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CE



Eppendorf Reference® 2

Operating manual

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1 Operating instructions

1.1 Using this manual

- Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- You will find the current version of the operating manual for all available languages on our website under www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

The safety instructions in this manual have the following danger symbols and danger levels:

 **Biohazard**	 **Hazard point**
 **Toxic substances**	 **Material damage**

1.2.2 Danger levels

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
‣	Actions without a specified order
•	List
	Direction of movement
Text	Display text or software text
	Additional information

2 Safety

2.1 Intended use

The Reference 2 pipette is designed and constructed for low-contamination transfer of liquids, in particular for samples from the human body and for reagents within the scope of an in-vitro diagnostic application in order to allow the in-vitro diagnostic medical device to be used as intended. This pipette is an in vitro diagnostic device according to Directive 98/79/EC of the European Parliament and the Council dated October 27, 1998. It is intended exclusively for indoor use and for operation by qualified staff.

2.2 Warnings for intended use



WARNING! Damage to health due to infectious liquids and pathogenic germs.

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- Wear personal protective equipment.
- For comprehensive regulations about handling germs or biological material of risk group II or higher, please refer to the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, in its respectively current valid version).



WARNING! Damage to health due to toxic, radioactive or aggressive chemicals.

- Wear personal protective equipment.
- Observe the national regulations for handling these substances.
- Observe the material safety data sheets and manufacturer's application notes.



CAUTION! Danger to individuals due to careless use

- Never point the opening of the device toward yourself or others.
- Only initiate liquid dispensing if it is safe to do so.
- With any dispensing task please ensure that you do not endanger yourself and other persons.



CAUTION! Poor safety due to incorrect accessories and spare parts.
The use of accessories and spare parts other than those recommended by Eppendorf may impair the safety, functioning and precision of the device. Eppendorf cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment.

- Only use accessories and original spare parts recommended by Eppendorf.

NOTICE! Damage to device from missing pipette tips.

- Use the pipette with fitted pipette tips only.

NOTICE! Incorrect dispensing volume with special liquids and due to temperature differences.
Solutions with physical data very different than water or differences in temperature between pipette, pipette tip and liquid can result in faulty dispensing volumes.

- Avoid temperature differences between the pipette, pipette tip and liquid.

NOTICE! Damage to the device due to penetration of liquids.

- Do not set the pipette aside when the pipette tip is filled.
- Do not allow any liquids to penetrate the inside of the housing.

3 Product description

3.1 Features

The Reference 2 pipette is a piston-stroke pipette for aspirating and dispensing liquids. The pipette operates according to the air cushion principle. A suitable pipette tip must be fitted prior to use. The dispensing, volume setting ring and ejector are controlled with the control button. Depending on the model, volumes between 0.1 µL and 10 mL can be dispensed.

3.1.1 Pipette models

Different variants are available:
- Single-channel pipettes with fixed volume (fix)
- Single-channel pipettes with variable volume setting
- Multi-channel pipettes with 8 or 12 channels and variable volume setting

3.2 Delivery package

Quantity	Description
1	Reference 2
1	Holder for pipette carousel
1	Operating manual
1	Certificate
1	Adjustment seal for user adjustment
2	Adjustment seal for factory adjustment
1	Pin (remove adjustment seal)

3.2.1 Accessories – single-channel pipettes

Quantity	Description
1	Locking ring (≤ 1000 µL)
1	Filter sleeve (≥ 2 mL)
10	Filter cartridges (≥ 2 mL)
1	Pipette wrench (≥ 2 mL)
1	Reusable box with pipette tips (≤ 1000 µL)
1	Bag with pipette tips (≥ 2 mL)

3.2.2 Accessories – multi-channel pipettes

Quantity	Description
1	Multi-channel tool (100 µL and 300 µL)

3.3 Product overview

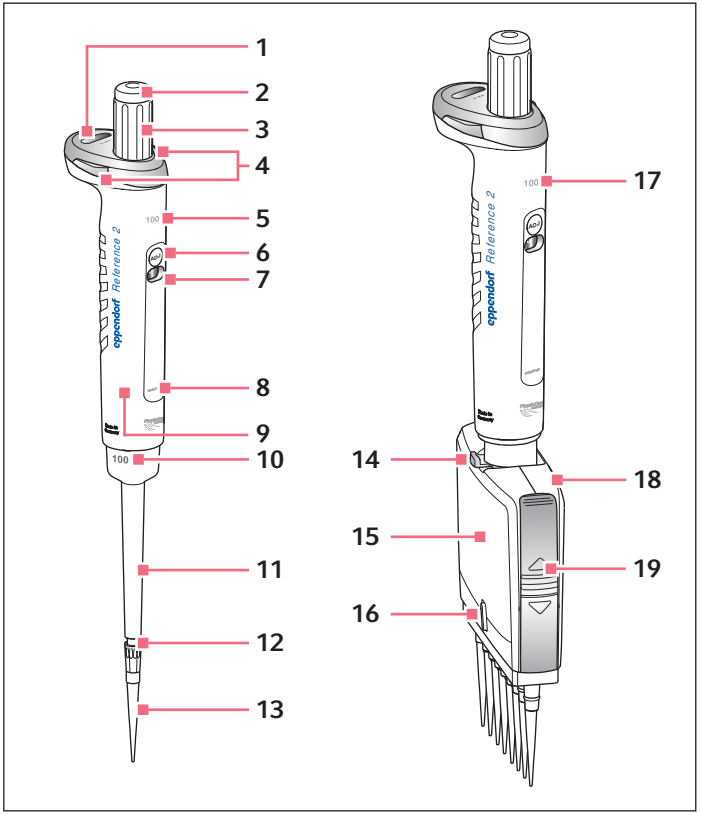


Fig. 3-1: Single-channel pipette and multi-channel pipette

1 Volume display
2 Color code
3 Control button
4 Volume catch
5 Single-channel upper part with nominal volume
6 User adjustment
7 User adjustment display
8 Serial number
9 RFID chip
10 Single-channel lower part with nominal volume
11 Ejector sleeve
12 Tip cone
13 Pipette tip
14 Lever
15 Multi-channel lower part
16 Switch spring load (On/Off)
17 Multi-channel upper part with nominal volume
18 Housing lid
19 Latch

3.4 Materials

NOTICE! Aggressive substances may damage the pipette, pipette tip and accessories.

- Check the resistance to chemicals before using organic solvents or aggressive chemicals.
- Only use liquids whose vapors do not corrode the used materials.
- Observe the cleaning instructions.

The components of the pipette which can be accessed by the user are made of the following materials:

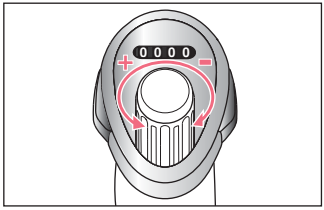
Assembly	Material
External surfaces of the upper part	• Improved polypropylene (PP) • Polycarbonate (PC) • Polyetherimide (PEI) • Stainless steel
Viewing window	• Polycarbonate (PC)
Exterior and interior of lower parts	• Improved polypropylene (PP) • Polyvinylidene fluoride (PVDF) • Polyetherimide (PEI) • Polyphenylene sulfide (PPS) • Polyetheretherketone (PEEK) • Polytetrafluoroethylene (PTFE) • Ethylene propylene diene rubber (EPDM) • Silicone • Steel (stainless steel and spring steel)

You can find information on the resistance to chemicals on our website www.eppendorf.com/manuals.

4 Operation

4.1 Setting the volume

Set the volume from a high to a low value. If necessary, exceed the desired volume and then go back.



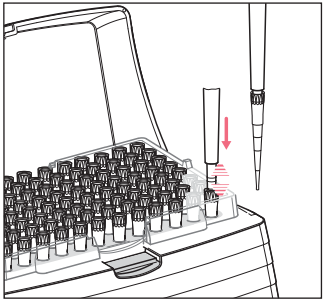
1. Keep the volume catch pressed.
2. Turn the control button.

4.2 Attaching the pipette tips

The pipette tip can be attached by hand or mounted directly from a tip holder (tray) with the pipette.

The pipette tips are single-use items.

The control button and the trays are color-coded. The color marks the pipette size and the volume of the pipette tip (epT.I.P.S.).



1. Insert the tip cone into the pipette tip using light force.

4.3 Optimum immersion depths

Volume	Immersion depth
0.1 µL – 1 µL	1 mm
1 µL – 100 µL	2 – 3 mm
100 µL – 1000 µL	2 – 4 mm
1 mL – 10 mL	3 – 5 mm

4.4 Forward pipetting

4.4.1 Aspirating liquid

Prerequisites
- The pipette tip has been attached.

To ensure maximum precision and accuracy, we recommend initially wetting each new tip by aspirating and dispensing the liquid one to three times.

1. Press down the control button to the first stop.
2. Immerse the pipette tip vertically in the liquid.
3. Maintain the immersion depth and let the control button slide back slowly.
   Liquid is aspirated into the pipette tip.
4. Wait approx. 3 seconds.
5. Remove the pipette tip from the liquid.

If necessary, wipe the pipette tip against the tube inner wall.

4.4.2 Dispensing liquid

1. Place the pipette tip on the tube inner wall at a steep angle.
2. Slowly press down the control button to the first stop.
   The liquid is dispensed.
3. Wait until the flow of liquid stops.
4. Press down the control button to the second stop.
   The pipette tip is completely emptied.
5. Hold down the control button and wipe the pipette tip on the tube inner wall.

4.4.3 Ejecting the pipette tip

- Press the control button down all the way.
  The pipette tip is ejected.

4.5 Reverse pipetting

An additional volume (blow out) is aspirated when performing reverse pipetting. This can improve dispensing results for viscous or foaming liquids. Volume limits may occur when using filter tips.

4.5.1 Aspirating liquid

1. Press down the control button to the second stop.
2. Immerse the pipette tip vertically in the liquid.
3. Maintain the immersion depth and let the control button slide back slowly.
   Liquid is aspirated into the pipette tip.
4. Wait approx. 3 seconds.
5. Remove the pipette tip from the liquid.

If necessary, wipe the pipette tip against the tube inner wall.

4.5.2 Dispensing liquid

1. Place the pipette tip on the tube inner wall at a steep angle.
2. Slowly press down the control button to the first stop.
   The liquid is dispensed.
3. Wait until the flow of liquid stops.
4. Hold down the control button and wipe the pipette tip on the tube inner wall.
   Residual liquid remains in the pipette tip.
   During dispensing, the additional volume (blow out) does not belong to the dispensing volume.

4.5.3 Ejecting the pipette tip

1. Press down the control button to the second stop.
   The residual liquid is dispensed.
   The residual liquid can be discarded.
2. Press the control button down all the way.
   The pipette tip is ejected.

4.6 Storing the pipette

The pipette can be stored in a pipette carousel, a wall mount or in horizontal position.

5 Troubleshooting

5.1 Control button

Problem	Cause	Solution
Control button jams.	• The lower part is dirty.	▸ Clean and grease the lower part.
	• Seal defective.	▸ Replace seal.
	• Protection filter is clogged.	▸ Replace the protection filter (2 mL – 10 mL).

5.2 Dispensing

Problem	Cause	Solution
Liquid is dripping.	• Pipette tip is loose.	▸ Attach the pipette tip firmly. ▸ Deactivate the spring load. ▸ Use the pipette tip epT.I.P.S..
	• Seal defective.	▸ Replace seal.
	• Defective o-ring.	▸ Replace o-ring.
	• Dispensed liquid has high vapor pressure.	▸ Pre-wet the pipette tip several times.
	• The tip cone is damaged.	▸ Replace lower part (single-channel pipette). ▸ Replace channel (multi-channel pipette).
Wrong dispensing volume.	• Dispensed liquid has high vapor pressure or a deviating density.	▸ Adjust the pipette for the liquid used.

5.3 Pipette tip

Problem	Cause	Solution
Pipette tip is loose.	The pipette tip is not compatible.	▸ Use epT.I.P.S. pipette tips. ▸ Use the correct size.
	Higher attachment forces are required.	▸ Attach the pipette tip firmly. ▸ Deactivate the spring load.

5.4 Tip cone

Problem	Cause	Solution
No spring-loaded action of tip cone.	The spring-loaded action is blocked (single-channel).	▸ Remove locking ring.
	Spring loading is switched off (multi-channel).	▸ Switch on spring loading.

6 Maintenance

6.1 Disassembling the single-channel pipette ≤ 1000 µL

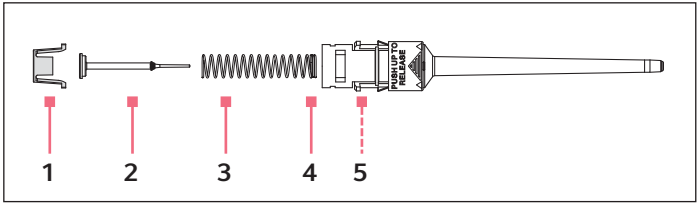


Fig. 6-2: Single-channel lower part ≤ 1000 µL

1 Piston mount

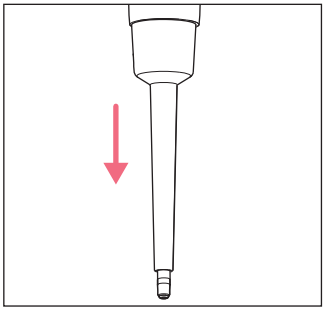
2 Piston

3 Piston spring

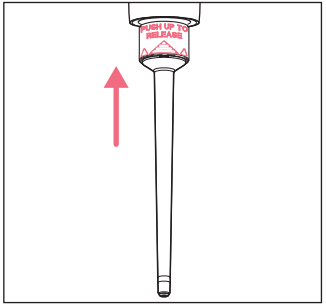
4 Double coil

5 Cylinder (internal)

6.1.1 Removing the lower part



1. Press the control button completely down and hold.
2. Remove the ejector sleeve and release the control button.

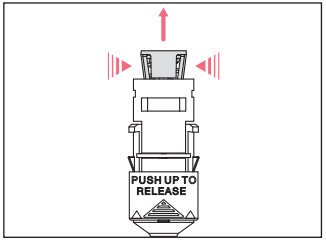


3. Push the ring "**PUSH UP TO RELEASE** upward until the lower part is detached.
4. Take out the lower part.

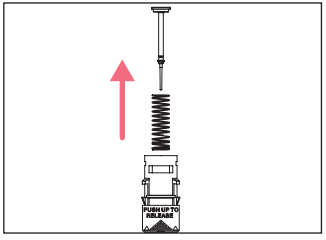
6.1.2 Disassembling the lower part

Prerequisites

- The ejector sleeve has been removed.
- The lower part has been removed from the upper part.



1. Squeeze the stop pins at the piston mount.
2. Remove the piston mount.



3. Remove the piston spring and the piston.
4. Remove the piston from the piston spring (Not possible for pipettes with blue control button).

6.2 Disassembling the single-channel pipette ≥ 2 mL

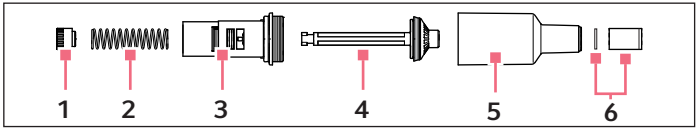
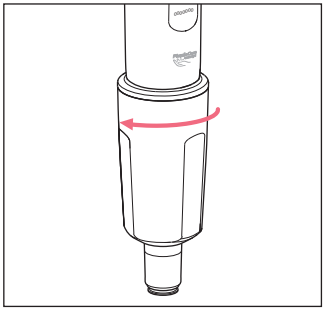


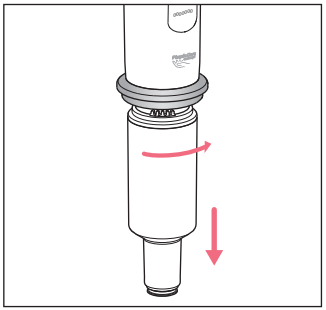
Fig. 6-3: Single-channel lower part ≥ 2 mL

1 Piston mount
2 Piston spring
3 Piston guide
4 Piston
5 Cylinder with tip cone
6 Filter sleeve with protection filter

6.2.1 Removing the lower part



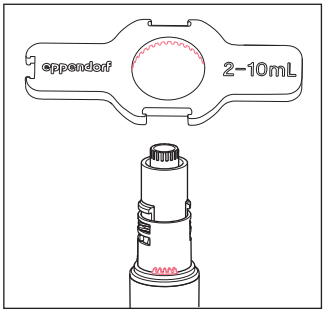
1. Unscrew the ejector sleeve.



2. Hold the control button completely pressed down.
3. Turn the lower part toward the right approx. 30°.
   The lower part is released from the upper part.

6.2.2 Disassembling the lower part

Prerequisites
- The lower part has been removed.



1. Place the pipette wrench onto the lower part.
2. Hold the cylinder and unscrew it from the lower part.

6.3 Assembling the single-channel pipette ≤ 1000 µL

1. Insert the piston spring.

   If using piston springs with double coil, this must point down.
2. Carefully insert the piston into the cylinder from the top.
3. Compress the piston spring with piston and hold.
4. Squeeze the stop pins at the piston mount and attach them.
5. Press on the piston from above and check for free movement.
   The piston must be able to move freely without resistance.

6. Insert the lower part into the upper part until it engages.
7. Fit the ejector sleeve.

6.4 Assembling the single-channel pipette ≥ 2 mL

6.4.1 Assembling the lower part

1. Insert the piston into the piston guide.
2. Insert the piston spring into the piston guide.
3. Attach the piston mount and press the piston spring into the piston guide.
4. Turn the piston mount by 90° and let it engage.
5. Insert the lower part into the upper part until it engages.
6. Attach and tighten the ejector sleeve.

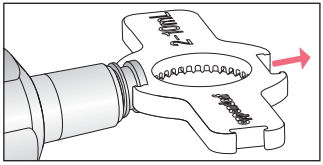
6.4.2 Checking the function

This inspection ensures that the pipette has been assembled correctly.

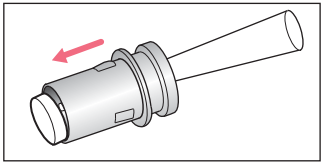
- Carry out a gravimetric test of the systematic and random errors.

6.5 Replacing the protection filter ≥ 2 mL

The protection filter in the tip cone must be replaced after every contact with liquids.

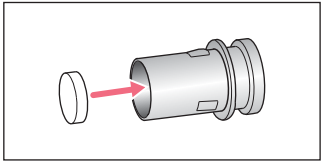


1. Place a pipette wrench with the appropriate opening onto the filter sleeve.
2. Pull out the filter sleeve.

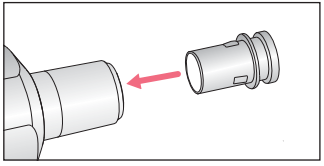


3. Use a pipette tip to push out the filter.

4. Clean the filter sleeve.



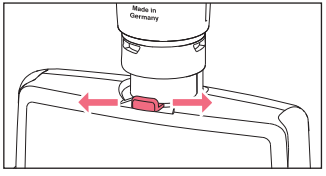
5. Insert a new protection filter into the filter sleeve.



6. Insert the filter sleeve in the tip cone.

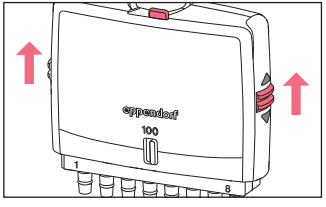
6.6 Disassembling the multi-channel pipette

6.6.1 Removing the lower part



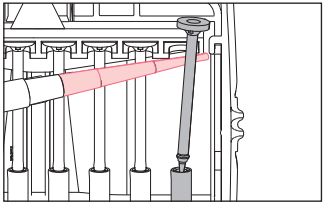
1. Set the volume to the nominal volume.
2. Turn the spring load switch to **On**.
3. Move the lever to one side and hold. The lower part is being unlocked.
4. Remove the lower part.

6.6.2 Opening the lower part

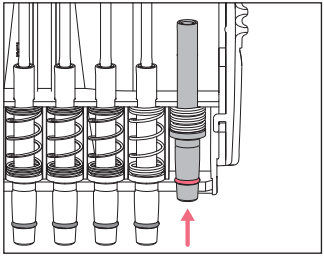


1. Hold the lower part with the lever pointing downward.
2. Push the side latch upward and remove the latch.
3. Remove the cover plate.

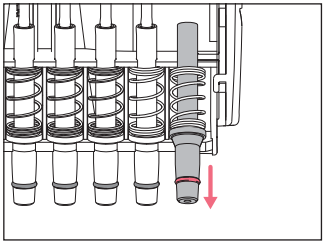
6.6.3 Removing the channel



1. Carefully release the piston from the upper rail and move upward to remove.



2. Slightly push the tip cone in and remove it from the lower rail.



3. Decompress the spring and pull the cylinder with spring out of the center rail.

6.6.3.1 Fitting the channel

1. Insert the spring with cylinder into the center rail.
2. Compress the spring with the cylinder and insert the cylinder into the lower rail.
3. Insert the piston into the cylinder.
4. Insert the piston into the upper rail.

6.6.4 Assembling the multi-channel lower part

1. Attach the cover plate.
2. Attach the side latches and slide down.
3. Insert the lower part into the upper part until it engages.

6.6.5 Checking the function

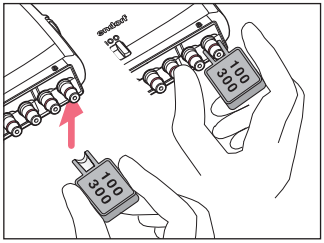
This inspection ensures that the pipette has been assembled correctly.

- Carry out a gravimetric test of the systematic and random errors.

6.7 Replacing the O-ring

The O-rings must be replaced in the case of wear or damage.

6.7.1 Removing the O-ring



1. Deactivate the spring load of the tip cones.
2. Attach the multi-channel tool to the tip cone with the opening.
3. Supporting the multi-channel tool with your thumb, push it firmly against the tip cone.
   The O-ring is cut at one location.
4. Remove the multi-channel tool and the O-ring.

6.7.2 Mounting a new O-ring

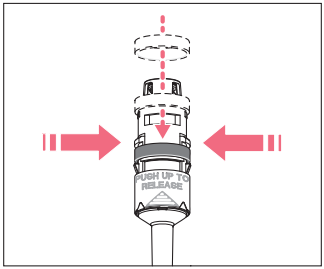
1. Attach the new O-ring to the tip cone and press it into the groove with the finger.
2. Attach the pipette tip.
3. Check firm fit and leak tightness of the pipette tip.

6.8 Deactivating the spring loading of the tip cone

The tip cone of the pipettes with a nominal volume of up to 1000 µL gives when the pipette tip is attached. This ensures optimum fit of the pipette tip and the attachment forces are kept low. If higher attachment forces are required, the spring load can be deactivated.

6.8.1 Deactivating the spring load – single-channel pipettes ≤ 1000 µL

Prerequisites
- The ejector sleeve has been removed.
- The lower part has been detached.



1. Lightly squeeze the clamps on the lower part and push the black locking ring onto the lower part from the top .
2. Insert the lower part and attach the ejector sleeve.

6.8.2 Deactivating the spring load – multi-channel pipettes

▸ Turn the switch spring load to **Off**.

6.9 Adjusting the pipette

The execution of changes to the user adjustment and factory adjustment is described on our website www.eppendorf.com/manuals.

6.10 Cleaning

NOTICE! Damage to device from unsuitable cleaning fluids or sharp or pointed objects.
Unsuitable cleaning agents can damage the device.

- Never use corrosive cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Please note the information on chemical resistance.
- Do **not** clean the device with acetone or organic solvents with a similar effect.
- Do **not** clean the device with sharp objects.

NOTICE! Damage to the device due to penetration of liquids.

- Do not set the pipette aside when the pipette tip is filled.
- Do not allow any liquids to penetrate the inside of the housing.

6.10.1 Cleaning and disinfecting the pipette

All single and multi-channel lower parts are wear parts. Clean them after contamination, use of aggressive chemicals and/or heavy stress. If the lower parts are worn or damaged, replace these parts.

1. Moisten a cloth with a cleaning agent and a decontamination agent.
2. Remove external contamination.
3. Moisten a new cloth with water.
4. Wipe down the housing.

6.10.2 Cleaning and disinfecting the lower part

Prerequisites
- Heavy contamination caused by ingress of liquid must be removed.
- Lower part has been removed and disassembled.

1. Remove piston grease.
2. Rinse the lower part with cleaning agent or decontamination agent or let it soak.

Observe the contact time recommended by the manufacturer.

3. Thoroughly rinse the lower part with demineralized water.
4. Let it dry.
5. Lubricate the piston or cylinder.

See instructions for use "Grease for pipettes".

6. Assemble the lower part.

6.10.3 Sterilizing the pipette with UV light

The pipette can be sterilized with UV light at 254 nm.

6.11 Autoclaving the pipette

NOTICE! Damage to device from incorrect handling.

- Do not use any additional disinfectants, decontamination agents or sodium hypochlorite during autoclaving or UV irradiation.

6.11.1 Autoclaving

Autoclave the filter sleeve and the protection filter separately.

Upper part and lower part can be autoclaved in assembled state. The lower part does not have to be disassembled.

Prerequisites
- The pipette has been cleaned.
- Any residual cleaning agent has been removed.
- The protection filter has been removed.

1. Autoclave the pipette at 121°C and 1 bar overpressure for 20 minutes.
2. Cool the pipette to ambient temperature and let it dry.

For maximum precision and accuracy, a gravimetric test is recommended after disassembly and autoclaving.

The pistons do **not** have to be relubricated and adjusted after autoclaving.

6.12 Decontamination before shipment

CAUTION! Use of a contaminated device may result in personal injuries and damage to the device.

- Clean and decontaminate the device in accordance with the cleaning instructions before shipping or storage.

Hazardous substances are:

- solutions presenting a hazard to health
- potentially infectious agents
- organic solvents and reagents
- radioactive substances
- proteins presenting a hazard to health
- DNA

1. Please note the information in the document "Decontamination certificate for product returns".
   You can find it as a PDF file on our webpage www.eppendorf.com.
2. Enter the serial number of the device in the decontamination certificate.
3. Enclose the completed decontamination certificate for returned goods with the device.
4. Send the device to Eppendorf AG or an authorized service center.

7 Technical data

7.1 Increments of the single-channel and multi-channel pipettes

Model	Increment
0.1 µL – 2.5 µL	0.002 µL
0.5 µL – 10 µL	0.01 µL
2 µL – 20 µL	0.02 µL
2 µL – 20 µL	0.02 µL
10 µL – 100 µL	0.1 µL
20 µL – 200 µL	0.2 µL
30 µL – 300 µL	0.2 µL
100 µL – 1000 µL	1 µL
0.25 mL – 2.5 mL	0.002 mL
0.5 mL – 5 mL	0.005 mL
1 mL – 10 mL	0.01 mL

7.2 Ambient conditions

	Temperature range	Relative humidity
Storage without transport package	-5 °C — 45 °C	10 % — 95 %
Operating conditions	5 °C — 40 °C	10 % — 95 %

8 Measurement deviations according to Eppendorf AG

8.1 Single-channel pipette with fixed volume

Model	Testing tip epT.I.P.S.	Error of measurement			
		Systematic error		Random error	
		± %	± µL	± %	± µL
1 µL	0.1 µL – 10 µL dark gray 34 mm	2.5	0.025	1.8	0.018
2 µL		2.0	0.04	1.2	0.024
5 µL	0.1 µL – 20 µL medium gray 40 mm	1.2	0.06	0.6	0.03
10 µL		1.0	0.1	0.5	0.05
20 µL	0.5 µL – 20 µL L light gray 46 mm	0.8	0.16	0.3	0.06
10 µL	2 µL – 200 µL yellow 53 mm	1.2	0.12	0.6	0.06
20 µL		1.0	0.2	0.3	0.06
25 µL		1.0	0.25	0.3	0.075
50 µL		0.7	0.35	0.3	0.15
100 µL		0.6	0.6	0.2	0.2
200 µL		0.6	1.2	0.2	0.4
200 µL	50 µL – 1000 µL blue 71 mm	0.6	1.2	0.2	0.4
250 µL		0.6	1.5	0.2	0.5
500 µL		0.6	3.0	0.2	1.0
1000 µL		0.6	6.0	0.2	2.0
2.0 mL	0.5 mL – 2.5 mL red 115 mm	0.6	12	0.2	4
2.5 mL		0.6	15	0.2	5

8.2 Single-channel pipette with variable volume

Model	Testing tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic error		Random error	
			± %	± µL	± %	± µL
0.1 µL – 2.5 µL	0.1 µL – 10 µL dark gray 34 mm	0.1 µL	48.0	0.048	12.0	0.012
		0.25 µL	12.0	0.03	6.0	0.015
		1.25 µL	2.5	0.031	1.5	0.019
		2.5 µL	1.4	0.035	0.7	0.018
0.5 µL – 10 µL	0.1 µL – 20 µL medium gray 40 mm	0.5 µL	8.0	0.04	5.0	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	0.10	0.4	0.04
2 µL – 20 µL	0.5 µL – 20 µL L light gray 46 mm	2 µL	3.0	0.06	1.5	0.03
		10 µL	1.0	0.10	0.6	0.06
		20 µL	0.8	0.16	0.3	0.06
2 µL – 20 µL	2 µL – 200 µL yellow 53 mm	2 µL	5.0	0.10	1.5	0.03
		10 µL	1.2	0.12	0.6	0.06
		20 µL	1.0	0.2	0.3	0.06
10 µL – 100 µL	2 µL – 200 µL yellow 53 mm	10 µL	3.0	0.3	0.7	0.07
		50 µL	1.0	0.5	0.3	0.15
		100 µL	0.8	0.8	0.2	0.2
20 µL – 200 µL	2 µL – 200 µL yellow 53 mm	20 µL	2.5	0.5	0.7	0.14
		100 µL	1.0	1.0	0.3	0.3
		200 µL	0.6	1.2	0.2	0.4
30 µL – 300 µL	20 µL – 300 µL orange 55 mm	30 µL	2.5	0.75	0.7	0.21
		150 µL	1.0	1.5	0.3	0.45
		300 µL	0.6	1.8	0.2	0.6
100 µL – 1000 µL	50 µL – 1000 µL blue 71 mm	100 µL	3.0	3.0	0.6	0.6
		500 µL	1.0	5.0	0.2	1.0
		1000 µL	0.6	6.0	0.2	2.0
0.25 mL – 2.5 mL	0.25 mL – 2.5 mL red 115 mm	0.25 mL	4.8	12	1.2	3
		1.25 mL	0.8	10	0.2	2.5
		2.5 mL	0.6	15	0.2	5
0.5 mL – 5 mL	0.1 mL – 5 mL violet 120 mm	0.5 mL	2.4	12	0.6	3
		2.5 mL	1.2	30	0.25	6
		5.0 mL	0.6	30	0.15	7.5

Model	Testing tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic error		Random error	
			± %	± µL	± %	± µL
0.5 mL – 5 mL	0.1 mL – 5 mL L violet 175 mm	0.5 mL	5.0	25	1.0	5.0
		2.5 mL	3.0	75	0.9	22.5
		5.0 mL	2.0	100	0.8	40
1 mL – 10 mL	1 mL – 10 mL turquoise 165 mm	1.0 mL	3.0	30	0.6	6
		5.0 mL	0.8	40	0.2	10
		10.0 mL	0.6	60	0.15	15
1 mL – 10 mL	1 mL – 10 mL L turquoise 243 mm	1.0 mL	6.0	6	1.0	10
		5.0 mL	3.0	150	0.9	45
		10.0 mL	2.0	200	0.7	70

8.3 Multi-channel pipette

Model	Testing tip epT.I.P.S.	Testing volume	Error of measurement			
			Systematic error		Random error	
			± %	± µL	± %	± µL
0.5 µL – 10 µL	0.1 µL – 20 µL medium gray 40 mm	0.5 µL	12.0	0.06	8.0	0.04
		1 µL	8.0	0.08	5.0	0.05
		5 µL	4.0	0.2	2.0	0.1
		10 µL	2.0	0.2	1.0	0.1
10 µL – 100 µL	2 µL – 200 µL yellow 53 mm	10 µL	3.0	0.3	2.0	0.2
		50 µL	1.0	0.5	0.8	0.4
		100 µL	0.8	0.8	0.3	0.3
30 µL – 300 µL	20 µL – 300 µL orange 55 mm	30 µL	3.0	0.9	1.0	0.3
		150 µL	1.0	1.5	0.5	0.75
		300 µL	0.6	1.8	0.3	0.9

8.4 Test conditions

Test conditions and test analysis in accordance with the standard ISO 8655, Part 6. The inspections are performed with a calibrated analytical balance with evaporation protection.

- Number of determinations per volume: 10
- Water according to ISO 3696
- Inspection at 20 °C – 27 °C ±0.5 °C
- Dispensing onto the tube inner wall

9 Ordering information

9.1 Single-channel pipettes, variable volume

Order no. (International)	Order no. (North America)	Description
		Eppendorf Reference 2, variable Single-channel; serial number on upper and lower part
4920 000.016	4920000016	dark gray, 0.1 - 2.5 µL
4920 000.024	4920000024	medium gray, 0.5 - 10 µL
4920 000.032	4920000032	light gray, 2 - 20 µL
4920 000.040	4920000040	yellow, 2 - 20 µL
4920 000.059	4920000059	yellow, 10 - 100 µL
4920 000.067	4920000067	yellow, 20 - 200 µL
4920 000.075	4920000075	orange, 30 - 300 µL
4920 000.083	4920000083	blue, 100 - 1 000 µL
4920 000.091	4920000091	red, 0.25 - 2.5 mL
4920 000.105	4920000105	violet, 0.5 - 5 mL
4920 000.113	4920000113	turquoise, 1 - 10 mL

9.2 Single-channel pipettes, fixed volume

Order no. (International)	Order no. (North America)	Description
		Eppendorf Reference 2, fixed Single-channel; serial number on upper and lower part
4921 000.010	4921000010	dark gray, 1 µL
4921 000.028	4921000028	dark gray, 2 µL
4921 000.036	4921000036	medium gray, 5 µL
4921 000.044	4921000044	medium gray, 10 µL
4921 000.052	4921000052	yellow, 10 µL
4921 000.060	4921000060	light gray, 20 µL
4921 000.079	4921000079	yellow, 20 µL
4921 000.087	4921000087	yellow, 25 µL
4921 000.095	4921000095	yellow, 50 µL
4921 000.109	4921000109	yellow, 100 µL
4921 000.117	4921000117	yellow, 200 µL
4921 000.125	4921000125	blue, 200 µL
4921 000.133	4921000133	blue, 250 µL

Order no. (International)	Order no. (North America)	Description
4921 000.141	4921000141	blue, 500 µL
4921 000.150	4921000150	blue, 1000 µL
4921 000.168	4921000168	red, 2 mL
4921 000.176	4921000176	red, 2.5 mL

9.3 Multi-channel pipettes

Order no. (International)	Order no. (North America)	Description
		Eppendorf Reference 2, variable
		8-channel; serial number on upper and lower part
4922 000.013	4922000013	medium gray, 0.5 - 10 µL
4922 000.030	4922000030	yellow, 10 - 100 µL
4922 000.056	4922000056	orange, 30 - 300 µL
		Eppendorf Reference 2, variable
		12-channel; serial number on upper and lower part
4922 000.021	4922000021	medium gray, 0.5 - 10 µL
4922 000.048	4922000048	yellow, 10 - 100 µL
4922 000.064	4922000064	orange, 30 - 300 µL

9.4 Spare parts, accessories and pipette tips

The ordering information can be found on our website www.eppendorf.com/manuals.

eppendorf

Declaration of Conformity

The product named below fulfills the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

Product name:

Eppendorf Reference ® 2

Product type:

variable- and fixed- volume pipette

Relevant directives / standards:

98/79/EC EN 14971, EN 18113- 3, EN 980, EN 15223- 1, EN 62366

EN ISO 8655- 1, EN ISO 8655- 2, EN ISO 8655- 6

Date: February 16, 2016

Management Board

Portfolio Management

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