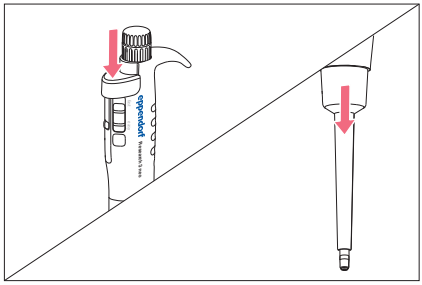
– Wear protective goggles.

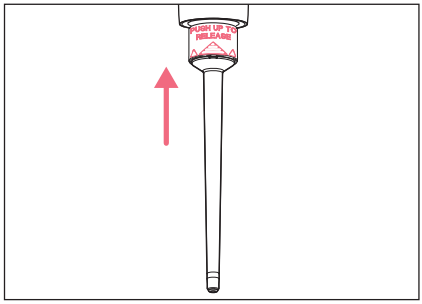
Protective equipment:

- Protective goggles

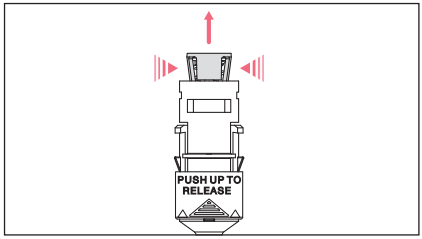


1. Press and hold the ejector button all the way down.
2. Pull off the ejector sleeve.
3. Release the ejector button.

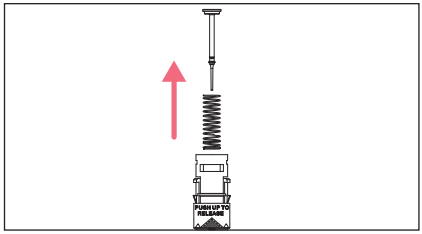




4. Push up the ring labeled *PUSH UP TO RELEASE* until the lower part is released.
5. Remove the lower part from the upper part.



6. Gently press the locking tabs on the piston mount together.



7. Remove the piston mount.

On the 1000 µL pipette (color code ■ blue), the piston spring is firmly attached to the piston.

8. Remove the piston and piston spring.

7.1.4 Disassembling the lower part of the single-channel pipette ≥ 2 mL

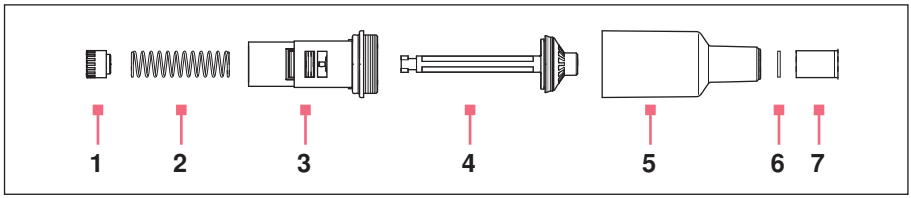


Fig. 7-2: Lower part of the single-channel pipette ≥ 2 mL

1 Piston mount
2 Piston spring
3 Piston guide
4 Piston
5 Tip cone with cylinder
6 Protection filter
7 Filter sleeve

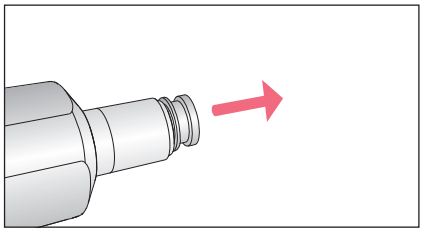
CAUTION! Damage to eyes

During disassembly, a spring may pop out uncontrollably. The spring and other components may hit the eye and cause injury.

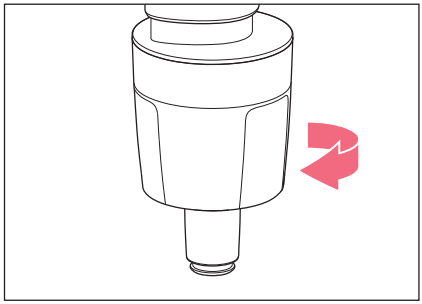
– Wear protective goggles.

Protective equipment:

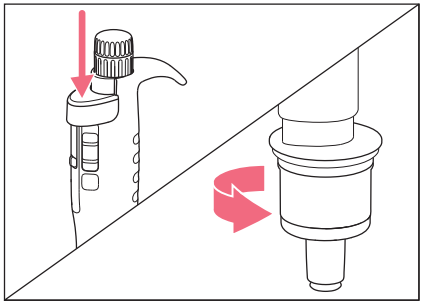
- Protective goggles



1. Pull out the filter sleeve.

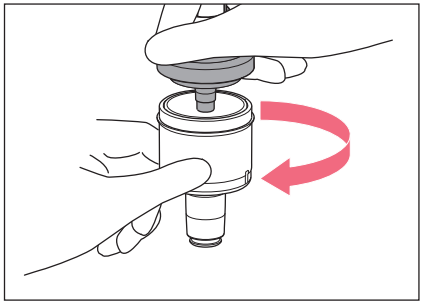


2. Unscrew the ejector sleeve.

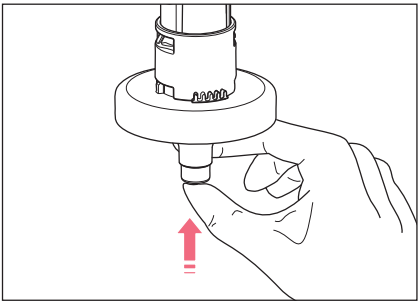


3. Press and hold the ejector button. Turn the lower part against the resistance to the right (counterclockwise).

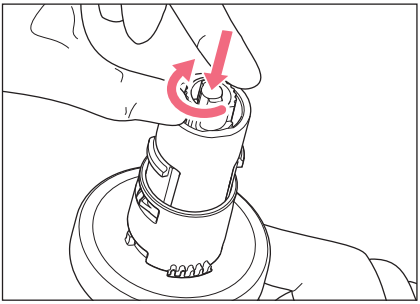
   The lower part is spring-loaded. It will pop out with a click.



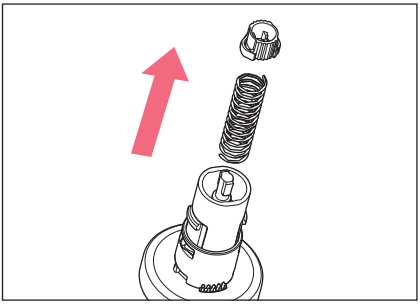
4. Unscrew the cylinder and piston guide clockwise.
5. Place the cylinder to one side.



6. Support the piston from below with one hand.



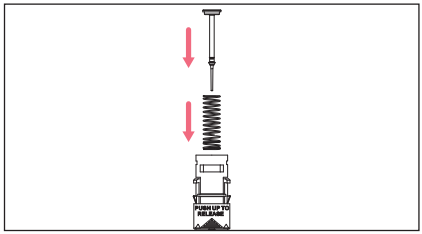
7. Use your other hand to press the piston mount down against the spring tension.
8. Hold the piston mount firmly and carefully unlock it by turning it 90°.



9. Remove the piston spring and piston.

7.1.5 Assembling the lower part of the single-channel pipette ≤ 1000 µL

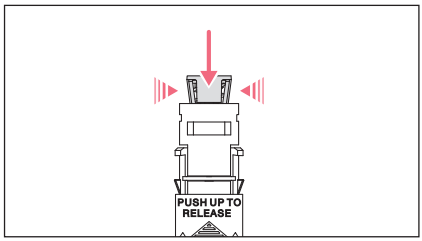
In the case of piston springs with double coils, these coils must point downwards. If the piston is not positioned correctly in the cylinder, you will feel resistance and the piston will not move correctly in the cylinder. Excessive pressure will bend the piston.



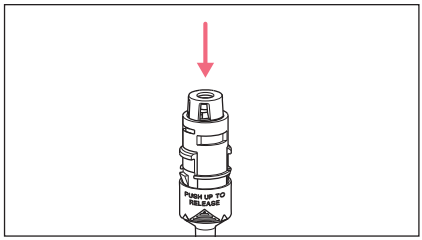
1. Carefully insert the piston and piston spring into the cylinder. Make sure that the piston is guided straight in the piston spring and in the cylinder.

   The piston must move freely in the cylinder.

2. If the piston does not move freely, gently pull the piston back. Repeat the process.

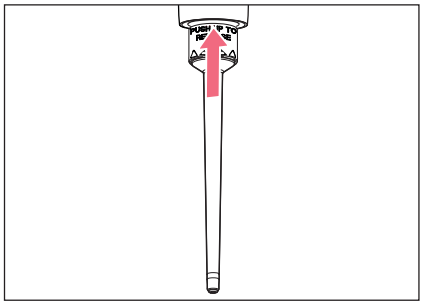


3. Keep the piston and piston spring pressed down.
4. Press the locking tabs on the piston mount together.
5. Insert the piston mount with the locking tabs into the retainers.

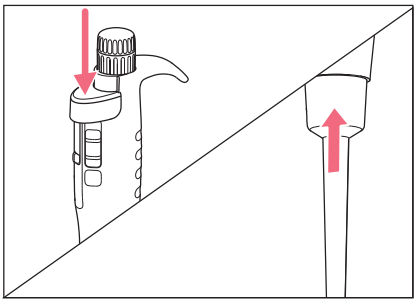


6. Gently press on the inserted piston with a pipette tip.

   The piston must move down in the cylinder without any noticeable resistance.



7. Insert the pre-assembled lower part of the pipette into the upper part until it audibly clicks into place.



8. Press and hold the ejector button and attach the ejector sleeve.

   You will hear a slight click when it is properly seated.

9. To ensure the pipette has been correctly assembled, check to see that it works.

10. Check the systematic and random errors using the Standard Testing Procedure For Manual Dispensing Systems.

7.1.6 Assembling the lower part of the single-channel pipette ≥ 2 mL

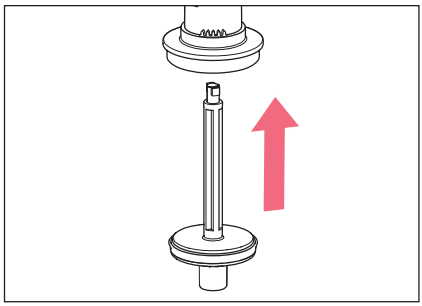
CAUTION! Damage to eyes

During disassembly, a spring may pop out uncontrollably. The spring and other components may hit the eye and cause injury.

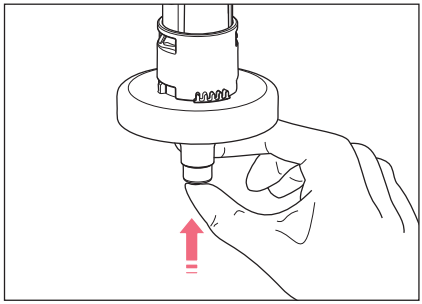
– Wear protective goggles.

Protective equipment:

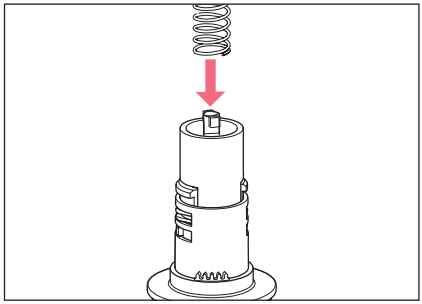
- Protective goggles



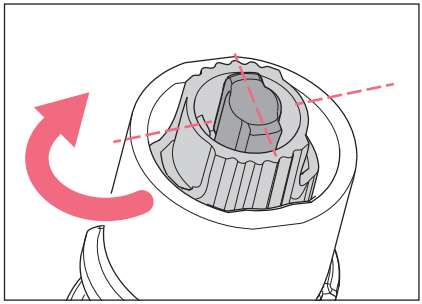
1. Insert the piston into the piston guide from below.



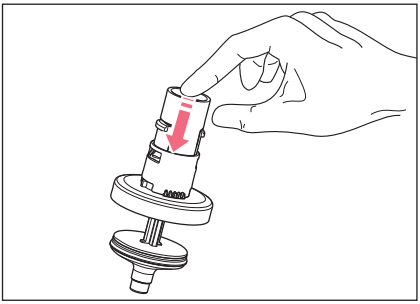
2. For the next steps, secure the piston from below.



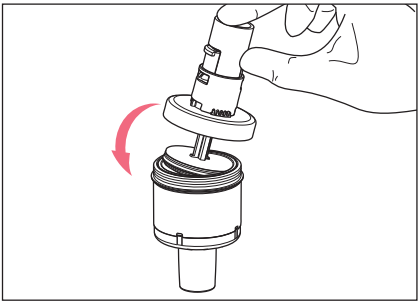
3. Insert the piston spring into the piston guide from above.



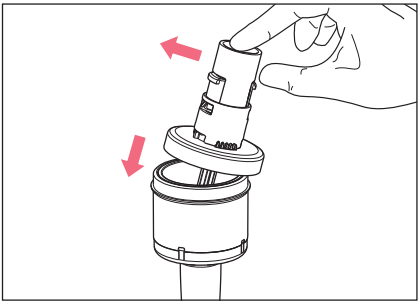
4. Attach the piston mount and press the piston spring into the piston guide.
5. Turn the piston mount 90°.



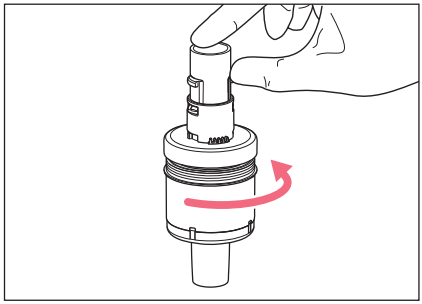
6. For the next steps, press and hold the piston down.



7. Insert the piston into the cylinder at a slight angle.

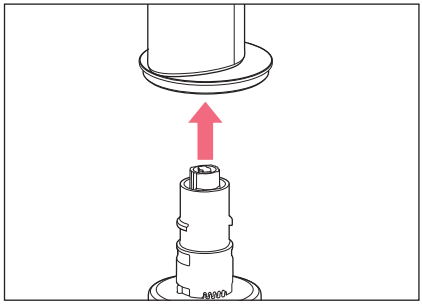


8. Push the piston further into the cylinder and slowly tilt it straight.



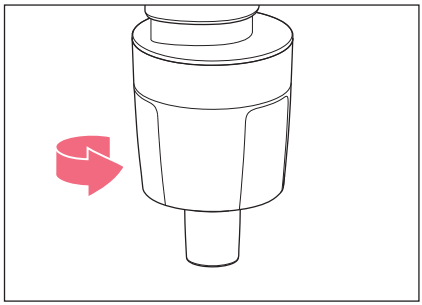
9. Screw the cylinder counterclockwise onto the piston guide.
10. To check that the piston rotates freely, press on the piston mount from above.

    The piston must move easily in the cylinder.

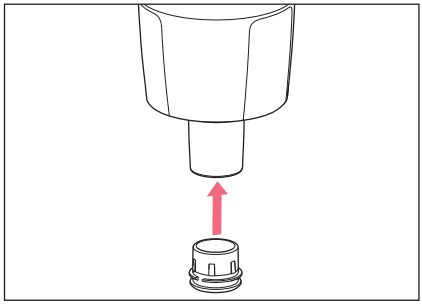


11. Insert the assembled lower part into the upper part.

    It will audibly click into place.



12. Attach the ejector sleeve. Screw it tight counterclockwise.



13. Insert the filter sleeve with the new protection filter.
14. To ensure the pipette has been correctly assembled, check to see that it works.
15. Check the systematic and random errors using the Standard Testing Procedure For Manual Dispensing Systems.

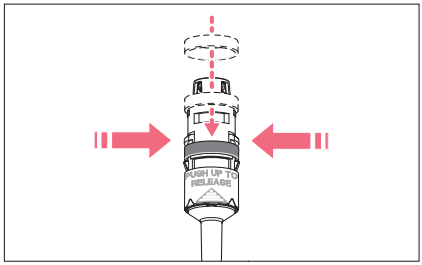
7.1.7 Deactivating and activating spring-loading action

The tip cone of the pipettes springs when the pipette tip is attached. This ensures that the pipette tip fits perfectly. Low attachment force is required. If higher attachment forces are required, the spring-loading action can be deactivated.

Deactivating the spring-loading action of single-channel pipettes

Prerequisites:

- The pipette lower part has been disassembled.



1. Gently press the clamps on the lower part together and slide the locking ring onto the lower part from above.
2. Insert the lower part.
3. Attach the ejector sleeve.

Activating the spring-loading action of single-channel pipettes

Prerequisites:

- The pipette lower part has been disassembled.

1. Gently press the clamps on the lower part together and pull the locking ring up and off the lower part.
2. Insert the lower part.
3. Attach the ejector sleeve.

7.1.8 Greasing the piston and cylinder

The piston or cylinder in the pipette lower part must be regreased after cleaning or decontamination.

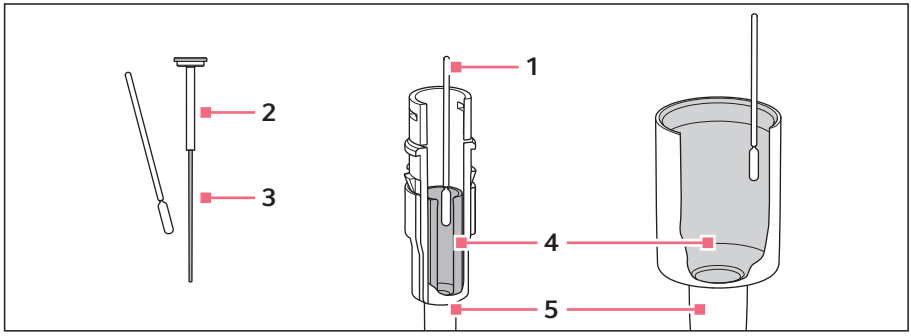


Fig. 7-3: Greasing the piston and cylinder

1	Swab	4	Cylinder
2	Piston ≤ 20 µL	5	Lower part > 20 µL
3	Running surface		

Greasing the piston

Prerequisites:

- For volumes ≤ 20 µL
- The pipette lower part has been disassembled.

1. Apply a small amount of grease to the swab.
2. Apply a thin layer of grease to the piston running surface.
   The pipette lower part can be reassembled.

Greasing the cylinder

Prerequisites:

- For volumes > 20 µL
- The pipette lower part has been disassembled.

1. Apply a small amount of grease to the swab.
2. Apply a thin layer of grease to the inside wall of the cylinder.
   The pipette lower part can be reassembled.

7.1.9 Calibrating the pipette

Shipping the pipette to a calibration laboratory

1. Have the pipette calibrated in accordance with DIN EN ISO 8655.

   Attach a label to the pipette. This label should show the date of the current calibration and the date of the next calibration.

Calibrating the pipette yourself

1. Calibrate the pipette in accordance with DIN EN ISO 8655 using the Standard Testing Procedure For Manual Dispensing Systems.

7.1.10 Changing the permanent adjustment

A permanent adjustment changes the factory adjustment of the pipette. Checking the factory adjustment is necessary after replacing volume-determining parts.

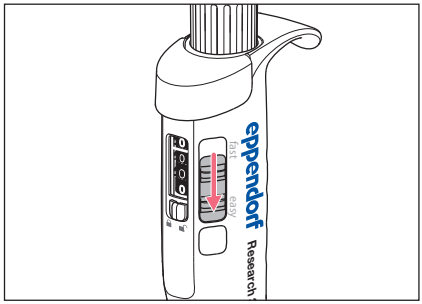
Tool:

- Analytical balance

Prerequisites:

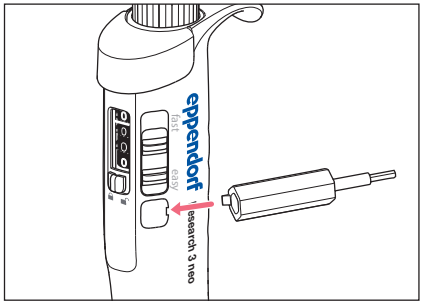
- The temporary adjustment is set to "0".
- A red adjustment seal is present.
- The following information is available from the "SOP – Standard Testing Procedure For Manual Dispensing Systems" document:
  - The correction factor Z for water
  - The formula for calculating the measured volume

1. Determine the actual volume gravimetrically for 10 %, 50 % and 100 % of the nominal volume.
2. Determine the dispensed volume gravimetrically.
3. Determine the difference between the set and calculated volume.
4. Find the volume difference for your pipette in the table, see *"Volume changes for single-channel pipettes" on page 69*.



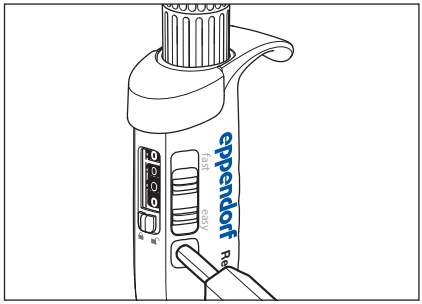
5. Move the speed adjustment slider to the *easy* position.

   Keep this setting until adjustment is complete.



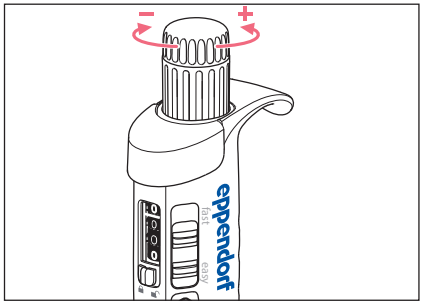
6. Place the adjustment tool with the flat side against the adjustment seal.
7. Pry off the adjustment seal.

   The adjustment seal is not connected to the housing.



8. Insert the adjustment tool with the hexagonal wrench until it stops.

   The counter is decoupled.



9. Turn the control button according to the information in the table.

   The counter does **not** rotate.

10. Remove the adjustment tool.
11. Check the volume gravimetrically.
12. Repeat the process until the set volume matches the dispensed volume.
13. Use this setting to check the volume gravimetrically for all three volume ranges (10 %, 50 % and 100 %).
14. Compare the gravimetric values with the errors of measurements. See *"Single-channel pipettes with adjustable volume" on page 82*
15. Adjust the adjustment value if necessary.
16. When the permanent adjustment is complete, insert the supplied red adjustment seal.

    The red adjustment seal indicates that the factory adjustment has been changed by the customer.

Volume changes for single-channel pipettes

These volume changes are guidelines only. The actual volume change must be determined gravimetrically.

Table 8: Calculated volume changes for single-channel pipettes

Pipette model	Color symbol	Color name	Control button rotated to – easy			
			-½	-¼	+¼	+½
			Volume change in µL			
0.1 µL – 2.5 µL		dark gray	-0.075	-0.038	+0.038	+0.075
0.5 µL – 10 µL		medium gray	-0.37	-0.18	+0.18	+0.37
1 µL – 20 µL		light gray	-0.74	-0.37	+0.37	+0.74
1 µL – 20 µL		yellow	-0.74	-0.37	+0.37	+0.74
5 µL – 100 µL		yellow	-3.7	-1.8	+1.8	+3.7
10 µL – 200 µL		yellow	-7.4	-3.7	+3.7	+7.4
15 µL – 300 µL		orange	-7.4	-3.7	+3.7	+7.4
50 µL – 1000 µL		blue	-37	-18	+18	+37
0.1 mL – 2 mL		red	-74	-37	+37	+74
0.25 mL – 5 mL		violet	-184	-92	+92	+184
0.5 mL – 10 mL		turquoise	-368	-184	+184	+368

7.2 Decontamination

7.2.1 Suitable cleaning agents and disinfectants

In the tables you will find suitable cleaning agents and disinfectants for various types of contamination.

Cleaning agents

Contamination	Suitable cleaning agents
Water-soluble contamination: • Acids • Alkalis • Saline solutions	• Deionized water
Molecular biological contamination: • Nucleic acids	• DNA/RNA cleaning agent • Sodium hypochlorite, maximum 4 %
Biochemical contamination: • Proteins	• Mild detergent

Disinfectants

Contamination	Suitable disinfectants
• Infectious liquids • Microorganisms	• Ethanol 70 % • Isopropanol • Meliseptol

7.2.2 Cleaning pipettes

Clean the outside of the pipette regularly to remove visible and non-visible contamination. The pipette upper parts are cleaned on the outside. The pipette lower parts can be cleaned from the outside and rinsed from the inside.

The pipette must be cleaned in the following cases:

- If it is dirty
- If aggressive chemicals are used
- If it is subjected to heavy use

Cleaning the pipette upper part and pipette lower part

NOTICE! Damage to the device and accessories

The use of unsuitable cleaning agents or sharp objects may damage the device and its accessories.

- Do not use any aggressive cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Do not clean the device with acetone or organic solvents with a similar effect.
- Do not use any sharp or pointed objects to clean the device.

Material:

- Suitable cleaning agent
- Deionized water
- Cloth

1. Dampen the cloth with a suitable cleaning agent.
2. Wipe the outside of the pipette.
3. Dampen a new cloth with deionized water.
4. Wipe off any cleaning agent residue from the pipette.
5. Allow the pipette to air dry or place the pipette in a drying cabinet at a maximum of 60 °C.

Rinsing the pipette lower part with cleaning agent

The pipette lower part must be rinsed in the following cases:

- Liquid has been drawn into the inside of the pipette.
- Aerosols have entered the inside of the pipette.

NOTICE! Damage to the device and accessories

The use of unsuitable cleaning agents or sharp objects may damage the device and its accessories.

- Do not use any aggressive cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Do not clean the device with acetone or organic solvents with a similar effect.
- Do not use any sharp or pointed objects to clean the device.

Material:

- Suitable cleaning agent
- Deionized water
- Cloth

Prerequisites:

- The pipette lower part has been separated from the pipette upper part.
- The pipette lower part has been disassembled.

1. Check the pipette lower part for wear and damage.
2. Replace defective components.
3. Remove the piston grease from the piston and from the cylinder wall.
4. Rinse the components of the pipette lower part with a suitable cleaning agent.
5. Rinse the components of the pipette lower part thoroughly with deionized water.
6. Allow the components of the pipette lower part to air dry or place the components in a drying cabinet at a maximum of 60 °C.
7. Regrease the piston and cylinder wall.
8. Reassemble the pipette lower part.

7.2.3 Disinfecting the pipette

The pipette upper parts are only disinfected on the outside. The pipette lower parts can be disinfected from the outside and inside.

The pipette must be disinfected in the following cases:

- If it comes into contact with infectious liquids.

NOTICE! Damage to the device and accessories

The use of unsuitable cleaning agents or sharp objects may damage the device and its accessories.

– Do not use any aggressive cleaning agents, strong solvents or abrasive polishes.
– Check the compatibility with the materials used.
– Do not clean the device with acetone or organic solvents with a similar effect.
– Do not use any sharp or pointed objects to clean the device.

Disinfecting the outside of the pipette upper part and pipette lower part

Material:

- Suitable disinfectant
- Deionized water
- Cloth

Prerequisites:

- All cleaning agent residues have been removed.

1. Dampen the cloth with a suitable disinfectant.
2. Wipe the outside of the pipette.
3. Dampen a new cloth with deionized water.
4. Wipe off any disinfectant residue from the pipette.
5. Allow the pipette to air dry or place the pipette in a drying cabinet at a maximum of 60 °C.

Rinsing the pipette lower part with disinfectant

Material:

- Suitable disinfectant
- Deionized water

Prerequisites:

- The pipette lower part has been separated from the pipette upper part.
- The pipette lower part has been disassembled.
- All cleaning agent residues have been removed.
- Contamination caused by liquid that has penetrated has been removed.

1. Check the pipette lower part for wear and damage.
2. Replace defective components.
3. Remove the piston grease from the piston and from the cylinder wall.
4. Rinse the components of the pipette lower part with a suitable disinfectant or place the components in the disinfectant.
5. Allow the disinfectant to take effect according to the manufacturer's instructions.
6. Rinse the components of the pipette lower part thoroughly with deionized water.
7. Allow the components of the pipette lower part to air dry or place the components in a drying cabinet at a maximum of 60 °C.

8. Regrease the piston and cylinder wall.
9. Reassemble the pipette lower part.

7.2.4 Sterilizing the pipette

Treatment with UV light deactivates microorganisms on the outer surface of the pipette. Typically, a UV lamp is used in a biosafety cabinet.

Material:
- UV lamp

Prerequisites:
- The rechargeable battery has been removed from an electronic pipette.

1. Sterilize the pipette with UV light at 254 nm and a distance of 60 cm.

7.2.5 Sterilizing pipettes with H_2O_2 gassing

Treatment with H_2O_2 gas deactivates microorganisms on the external and internal surfaces, as long as they can be reached by the gas. Pipettes are typically gassed as part of biosafety cabinet maintenance. Alternatively, special devices for H_2O_2 gassing can be used. Neither the material nor the adjustment of pipettes is affected by H_2O_2 gassing with a concentration of up to 500 ppm and a contact time of up to 3 h per sterilization process.

7.2.6 Autoclaving the pipette

NOTICE! Material damage

If disinfectant, decontamination agent, Sodium hypochlorite or UV irradiation is used directly before autoclaving, the surface and material of the pipette may become damaged and porous.
- Wipe away any remaining disinfectant or decontamination agent from the pipette using deionized water.
- Do not use any additional disinfectant or decontamination agent with the autoclave.

The pistons do not need to be re-greased after autoclaving.

Prerequisites:
- The pipette has been cleaned.
- All residues of cleaning agents or disinfectants have been removed.

- The volume setting ring is unlocked .
- The protection filter in the 2 mL – 10 mL pipettes has been removed.

1. Autoclave the pipette for 20 min at 121 °C and 1 bar positive pressure.
2. Autoclave the filter sleeve and the protection filter separately.
3. Allow the pipette to cool to ambient temperature and dry.

For maximum precision and accuracy, it is recommended to carry out a gravimetric test after autoclaving.

8 Troubleshooting

8.1 Problems with the pipette

Error description	Cause	Solution
The temporary adjustment display has been changed.	The pipette has been temporarily adjusted for a different liquid sample, for long pipette tips or a different pipetting technique.	To restore the initial state, reset the temporary adjustment to 0.
The control button is stuck.	The piston or the seal is contaminated.	Clean the lower part.
	The seal is defective.	Replace the seal.
	The pipette is clogged.	Replace the protection filter for volume sizes 2 mL – 10 mL.
The tip cone of the single-channel pipette is not spring-loaded.	The spring-loading action is blocked.	Remove the locking ring from the single-channel lower part of the pipette.
The volume cannot be adjusted.	The speed adjustment slider is in the middle. The counter is decoupled.	Move the slider to *easy* or *fast*.
	The control button has been turned too forcefully toward the minimum or maximum end stop.	Move the speed adjustment slider to *easy*. Carefully turn the control button back. If the control button cannot be turned, contact your Eppendorf partner.
The set volume changed during pipetting.	The control button is not locked.	Move the volume catch slider to the 🔒 symbol.
The control button is difficult to turn.	The speed adjustment of volume setting is set to *fast*. The volume can be adjusted quickly. The operating force is higher than with the *easy* setting.	Set the speed adjustment to *easy*.

Error description	Cause	Solution
The pipette makes a clicking noise when adjusting the volume.	The control button is locked.	Move the volume catch slider to the 🔓 symbol.
	The control button is turned beyond the end stop. The gears in the counter slide over each other and produce the clicking noises. Over time, the gears wear down and damage the counter.	If the clicking noises occur, do **not** turn the control button any further. Move the speed adjustment slider to *easy*. Carefully turn the control button back. If you cannot turn the control button back, contact your Eppendorf partner.

8.2 Problems with the pipette tip

Error description	Cause	Solution
The pipette tip is loose.	The pipette tip is not compatible.	Use the correct size epT.I.P.S. pipette tips.
	Higher attachment forces are necessary.	Attach the pipette tip firmly. Deactivate the spring-loading action.
Liquid is dripping from the pipette tip.	The pipette tip is loose.	Attach the pipette tip firmly. Deactivate the spring-loading action. Use the correct size epT.I.P.S. pipette tips. If you are using ep Dualfilter T.I.P.S. pipette tips, remove the protection filter from the pipette (2 mL to 10 mL only).
	The piston is contaminated.	Clean and grease the piston.
	The piston is damaged.	Replace the piston.
	The seal is defective.	Replace the seal.

Error description	Cause	Solution
Liquid is dripping from the pipette tip.	The o-ring is defective.	Replace the o-ring.
	The dispensed liquid sample has a high vapor pressure.	Pre-saturate the pipette tip several times.
	The tip cone is damaged.	Replace the lower part of the single-channel pipette. Replace the channel of the multi-channel pipette.
The dispensing volume is incorrect.	The dispensed liquid sample has a high vapor pressure or a different density.	Adjust the pipette for the liquid sample used.

9 Transport

9.1 Shipping the pipette

WARNING! Contamination

Shipping or storing a contaminated pipette may lead to contamination of persons or cause damage to health.

– Clean and decontaminate the pipette before shipping it or putting it into storage.

Prerequisites:

- The pipette has been cleaned and decontaminated.

1. Download the decontamination certificate for returning goods from www.eppendorf.com.
2. Fill out the decontamination certificate.
3. Pack the pipette securely against shocks.
4. Attach the decontamination certificate to the outside of the packing so that it is safe for transport.
5. Ship the pipette.

10 Disposal

10.1 Preparing for disposal

Preparing disposal according to legal regulations

For information on the legal regulations that apply in your country, contact your local authority and your Eppendorf partner.

Dispose of non-decontaminable devices as hazardous waste.

1. Check which legal regulations apply to disposal in your country.
2. Choose a certified waste disposal company or contact your Eppendorf partner.

Creating a decontamination certificate

Prerequisites:

- The device has been decontaminated.

1. Download a decontamination certificate from our webpage www.eppendorf.com.
2. Complete the decontamination certificate.

11 Technical data

11.1 Ambient conditions

Operation

Operating temperature	5 °C – 40 °C
Relative humidity	10 % – 95 %

Storage in transport packing

Air temperature	-25 °C – 55 °C
Relative humidity	10 % – 95 %

Storage without transport packing

Air temperature	-5 °C – 45 °C
Relative humidity	10 % – 95 %

11.2 Adjustable sub-steps

Single-channel pipettes

Model	Color symbol	Color name	Increment
0.1 µL – 2.5 µL		dark gray	0.002 µL
0.5 µL – 10 µL		medium gray	0.01 µL
1 µL – 20 µL		light gray	0.02 µL
1 µL – 20 µL		yellow	0.02 µL
5 µL – 100 µL		yellow	0.1 µL
10 µL – 200 µL		yellow	0.2 µL
15 µL – 300 µL		orange	0.2 µL
50 µL – 1000 µL		blue	1 µL
0.1 mL – 2 mL		red	0.002 mL
0.25 mL – 5 mL		violet	0.005 mL
0.5 mL – 10 mL		turquoise	0.01 mL

11.3 Errors of measurement

The errors of measurement correspond to specifications from the DIN EN ISO 8655 standard.

The smallest adjustable volume will be provided by Eppendorf SE as additional information.

Single-channel pipettes with adjustable volume

Model	Test tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic		Random	
			±%	±µL	%	µL
0.1 µL – 2.5 µL dark gray	0.1 µL – 10 µL dark gray 34 mm	0.1 µL	24	0.024	10	0.01
		0.25 µL	12	0.03	6	0.015
		1.25 µL	2.5	0.031	1.5	0.018 75
		2.5 µL	1.4	0.035	0.7	0.017 5
0.5 µL – 10 µL medium gray	0.1 µL – 20 µL medium gray 40 mm	0.5 µL	8	0.04	5	0.025
		1 µL	2.5	0.025	1.8	0.018
		5 µL	1.5	0.075	0.8	0.04
		10 µL	1	0.1	0.4	0.04
1 µL – 20 µL light gray	0.5 µL – 20 µL L light gray 46 mm	1 µL	10	0.1	3	0.03
		2 µL	5	0.1	1.5	0.03
		10 µL	1.2	0.12	0.6	0.06
		20 µL	1	0.2	0.3	0.06
1 µL – 20 µL yellow	2 µL – 200 µL yellow 53 mm	1 µL	10	0.1	3	0.03
		2 µL	5	0.1	1.5	0.03
		10 µL	1.2	0.12	0.6	0.06
		20 µL	1	0.2	0.3	0.06
5 µL – 100 µL yellow	2 µL – 200 µL yellow	5 µL	6	0.3	2	0.1
		10 µL	3	0.3	1	0.1

Model	Test tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic		Random	
			±%	±µL	%	µL
	53 mm	50 µL	1	0.5	0.3	0.15
		100 µL	0.8	0.8	0.2	0.2
10 µL – 200 µL yellow	2 µL – 200 µL yellow 53 mm	10 µL	5	0.5	1.4	0.14
		20 µL	2.5	0.5	0.7	0.14
		100 µL	1	1	0.3	0.3
		200 µL	0.6	1.2	0.2	0.4
15 µL – 300 µL orange	20 µL – 300 µL orange 55 mm	15 µL	5	0.75	1.4	0.21
		30 µL	2.5	0.75	0.7	0.21
		150 µL	1	1.5	0.3	0.45
		300 µL	0.6	1.8	0.2	0.6
50 µL – 1000 µL blue	50 µL – 1000 µL blue 71 mm	50 µL	6	3	1.2	0.6
		100 µL	3	3	0.6	0.6
		500 µL	1	5	0.2	1
		1000 µL	0.6	6	0.2	2
0.1 mL – 2 mL red	0.25 mL – 2.5 mL red 115 mm	0.1 mL	5	5	1.4	1.4
		0.2 mL	3	6	1.2	2.4
		1.0 mL	0.8	8	0.2	2
		2.0 mL	0.5	10	0.2	4
0.25 mL – 5 mL violet	0.1 mL – 5 mL violet 120 mm	0.25 mL	4.8	12	1.2	3
		0.5 mL	2.4	12	0.6	3
		2.5 mL	0.8	20	0.25	6.25
		5.0 mL	0.6	30	0.15	7.5
0.5 mL – 10 mL turquoise	0.5 mL – 10 mL turquoise 165 mm	0.5 mL	6	30	1.2	6
		1.0 mL	3	30	0.6	6

Model	Test tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic		Random	
			±%	±µL	%	µL
		5.0 mL	0.8	40	0.2	10
		10.0 mL	0.6	60	0.15	15

11.4 Test conditions

Test conditions and test evaluation in accordance with DIN EN ISO 8655. Testing was carried out using a certified analytical balance with evaporation protection.

- Number of determinations per volume: 10
- Water according to ISO 3696
- Testing at 20 °C (±3 °C) or
  Testing at 27 °C (±3 °C)
  Temperature fluctuation during measurement maximum ±0.5 °C
- Dispensing onto the tube inner wall

11.5 Materials

Front view

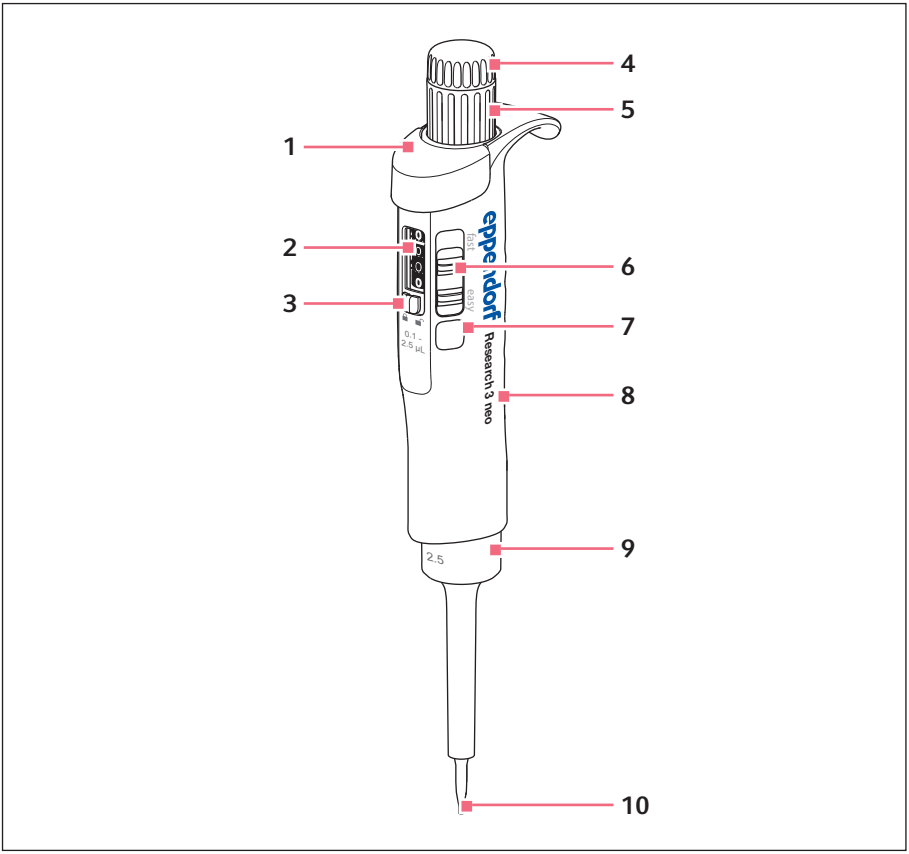


Fig. 11-1: Externally accessible materials

Number	Component	Material
1	Ejector button	• Refined Polypropylene (PP)
2	Volume display viewing window	• Polycarbonate (PC)
3	Volume catch	• Polyvinylidene fluoride (PVDF)

Number	Component	Material
4	Control button upper part	• Refined Polypropylene (PP)
5	Control button lower part	• Polyetherimide (PEI)
6	Speed adjustment	• Polyvinylidene fluoride (PVDF)
7	Adjustment seal for factory settings and service	• Refined Polypropylene (PP)
8	Pipette upper part	• Refined Polypropylene (PP)
9	Ejector sleeve	• Refined Polypropylene (PP)
10	Tip cone (2.5 µL – 20 µL)	• Stainless steel
	Tip cone (20 µL – 10 mL)	• Polyvinylidene fluoride (PVDF)

Rear view

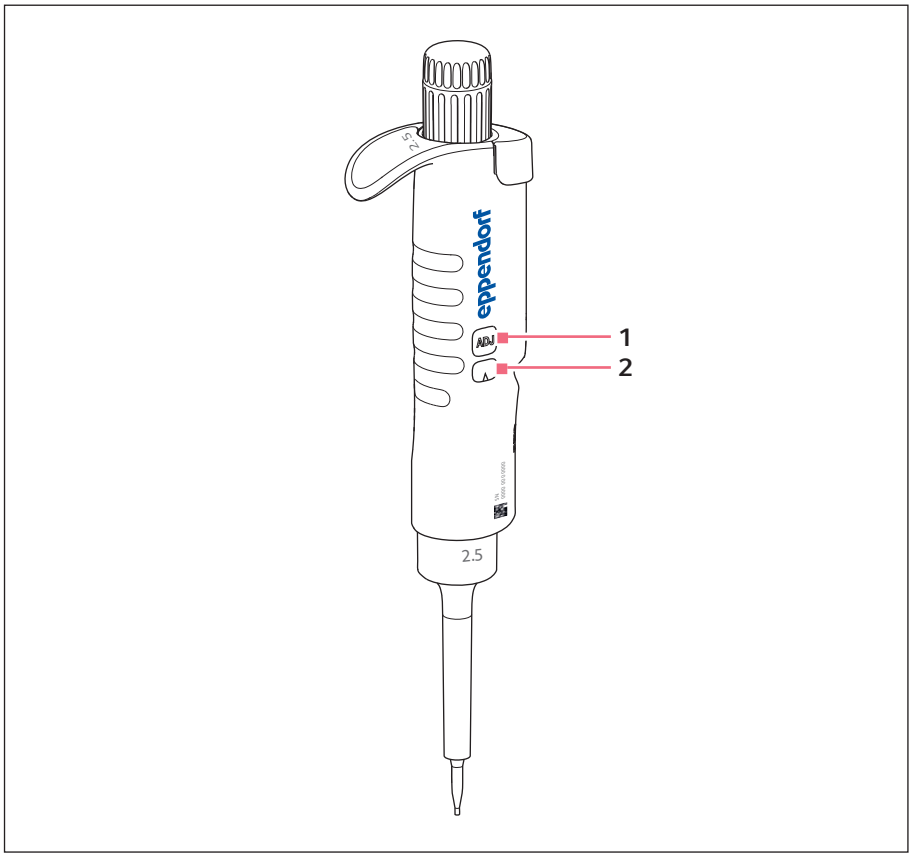


Fig. 11-2: Externally accessible materials

Number	Component	Material
1	*ADJ* adjustment cover	• Refined Polypropylene (PP)
2	Adjustment window	• Cyclic olefin copolymer (COC)

Pipette lower part

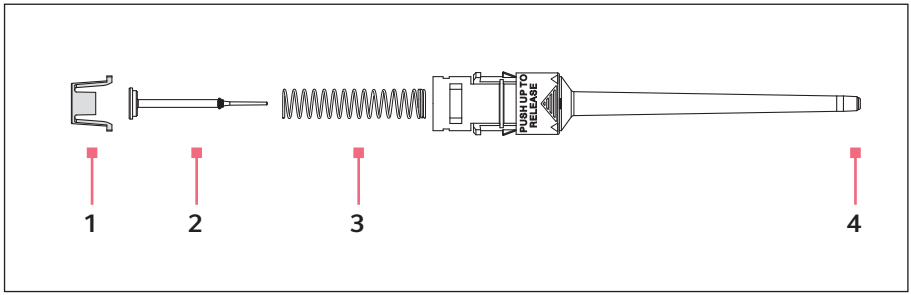


Fig. 11-3: Example figure for 2.5 µL – 1000 µL

Number	Component	Material
1	Piston mount	• Polyetherimide (PEI)
2	Piston 2.5 µL – 20 µL	• Stainless steel
	Piston, molded, 2.5 µL – 20 µL	• Polyetherimide (PEI)
	Piston 100 µL – 300 µL	• Polyetherimide (PEI)
	Piston 1000 µL – 10 mL	• Polyphenylene sulfide (PPS)
3	Piston spring	• Spring steel
4	Tip cone 2.5 µL – 20 µL, gray	• Stainless steel
	Tip cone 20 µL, yellow – 10 mL	• Polyvinylidene fluoride (PVDF)

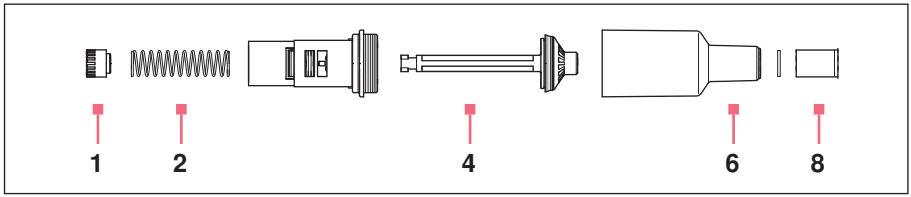


Fig. 11-4: Example figure for 2 mL – 1000 mL

Number	Component	Material
6	Tip cone	• Polyvinylidene fluoride (PVDF)
8	Filter sleeve 2 mL – 10 mL	• Refined Polypropylene (PP)

11.6 Chemical resistance

11.6.1 General conditions

The following general conditions apply:

- The resistance data listed in the following tables is derived from storage of the test material in the liquid for 24 h. The data only applies to handling and cleaning at ambient temperature.
- The test material is tested in the respective liquid for 24 h.
- The chemical resistance data refers exclusively to the plastics used in the consumable/device.
- The chemical resistance data is not transferable to other products.

Aggressive liquids

- Careful use of aggressive liquids for a limited time is possible because, with proper handling, only the consumables come into contact with the liquid.
- If high vapor pressure occurs, the limited time is reduced. Gases or aerosols may escape or condense.
- The use of aggressive liquids can reduce the lifetime of the device.

Special conditions

- After using aggressive chemicals, you must ventilate the lower part and clean it if necessary.

11.6.2 Acids and alkalis

Designation	Concentration	PP	PEI	PVDF	PC	COC	Steel	PPS	PEEK	PTFE	Silicone
Ammonia solution	25 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Ammonia solution	2 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Acetic acid	96 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Acetic acid	12 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Caustic soda	20 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Caustic soda	4 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Perchloric acid	10 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Nitric acid	65 %	■■ (2)	■■ (2)	■■■	■■ (2)	■■■	■■■	■	■■■	■■■	■ (6)
Nitric acid	6.3 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Hydrochloric acid	32 %	■■■	■■■	■■■	■■■	■■■	■ (4)	■■■	■■■	■■■	■ (6)
Hydrochloric acid	3.6 %	■■■	■■■	■■■	■■■	■■■	■ (4)	■■■	■■■	■■■	■■■
Sulfuric acid	96 %	■■■	■	■■■	■■■	■■■	■■■	■■■	■	■■■	■ (6)
Sulfuric acid	16 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Trichloroacetic acid	40 %	■■■	■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■
Trichloroacetic acid	10 %	■■■	■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■
Trifluoroacetic acid (TFA)	100 %	■■■	■	■■■	■ (1)	■■■	■■■	■■■	■■■	■■■	■ (6)
Trifluoroacetic acid (TFA)	10 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■

Grading criteria

■■■	Resistant	Chemical can be used.
■■	Partially resistant	Chemical can be used for a limited time.
■	Not resistant	Risk and wear are increased. The chemical must be used with extreme caution.

Explanation of the footnotes

(1)	Careful handling is necessary to avoid damage to the viewing windows or printing.
(2)	External discoloration. The pipette's function is not impaired.
(3)	Dried-on residues are difficult to remove.
(4)	If hydrochloric acid is not removed after incorrect dispensing, the stainless steel tip cone may corrode. Hydrochloric acid with a concentration of 32 % or higher may cause corrosion of the spring steel piston spring and other internal parts after several years of use.
(5)	Wiping the pipette with the chemical may damage the printing. The pipette material remains unchanged.
(6)	Silicone o-rings and wearing parts should be replaced more frequently.

11.6.3 Organic solvents

Designation	Concentration	PP	PEI	PVDF	PC	COC	Steel	PPS	PEEK	PTFE	Silicone
Acetone	≥ 99.8 %	(5)			(1)						
Acetonitrile	≥ 99.9 %				(1)						
Trichloromethane (chloroform)	—				(1)						
Dichloromethane (methylene chloride)	≥ 99.5 %				(1)						
Diethyl ether	≥99 %	(5)			(1)						
Dimethyl sulfoxide (DMSO)	100 %										
Dimethyl sulfoxide (DMSO)	50 %										
Dimethyl sulfoxide (DMSO)	10 %										
Acetic acid ethyl ester[1]	≥99 %				(1)						
Ethanol (denatured)	96 %										
Formaldehyde	37 %										
Isoamyl alcohol	≥98 %										
Isopropanol	99.8 %										
Methanol	99.9 %										
Phenol (water-saturated)	—	(2)			(1)	(1)					
Petroleum ether	—										
Toluol	—				(1)	(1)					

Grading criteria

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Explanation of the footnotes

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(5)	Wiping the pipette with the chemical may damage the printing. The pipette material remains unchanged.
(6)	Silicone o-rings and wearing parts should be replaced more frequently.

11.6.4 Cleaning and decontamination agents

Designation	Concentration	PP	PEI	PVDF	PC	COC	Steel	PPS	PEEK	PTFE	Silicone
Biocidal ZF	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
COUNT-OFF Liquid Concentrat	2 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
COUNT-OFF Surface Cleaner	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Dismozon pur (peroxide-based)	4 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
DNA *AWAY*	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
DNA ExitusPlus	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Ethanol	70 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Formaldehyde	6 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Helipur(phenol-based)	6 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Hexaquart pure (QAV-based)	5 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Isopropanol	70 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Korsolex basic(aldehyde-based)	5 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Meliseptol(alcohol-based)	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Sodium hypochlorite	10 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Sodium hypochlorite	6 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
RNase AWAY	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
RNase-ExitusPlus	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Hydrogen peroxide	35 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Hydrogen peroxide	6 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■

Grading criteria

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Explanation of the footnotes

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(3)	Dried-on residues are difficult to remove.
(4)	If hydrochloric acid is not removed after incorrect dispensing, the stainless steel tip cone may corrode. Hydrochloric acid with a concentration of 32 % or higher may cause corrosion of the spring steel piston spring and other internal parts after several years of use.
(5)	Wiping the pipette with the chemical may damage the printing. The pipette material remains unchanged.
(6)	Silicone o-rings and wearing parts should be replaced more frequently.

11.6.5 Saline solutions, buffers, wetting agents, oils and other solutions

Designation	Concentration	PP	PEI	PVDF	PC	COC	Steel	PPS	PEEK	PTFE	Silicone
Cesium chloride (saturated)	1.86 g/mL	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
	10 % (w/w)	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
EDTA (pH 8)	0.5 mol/L	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Ficoll (Polysaccharide)	1.077 g/mL	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Formamide	50 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Glutaraldehyde	25 %	■■■(3)	■■■(3)	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Glycerol	50 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Guanidine hydrochloride	6 mol/L	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Guanidinium thiocyanate	4 mol/L	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Mineral oil	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Sodium acetate(pH 5.2)	2 mol/L	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Paraffin oil	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Sodium dodecyl sulfate (SDS)	1 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
TRIS buffer(pH 5.2)	1 mol/L	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Triton X-100	1 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Tween 20	1 %	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
Water	—	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■

Grading criteria

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Explanation of the footnotes

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(3)	Dried-on residues are difficult to remove.
(4)	If hydrochloric acid is not removed after incorrect dispensing, the stainless steel tip cone may corrode. Hydrochloric acid with a concentration of 32 % or higher may cause corrosion of the spring steel piston spring and other internal parts after several years of use.
(5)	Wiping the pipette with the chemical may damage the printing. The pipette material remains unchanged.
(6)	Silicone o-rings and wearing parts should be replaced more frequently.

12 Ordering information

12.1 Single-channel pipettes with variable volume setting

Description	Order no.
Eppendorf Research® 3 neo	
1-channel, variable, incl. epT.I.P.S.® Box 2.0 (x 96 tips) and ep Dual-filter T.I.P.S.® Rack (x 96 tips)	
0.1 – 2.5 µL, dark gray, ACT	3174 000 001
1-channel, variable, incl. epT.I.P.S.® Box 2.0 (x 96 tips) and ep Dual-filter T.I.P.S.® BioBased Reload (x 96 tips)	
0.5 – 10 µL, medium gray, ACT	3174 000 002
1 – 20 µL, light gray, ACT	3174 000 003
1 – 20 µL, yellow, ACT	3174 000 004
5 – 100 µL, yellow, ACT	3174 000 005
10 – 200 µL, yellow, ACT	3174 000 006
15 – 300 µL, orange, ACT	3174 000 007
50 – 1,000 µL, blue, ACT	3174 000 008
1-channel, variable, incl. epT.I.P.S.® sample bag (x 10 tips)	
0.1 – 2 mL, red, ACT	3174 000 009
0.25 – 5 mL, violet, ACT	3174 000 010
0.5 – 10 mL, turquoise, ACT	3174 000 011

12.2 Spare parts for single-channel pipettes

ADJ adjustment cover and adjustment seal

Description	Order no.
Pipette factory adjustment seal for Eppendorf Research® 3 pipettes 10 adjustment seals, red	3102 603 001
Pipette temporary adjustment cover for Eppendorf Research® 3 pipettes 10 adjustment covers ADJ, white	3102 603 000

Single-channel pipette lower part

Description	Order no.
Single-channel pipette lower part for Eppendorf Research® 3 pipettes 2.5 µL, color code: dark gray	3102 634 000
10 µL, color code: medium gray	3102 634 001
20 µL, color code: light gray	3102 634 002
20 µL, color code: yellow	3102 634 003
100 µL, color code: yellow	3102 634 004
200 µL, color code: yellow	3102 634 005
300 µL, color code: orange	3102 634 006
1,000 µL, color code: blue	3102 634 007
2 mL, color code: red	3102 634 008
5 mL, color code: violet	3102 634 009
10 mL, color code: turquoise	3102 634 010

Pipette ejector sleeve

Description	Order no.
Pipette ejector sleeve	
for Eppendorf Research® 3 single-channel pipettes	
2.5 µL, color code: dark gray	3102 630 000
10 µL, color code: medium gray or yellow	3102 630 001
20 µL, color code: light gray or yellow	3102 630 002
100 µL, color code: yellow	3102 630 004
200 µL, color code: yellow	3102 630 005
300 µL, color code: orange	3102 630 006
1,000 µL, color code: blue	3102 630 007
Pipette ejector sleeve with ejection carrier	
for Eppendorf Research® 3 single-channel pipettes	
2 mL, color code: red	3102 630 008
5 mL, color code: violet	3102 630 009
10 mL, color code: turquoise	3102 630 010

Pipette piston, pipette piston holder and pipette piston spring

Description	Order no.
Pipette piston	
for Eppendorf Research® 3 single-channel pipettes	
2.5 µL, color code: dark gray	3102 633 000
10 µL, color code: medium gray	3102 633 001
20 µL, color code: light gray or yellow	3102 633 002
100 µL, color code: yellow, with sealing	3102 633 004
200 µL, color code: yellow, with sealing	3102 633 005
300 µL, color code: orange, with sealing	3102 633 006
1,000 µL, color code: blue, with sealing and piston spring	3102 633 007

Description	Order no.
Pipette piston mount	
for Eppendorf Research® 3 single-channel pipettes	
for pistons from 2.5 µL – 1,000 µL, 5 pcs.	3102 631 000
Pipette piston spring	
for Eppendorf Research® 3 single-channel pipettes	
for 2 mL piston, color code: red	3102 636 000
for 5 mL piston, color code: violet	3102 636 001
for 10 mL piston, color code: turquoise	3102 636 002
for 2.5 µL, 10 µL, 20 µL piston, color code: gray or yellow	3102 636 003
for 100 µL piston, color code: yellow	3102 636 004
for 200 µL piston, color code: yellow	3102 636 005
for 300 µL piston, color code: orange	3102 636 006
Pipette piston spring lock	
for Eppendorf Research® 3 pipettes	
for 2 mL, 5 mL, 10 mL single-channel pipette piston springs and all multi-channel piston springs, 5 pcs.	3102 632 000

12.3 Pipette protection filter and filter sleeve

Description	Order no.
Pipette protection filter set	
for Eppendorf Research® 3 single-channel pipettes, 2 mL, color code: red	
20 filters with 1 filter sleeve for 2 mL pipettes	3102 635 000
for Eppendorf Research® 3 single-channel pipettes, 5 mL, color code: violet	
20 filters with 1 filter sleeve for 5 mL pipettes	3102 635 001
for Eppendorf Research® 3 single-channel pipettes, 10 mL, color code: turquoise	
20 filters with 1 filter sleeve for 10 mL pipettes	3102 635 002

12.4 Tools and auxiliary equipment

Description	Order no.
Grease for pipettes incl. lint-free applicators to relubricate the piston or cylinder in pipette lower parts	0013 022 153
Locking ring for single-channel pipettes for Eppendorf Research® 3, Xplorer/Xplorer plus, Research plus and Reference 2 single-channel pipettes to prevent spring action in single-channel pipettes, 5 rings	3102 637 000
Pipette adjustment tool for Eppendorf Research® 3 pipettes 5 tools, grey	3102 690 000

12.5 Pipette holder sytem

Description	Order no.
Pipette Carousel 2, white with 6 holders for Eppendorf Research® 3 pipettes additional pipette holders, compatible with other Eppendorf pipettes and dispensers, are sold separately	3116 000 236
Pipette Holder 2, white for one Eppendorf Research® 3 pipette for Pipette Carousel 2 and Charger Carousel 2 or wall mounting, sticky tape included	3116 000 295

12.6 Pipette marking rings – ColorTag

ColorTag pipette marking rings 19 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf single-channel pipettes up to 1,000 µL, fits pipette lower part light blue, inner diameter: 19 mm, 10 pcs.	3102 660 000
light green, inner diameter: 19 mm, 10 pcs.	3102 660 001

Description	Order no.
light yellow, inner diameter: 19 mm, 10 pcs.	3102 660 002
light orange, inner diameter: 19 mm, 10 pcs.	3102 660 003
light pink, inner diameter: 19 mm, 10 pcs.	3102 660 004
light violet, inner diameter: 19 mm, 10 pcs.	3102 660 005
neon blue, inner diameter: 19 mm, 10 pcs.	3102 660 010
neon green, inner diameter: 19 mm, 10 pcs.	3102 660 011
neon yellow, inner diameter: 19 mm, 10 pcs.	3102 660 012
neon orange, inner diameter: 19 mm, 10 pcs.	3102 660 013
neon pink, inner diameter: 19 mm, 10 pcs.	3102 660 014
neon magenta, inner diameter: 19 mm, 10 pcs.	3102 660 015

ColorTag pipette marking rings 24 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf pipettes, fits pipette upper part or 2 mL pipette lower part	
light blue, inner diameter: 24 mm, 10 pcs.	3102 661 000
light green, inner diameter: 24 mm, 10 pcs.	3102 661 001
light yellow, inner diameter: 24 mm, 10 pcs.	3102 661 002
light orange, inner diameter: 24 mm, 10 pcs.	3102 661 003
light pink, inner diameter: 24 mm, 10 pcs.	3102 661 004
light violet, inner diameter: 24 mm, 10 pcs.	3102 661 005
neon blue, inner diameter: 24 mm, 10 pcs.	3102 661 010
neon green, inner diameter: 24 mm, 10 pcs.	3102 661 011
neon yellow, inner diameter: 24 mm, 10 pcs.	3102 661 012
neon orange, inner diameter: 24 mm, 10 pcs.	3102 661 013
neon pink, inner diameter: 24 mm, 10 pcs.	3102 661 014
neon magenta, inner diameter: 24 mm, 10 pcs.	3102 661 015

ColorTag pipette marking rings 27 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf 5 mL pipette lower parts, and Easypet® 3 pipette controller aspirating cone	
light blue, inner diameter: 27 mm, 5 pcs.	3102 662 000
light green, inner diameter: 27 mm, 5 pcs.	3102 662 001
light yellow, inner diameter: 27 mm, 5 pcs.	3102 662 002
light orange, inner diameter: 27 mm, 5 pcs.	3102 662 003
light pink, inner diameter: 27 mm, 5 pcs.	3102 662 004
light violet, inner diameter: 27 mm, 5 pcs.	3102 662 005
neon blue, inner diameter: 27 mm, 5 pcs.	3102 662 010
neon green, inner diameter: 27 mm, 5 pcs.	3102 662 011
neon yellow, inner diameter: 27 mm, 5 pcs.	3102 662 012
neon orange, inner diameter: 27 mm, 5 pcs.	3102 662 013
neon pink, inner diameter: 27 mm, 5 pcs.	3102 662 014
neon magenta, inner diameter: 27 mm, 5 pcs.	3102 662 015

ColorTag pipette marking rings 34 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf 10 mL pipette lower parts, Multipette® M4 and E3/E3x dispensers, Easypet® 3 pipette controller grip and Pipette Carousels & Stands	
light blue, inner diameter: 34 mm, 5 pcs.	3102 663 000
light green, inner diameter: 34 mm, 5 pcs.	3102 663 001
light yellow, inner diameter: 34 mm, 5 pcs.	3102 663 002
light orange, inner diameter: 34 mm, 5 pcs.	3102 663 003
light pink, inner diameter: 34 mm, 5 pcs.	3102 663 004
light violet, inner diameter: 34 mm, 5 pcs.	3102 663 005

Description	Order no.
neon blue, inner diameter: 34 mm, 5 pcs.	3102 663 010
neon green, inner diameter: 34 mm, 5 pcs.	3102 663 011
neon yellow, inner diameter: 34 mm, 5 pcs.	3102 663 012
neon orange, inner diameter: 34 mm, 5 pcs.	3102 663 013
neon pink, inner diameter: 34 mm, 5 pcs.	3102 663 014
neon magenta, inner diameter: 34 mm, 5 pcs.	3102 663 015

ColorTag pipette marking rings 50 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf 8- or 16-channel pipette lower parts, Eppendorf Top Buret and Varispenser® 2/2x dispensers	
light blue, inner diameter: 50 mm, 5 pcs.	3102 664 000
light green, inner diameter: 50 mm, 5 pcs.	3102 664 001
light yellow, inner diameter: 50 mm, 5 pcs.	3102 664 002
light orange, inner diameter: 50 mm, 5 pcs.	3102 664 003
light pink, inner diameter: 50 mm, 5 pcs.	3102 664 004
light violet, inner diameter: 50 mm, 5 pcs.	3102 664 005
neon blue, inner diameter: 50 mm, 5 pcs.	3102 664 010
neon green, inner diameter: 50 mm, 5 pcs.	3102 664 011
neon yellow, inner diameter: 50 mm, 5 pcs.	3102 664 012
neon orange, inner diameter: 50 mm, 5 pcs.	3102 664 013
neon pink, inner diameter: 50 mm, 5 pcs.	3102 664 014
neon magenta, inner diameter: 50 mm, 5 pcs.	3102 664 015

ColorTag pipette marking rings 73 mm

Description	Order no.
ColorTag pipette marking rings for all Eppendorf 12- or 24-channel pipette lower parts and Move It® adjustable tip spacing pipettes	
light blue, inner diameter: 73 mm, 5 pcs.	3102 665 000
light green, inner diameter: 73 mm, 5 pcs.	3102 665 001
light yellow, inner diameter: 73 mm, 5 pcs.	3102 665 002
light orange, inner diameter: 73 mm, 5 pcs.	3102 665 003
light pink, inner diameter: 73 mm, 5 pcs.	3102 665 004
light violet, inner diameter: 73 mm, 5 pcs.	3102 665 005
neon blue, inner diameter: 73 mm, 5 pcs.	3102 665 010
neon green, inner diameter: 73 mm, 5 pcs.	3102 665 011
neon yellow, inner diameter: 73 mm, 5 pcs.	3102 665 012
neon orange, inner diameter: 73 mm, 5 pcs.	3102 665 013
neon pink, inner diameter: 73 mm, 5 pcs.	3102 665 014
neon magenta, inner diameter: 73 mm, 5 pcs.	3102 665 015

Sample bag with ColorTag pipette marking rings

Description	Order no.
ColorTag pipette marking rings sample bag with each size in 2 colors (all 12 colors included) for Eppendorf liquid handling instruments and other lab equipment	3102 666 000

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