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# Top Buret™ M/H

Operating manual

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## 1 Operating instructions






### 1.1 Using this manual

- ▶ Read this operating manual thoroughly 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. It must always be kept 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 at [www.eppendorf.com/manuals](http://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:

	<b>Biohazard</b>		<b>Explosive substances</b>
	<b>Toxic substances</b>		<b>Hazard point</b>
	<b>Material damage</b>		

#### 1.2.2 Danger levels

<b>DANGER</b>	<i>Will</i> lead to severe injuries or death.
<b>WARNING</b>	<i>May</i> lead to severe injuries or death.
<b>CAUTION</b>	May lead to light to moderate injuries.
<b>NOTICE</b>	May lead to material damage.

### 1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
▶	Actions without a specified order
•	List
<i>Text</i>	Display or software texts
	Additional information

## **6 Operating instructions**

Top Buret™ M/H

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### **1.4 Abbreviations used**

#### **ETFE**

Ethylene tetrafluoroethylene copolymer

#### **FEP**

Fluorinated ethylene propylene copolymer

#### **FKM**

Fluororubber

#### **PFA**

Perfluoroalkoxy copolymer

#### **PP**

Polypropylene

#### **PTFE**

Polytetrafluorethylene

#### **PVDF**

Polyvinylidene fluoride

## 2 Safety

### 2.1 Intended use

The Top Buret is a laboratory device for dispensing aqueous solutions in a volume range between 10 µL and 999.9 mL. Applications in or on the human body (in vivo applications) are not permitted.

The dispenser may only be used within the specified technical and physical limits.

The dispenser must not be exposed to an aggressive atmosphere (e.g., HCl vapors). The dispenser must not be autoclaved.

### 2.2 Application limits

#### 2.2.1 Physical properties of the liquid

Density (maximum)	2.2 g/cm
Concentration (maximum)	1 mol/L
Vapor pressure (maximum)	50 kPa

#### 2.2.2 Unsuitable liquids



#### **NOTICE! Material damage due to incorrect handling**

Deposits that are hard to dissolve lead to irreparable damage on the piston, the valves, and the discharge tube.

- ▶ Only use approved liquids.

The dispenser is not suitable for the following solutions, substances, and liquids:

- Liquids with low ignition temperatures (e.g., carbon disulfide).
- Liquids which attack ETFE, FEP, PFA, PTFE or Boro 3.3.
- Solutions containing hydrofluoric acid.
- Suspensions, as solid particles can clog or damage the device (e.g., activated carbon).
- Liquids which form insoluble deposits and decomposing solutions (e.g., Biuret reagent).
- Fuming acids or highly concentrated alkaline solutions
- Substances which react catalytically with platinum iridium (e.g., H<sub>2</sub>O<sub>2</sub>).
- Solutions prone to crystallization.

### 2.2.3 Liquids with limited suitability

The dispenser is suitable to a limited extent for the following liquids up to a concentration of 1 mol/L:

- Ammonium iron(II) sulfate solution
- Ammonium thiocyanate solution
- Barium chloride solution
- Bromid bromate solution
- Cerium(IV) sulfate solution
- EDTA solution
- Iron(II) sulfate solution
- Acetic acid
- Iodine solution
- Caustic potash solution
- Potassium bromate solution
- Potassium bromide bromate solution
- Potassium dichromate solution
- Potassium iodate solution
- Potassium permanganate solution
- Potassium thiocyanate solution
- Sodium arsenite solution
- Sodium carbonate solution
- Sodium chloride solution
- Sodium nitrite solution
- Sodium thiosulfate solution
- Caustic soda
- Oxalic acid
- Perchloric acid
- Nitric acid
- Hydrochloric acid
- Sulfuric acid
- Silver nitrate solution
- Tetra-n-butylammonium hydroxide solution
- Zinc sulfate solution

Refer to the information provided by the reagent manufacturers. If you have any questions, contact our authorized Eppendorf Service.



### 2.3 User profile

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

### 2.4 Warnings for intended use

---



**DANGER! Risk of explosion.**

- ▶ Do not operate the device in areas where explosive substances are handled.
  - ▶ Do not use this device to process any explosive or highly reactive substances.
  - ▶ Do not use this device to process any substances which may generate an explosive atmosphere.
- 



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

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biosafety level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- ▶ Wear your 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, the current edition).



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

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

**CAUTION! Contamination due to contact with biological and chemical reagents.**

Contact with reagents may be harmful to eyes or skin.

- ▶ Wear your personal protective equipment.
- ▶ Make sure that no reagents are leaking from the device.
- ▶ Ensure that the piston can move freely before starting work.
- ▶ Do not point the opening of the discharge tube towards people.
- ▶ Remove the sealing cap from the discharge tube before pushing down the piston.
- ▶ Only trigger liquid dispensing if you are not endangering other people.
- ▶ Dispense liquid slowly and evenly to prevent splashing. Do not use force.
- ▶ Only disassemble the device when it is clean.

**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 accessories and spare parts other than those recommended, or from the improper use of such equipment.

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

**CAUTION! Personal injury due to incorrect transportation of the device.**

If the assembled device is not transported correctly, reagents will be released. Contact with reagents may be harmful to eyes or skin.

- ▶ To transport the assembled device, hold the head gear of the device with one hand and support the bottom of the bottle with the other hand.
- ▶ Do not hold the device by the cylinder sleeve.

**NOTICE! Damage to device due to autoclaving.**

- ▶ Do not autoclave the device.

## **2.5 Information on product liability**

In the following cases, the designated protection of the device may be affected. Liability for any resulting damage or personal injury is then transferred to the owner:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables that are not recommended by Eppendorf.
- The device is maintained or repaired by persons not authorized by Eppendorf AG.
- The user makes unauthorized changes to the device.

**Product description**

Top Buret™ M/H

English (EN)

**3 Product description****3.1 Delivery package**

<b>Quantity</b>	<b>Description</b>
1	Top Buret
1	Canula arm
1	Discharge tube with knurled nut
1	Tube holder
1	Telescopic aspirating tube
2	Battery LR03/AAA, 1.5 V
1	Operating manual

**3.1.1 Accessories – bottle thread adapter**

<b>Quantity</b>	<b>Description</b>
1	GL 45/S 40
1	GL 45/GL 38
1	GL 45/GL 32

### 3.2 Product overview

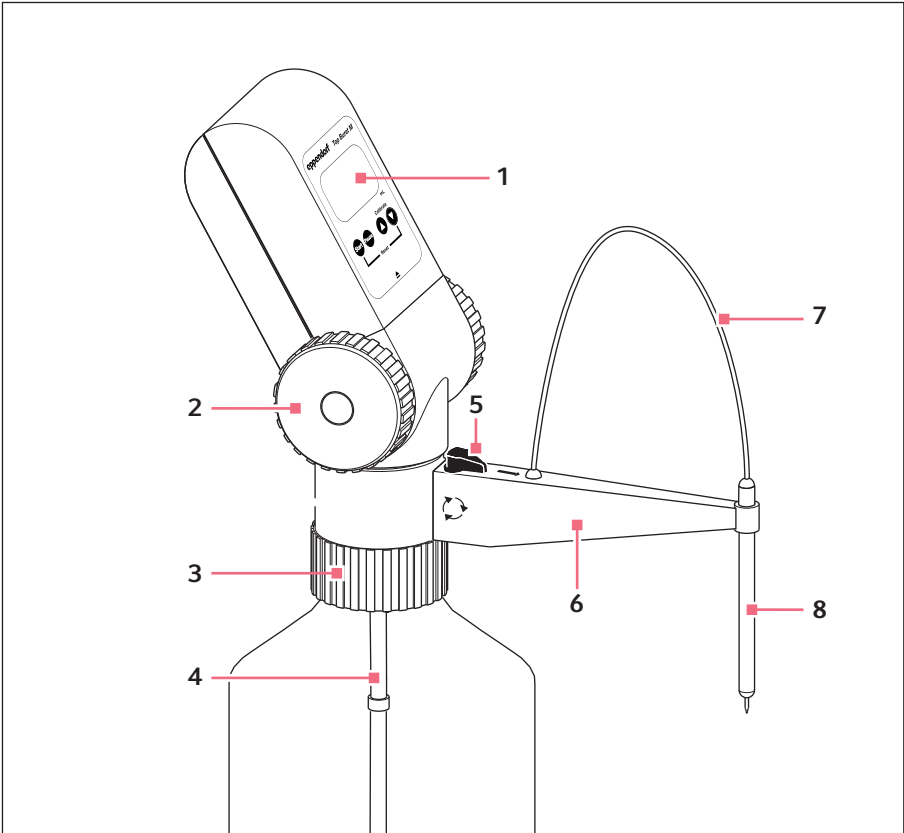


Fig. 3-1: Top Buret M/H

- |                              |                          |
|------------------------------|--------------------------|
| 1 Control panel              | 5 Discharge valve toggle |
| 2 Dispensing wheels          | 6 Canula arm             |
| 3 Bottle thread              | 7 Discharge tube         |
| 4 Telescopic aspirating tube | 8 Tube holder            |

### 3.2.1 Control panel

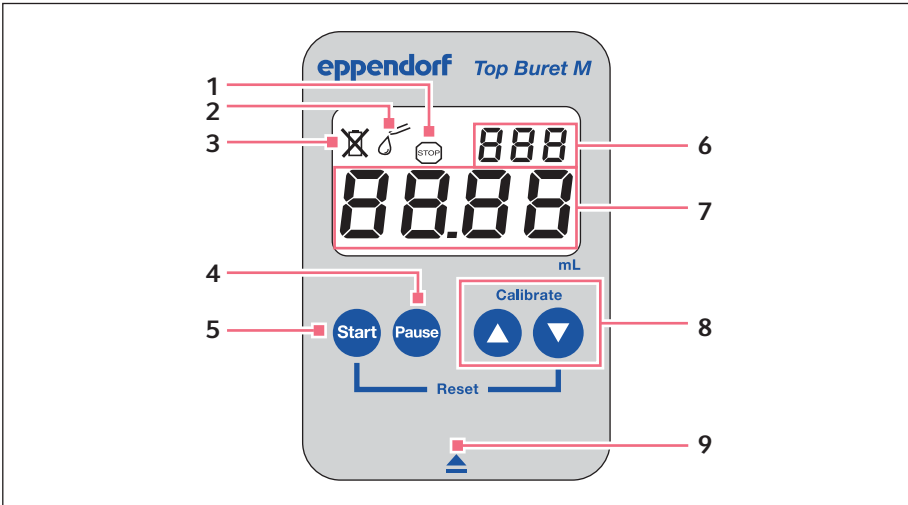


Fig. 3-2: Control panel with display and keys

- |   |                       |   |                  |
|---|-----------------------|---|------------------|
| 1 | Pause symbol          | 6 | Opening symbol   |
| 2 | Titration mode symbol | 7 | Arrow keys       |
| 3 | Battery flat symbol   | 8 | Volume display   |
| 4 | Pause key             | 9 | Calibration mode |
| 5 | Start key             |   |                  |

### 3.2.2 Telescopic aspirating tube

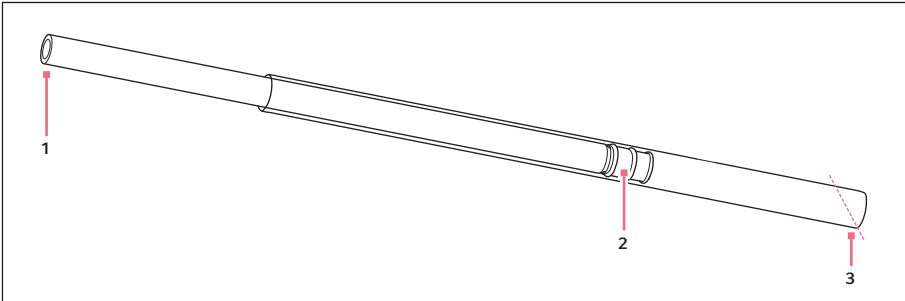


Fig. 3-3: Telescopic aspirating tube

**1 Connection opening**  
Inner tube

**3 Aspirating opening**  
Outer tube

**2 Sealing**

### 3.2.3 Thread adapter

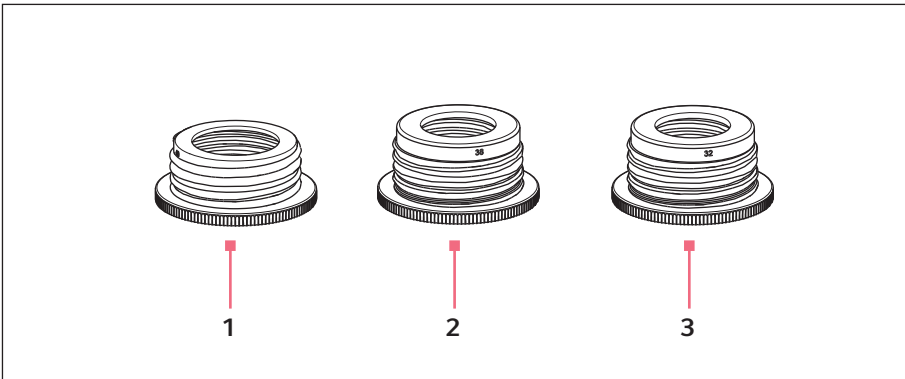


Fig. 3-4: Thread adapter

**1 Reducing from 45 mm to 40 mm**

**3 Reducing from 45 mm to 32 mm**

**2 Reducing from 45 mm to 38 mm**

**Product description**

Top Buret™ M/H

English (EN)

**3.3 Features**

The Top Buret is a bottle-top buret which features a continuous, pulse-free dispensing technique. The Top Buret can dispense volumes between 10 µL and 999.9 mL at a maximum concentration of 1 mol/L.

When the dispensing wheels are fully rotated, the following volumes are dispensed:

- Top Buret M: 2.5 mL
- Top Buret H: 5.0 mL

The Top Buret has two dispensing settings. The dispensing settings are set with the toggle on the canula arm.

- **Titration** →  
Titrate liquid from the bottle to a destination vessel.
- **Deairing** ↻  
Rinse liquid through the discharge valve into the bottle, e.g., to remove air bubbles.



### 3.4 Materials



**NOTICE! Aggressive substances may damage components, consumables and accessories.**

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

The assembly parts of the dispenser consist of the following materials:

Assembly parts that come into contact with liquid	Assembly parts that do not come into contact with liquid
<ul style="list-style-type: none"> <li>• Borosilicate glass 3.3 (Boro 3.3)</li> <li>• Ethylene-tetrafluoroethylene copolymer (ETFE)</li> <li>• Perfluoroalkoxy copolymer (PFA)</li> <li>• Tetrafluoroethylene-perfluoropropylene copolymer (FEP)</li> <li>• Platinum iridium (Pt-Ir)</li> <li>• Polytetrafluorethylene (PTFE)</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Fluororubber (FKM)</li> <li>• Polyester</li> <li>• Polypropylene (PP)</li> <li>• Polyvinylidene fluoride (PVDF)</li> <li>• Polyamide (PA)</li> <li>• Polyoxymethylene (POM)</li> <li>• Polyphenylene sulfide (PPS)</li> </ul>

**4 Installation**  
**4.1 Mounting the dispenser**

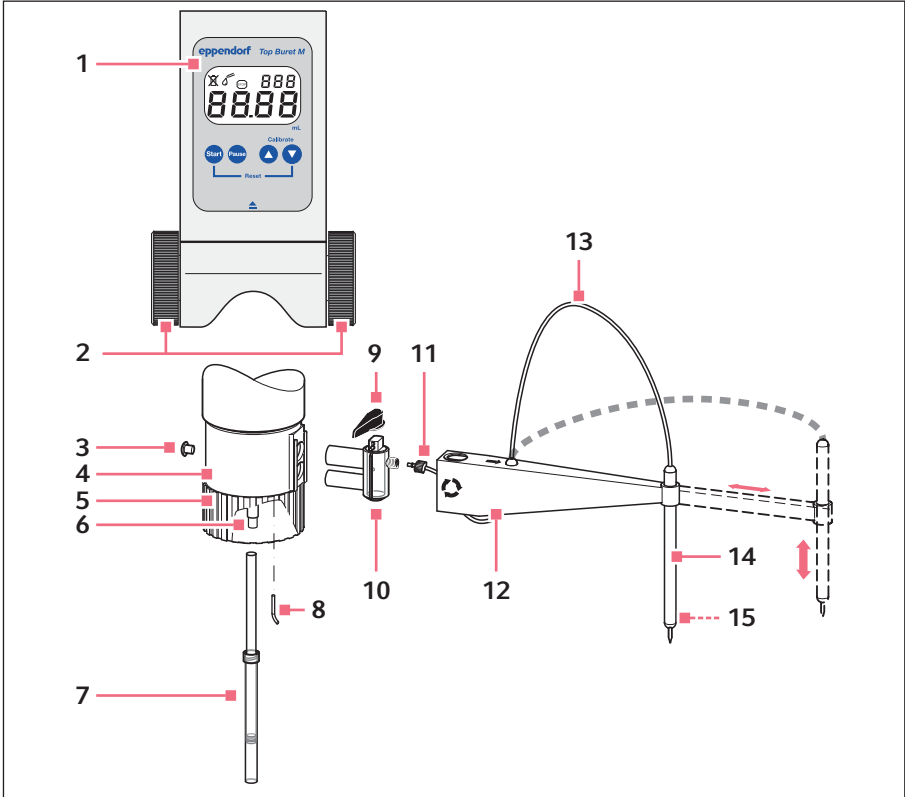
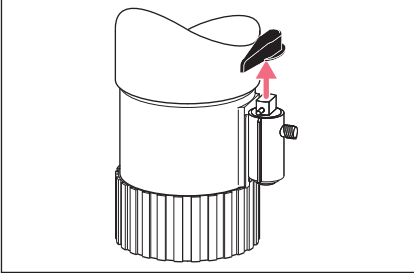


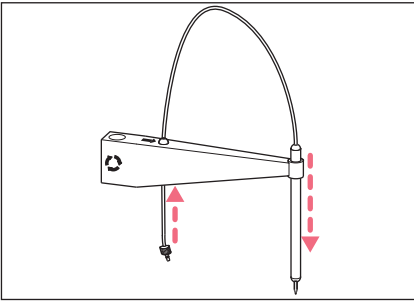
Fig. 4-1: Overview of the individual parts

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| <b>1 Control panel</b>              | <b>9 Discharge valve toggle</b>  |
| <b>2 Dispensing wheels</b>          | <b>10 Discharge valve</b>        |
| <b>3 Air vent cover</b>             | <b>11 Knurled nut</b>            |
| <b>4 Valve head</b>                 | <b>12 Canula arm</b>             |
| <b>5 Bottle thread</b>              | <b>13 Discharge tube</b>         |
| <b>6 Connection opening</b>         | <b>14 Tube holder</b>            |
| <b>7 Telescopic aspirating tube</b> | <b>15 Gripping nubs (inside)</b> |
| <b>8 Recirculation tube</b>         |                                  |

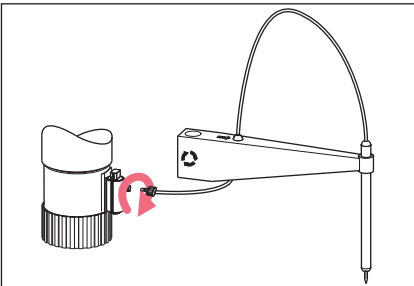
#### 4.2 Mounting the canula arm



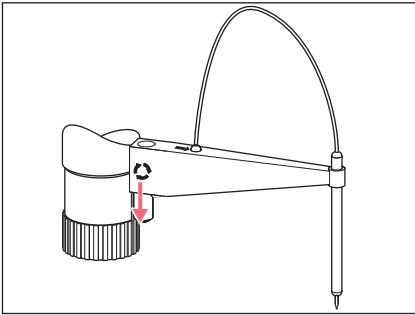
1. Rotate the toggle to the deairing position.
2. Remove the toggle upwards.



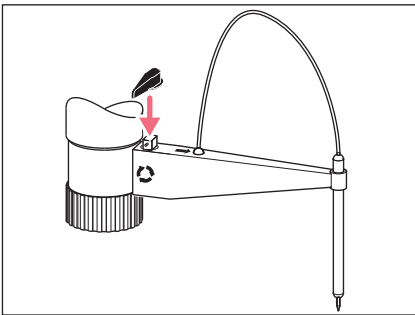
3. Insert the tube holder into the canula arm with the gripping nubs pointing downwards.
4. Guide the discharge tube through the hole in the canula arm from below.
5. Insert the discharge tube through the tube holder from above. The discharge tube should protrude slightly from the tube holder.



6. Screw the knurled nut onto the discharge valve.



7. Slide the canula arm over the discharge valve from above up to the stop.



8. Attach the toggle.

### 4.3 Inserting the batteries

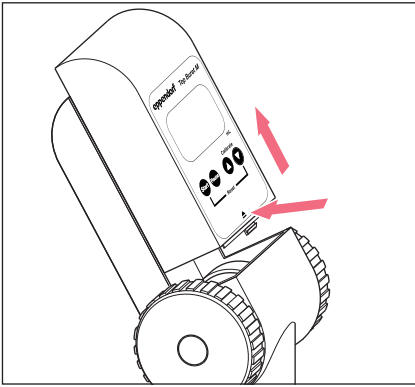


**NOTICE! Damage to the battery compartment due to incorrect insertion of the batteries**

- ▶ Observe the correct polarity of the batteries.
- ▶ Do not use force.



The display automatically switches on when the batteries are inserted. If the device is not used, the display will switch off after about 5 minutes.



1. Press and hold the opening symbol.
2. Slide the control panel upwards and remove it.
3. Remove the battery compartment lid at the back of the control panel.
4. Insert the batteries.
5. Replace the battery compartment lid.
6. Attach the control panel and slide it downwards until it engages.

#### 4.4 Mounting the telescopic aspirating tube

The dispenser conveys the liquid through the telescopic aspirating tube from the supply bottle. Adjust the length of the telescopic aspirating tube to the bottle height to empty the bottle completely.

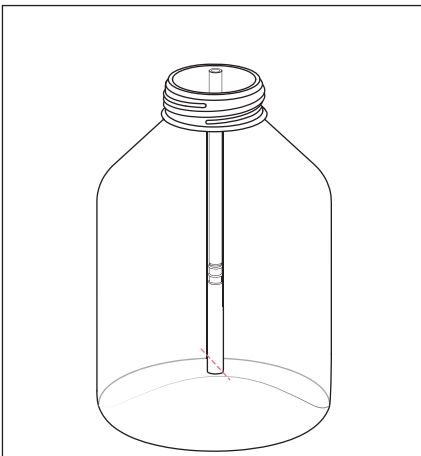
##### 4.4.1 Adjusting the telescopic aspiration tube to the height of the bottle

Prerequisites

- The bottle is larger than the collapsed telescopic aspirating tube.



Use an empty bottle to adjust the telescopic aspiration tube.



1. Hold the telescopic aspiration tube next to the bottle.
2. Extend the telescopic aspiration tube. The telescopic aspiration tube is supposed to reach from the bottle opening to just above the base of the bottle.
3. Cut the lower end of the outer tube off at an angle.

#### 4.4.2 Shortening the telescopic aspiration tube for smaller bottles.

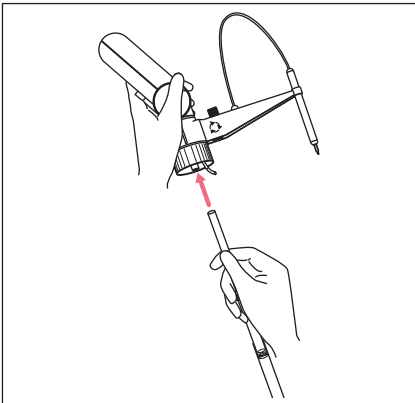
Prerequisites

- The bottle is smaller than the collapsed telescopic aspirating tube.
1. Shorten the inner tube.
  2. Shorten the outer tube.
  3. Cut the lower end of the outer tube off at an angle.

#### 4.4.3 Inserting the telescopic aspirating tube

Prerequisites

- The telescopic aspiration tube is adjusted to the height of the bottle.



1. Cut the lower end of the outer tube off at an angle.
2. Slide the inner tube onto the connection opening up to the stop.

#### 4.5 Screwing the dispenser onto the bottle



**CAUTION! Personal injury due to incorrect transportation of the burette.**

If the mounted burette is not transported correctly, reagents will be released. Contact with reagents may be harmful to eyes or skin.

- ▶ To transport the mounted burette, grasp the burette with one hand and the bottle with the other hand.
- ▶ Do not hold the burette by the housing.



**CAUTION! Personal injury due to contact with reagents.**

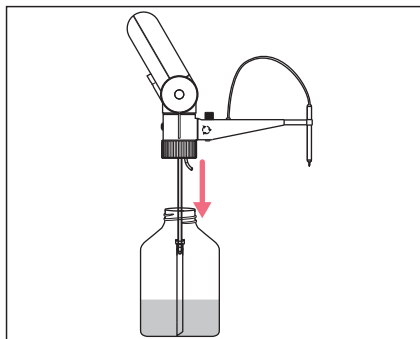
Contact with reagents may be harmful to eyes or skin.

- ▶ Wear your personal protective equipment.
- ▶ Make sure that no reagents are leaking from the device.

The thread connection of the dispenser is designed for bottle threads of 45 mm. For other bottle threads a thread adapter can be used.

Prerequisites

- The telescopic aspirating tube is inserted.
- The length of the telescopic aspirating tube has been adjusted to the height of the bottle.



1. Rotate the discharge valve toggle to deairing.
2. Attach the dispenser onto the bottle from above.
3. Screw the dispenser onto the bottle.

#### 4.5.1 Determining the diameter of the flask neck

Prerequisites

- A suitable thread adapter is available.

Some thread adapters are included in the delivery package. Other diameters can be ordered. The diameter of the thread adapter is imprinted on the adapter. If the bottle thread is smaller than 32 mm, a second adapter must be used.

1. Measure the inner diameter of the bottle top or the outer diameter of the flask neck.
2. Choose the suitable thread adapter.

#### 4.5.2 Screwing on the thread adapter

Prerequisites

- A suitable thread adapter is available.



If you need a thread adapter with a high resistance to chemicals, use a ETFE or PTFE adapter.

1. Screw the thread adapter onto the flask neck.
2. Rotate the discharge valve toggle to deairing.
3. Attach the dispenser onto the bottle from above.
4. Screw the dispenser onto the bottle.



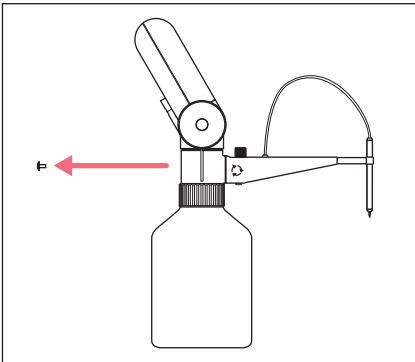
#### 4.6 Connecting the drying tube

For the titration of hygroscopic liquids you need a drying tube with a suitable liquid absorber.

The drying tube is not included in the delivery package and can be ordered as an accessory.

Suitable liquid absorbers:

- Silica gel with a particle size of 1 mm – 3 mm
- $\text{CaCO}_2$
- NaOH pills with a diameter of 5 mm for the absorption of  $\text{CO}_2$



1. Remove the air vent cover.
2. Insert the drying tube into the opening.
3. Fill the drying tube with moisture absorber.

**Operation**

Top Buret™ M/H  
English (EN)

**5 Operation**

Rinse the dispenser thoroughly before first use or discard the first unit dispensed.

**5.1 Venting the dispenser****CAUTION! Personal injury due to contact with reagents.**

Contact with reagents may be harmful to eyes or skin.

- ▶ Wear your personal protective equipment.
- ▶ Do not point the discharge tube at people.

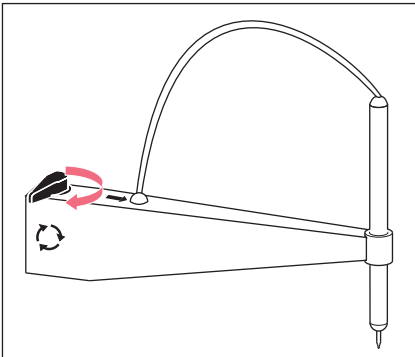
Air bubbles in the supply lines and in the feeding mechanics will distort the measuring results.

Deair the dispenser in the following situations:

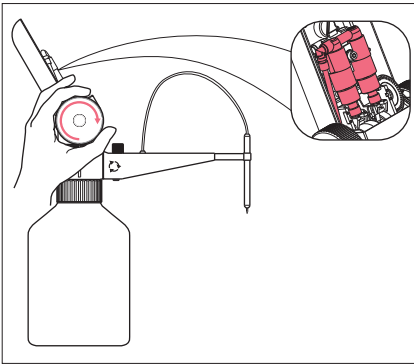
- Prior to initial operation
- After intensive cleaning
- After changing the bottle
- After a long period of inactivity

Prerequisites

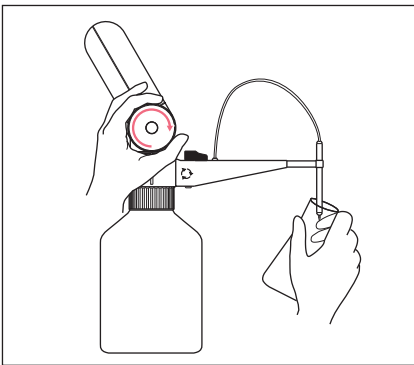
- The dispenser has been completely mounted.



1. Rotate the discharge valve toggle to deairing.



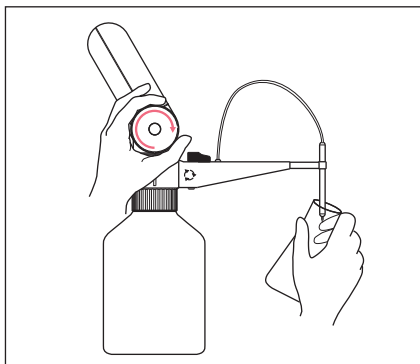
2. Remove the control panel.
3. Rotate the dispensing wheels slowly and evenly forward until there is no more air left in the system or in the dispensing hose.



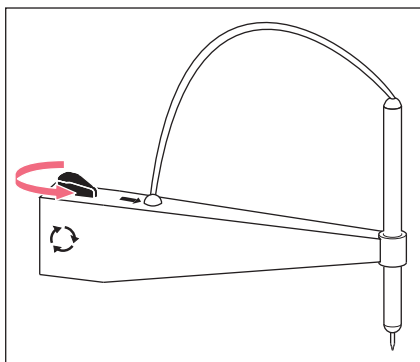
4. Rotate the discharge valve toggle to titration.
5. Place a collection vessel below the canula.
6. Rotate the dispensing wheels forward until liquid emerges from the opening of the discharge tube.
7. Attach the control panel.
8. Wipe any chemical residues from the discharge tube.

## 5.2 Titrating liquid

- i** If you rotate the dispensing wheels backwards, they do not engage. No dispensing of liquid is performed and no volume is counted.
- i** If the dispenser is not used, the display will switch off after 5 minutes. The titrated volume is stored until the next titration.



1. Press the **Start** key.  
 The display switches on.  
 The display shows *0.00* or the volume of the last titration.
2. Press the **Start** key.  
 The volume display is set to *0.00*.
3. Pull out the canula arm to the desired length.
4. Hold a collection vessel below the discharge tube.



5. Rotate the toggle to titration.
6. Rotate the dispensing wheels forward evenly.  
 The liquid is dispensed.
7. After titration, rotate the toggle to deairing.

### 5.3 Changing the supply bottle during titration

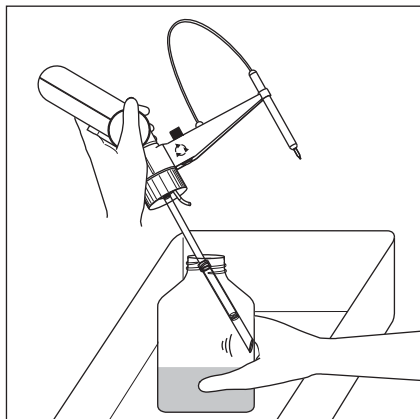
You can change the supply bottle during a titration sequence without changing the displayed volume.

#### Prerequisites

- The same chemical is used.
1. Press the **Pause** key.  
 On the display, the **Stop** symbol appears.  
 The titrated value is stored.
  2. Remove the bottle.
  3. Mount the new bottle.
  4. Vent the dispenser.
  5. Press the **Pause** key again.

The display is enabled. The display shows the stored value and the titration symbol  $\delta$  .  
 6. Continue titration.

#### 5.4 Removing the bottle



1. Rotate the discharge valve toggle to deairing.
2. Place the dispenser with bottle into a suitable collecting vessel.
3. Unscrew the dispenser from the bottle in a counterclockwise direction.
4. Lift the dispenser until the telescopic aspirating tube is no longer immersed in the liquid.
5. Gently tap the telescopic aspirating tube against the inside of the bottle. The residual liquid from the telescopic aspirating tube runs into the bottle.

#### 5.5 Emptying the dispenser

Before changing the liquid and before cleaning, the dispenser must be emptied.

Prerequisites

- The bottle has been unscrewed.

1. Screw the dispenser onto an empty bottle.
2. Place a collection vessel below the canula.
3. Rotate the toggle to titration.
4. Rotate the dispensing wheels forward until no more liquid runs out of the discharge tube.
5. Rotate the toggle to deairing.
6. Rotate the dispensing wheels forward until no more liquid runs out of the recirculation tube.



To remove the reagents completely, clean the dispenser.

## 6 Calibration and adjustment

### 6.1 Calibrating the dispenser

The gravimetric test and the conversion of the measured values for the volume are described in the document "*Standard operating procedure for manual dispensing systems (SOP)*". The document is available on the webpage [www.ependorf.com/manuals](http://www.ependorf.com/manuals).

### 6.2 Adjusting the dispenser

The dispenser has been adjusted to the physical properties of demineralized water at the factory.

The dispenser can be readjusted:

- If the physical properties of the liquid are different to those of water.
- If the error of measurement of the dispensed volume is outside of the tolerance range.

Calibration is only possible with a testing volume between 10 mL – 90 mL.

If the testing volume is < 10 mL, the display shows:



If the testing volume is > 90 mL, the display shows:



To display the set adjustment value, either press the ▲ or ▼ arrow key in titration mode. After you release the key, the display automatically returns to the last volume display.

## 6.2.1 Adjustment to distilled water

### Prerequisites

- The document "*Standard operating procedure for manual dispensing systems – (SOP)*" is available.
1. Measure the testing volume according to the method described in the *SOP*.
  2. Use the average value of the volumes from the calibration.
  3. Press the **Pause** key.  
The volume is saved.
  4. Press and hold the ▲ and ▼ arrow keys for 3 seconds.  
The display shows *CAL*.
  5. Set the calculated average value of the volumes using the ▲ and ▼ arrow keys.
  6. Press the **Start** key.
    - The set value is accepted.
    - The display is reset to zero.
    - The adjustment is ended.
    - The display shows *C* at the top right. The display indicates that the factory settings have been changed.

### 6.2.2 Adjustment to a liquid with a different density

- The document "*Standard operating procedure for manual dispensing systems – (SOP)*" is available.
1. Set up the calibrated analytical balance at a vibration and draft-free location.
  2. Place a beaker on the balance.
  3. With the Top Buret M, titrate 25 mL of the test liquid into the beaker and record the weight.
  4. Repeat step 3 10 times.
  5. With the Top Buret H, titrate 50 mL of the test liquid into the beaker and record the weight.
  6. Repeat step 5 10 times.
  7. Calculate the volume of the standard solution according to the *SOP*.
  8. Calculate the average value of the volumes according to the *SOP*.
  9. Press the **Pause** key.  
The volume is saved.
  10. Press and hold the ▲ and ▼ arrow keys for 3 seconds.  
The display shows *CAL* at the top right.
  11. Set the calculated average value of the volumes using the ▲ and ▼ arrow keys.
  12. Press the **Start** key.
    - The set value is accepted.
    - The display is reset to zero.
    - The adjustment is ended.
    - The display shows *C*. The display indicates that the factory settings have been changed.


### 6.3 Resetting the Top Buret to the factory settings

The reset function is used to restore the factory settings. If you have adjusted the device, the display will show a *C*. When you restore the factory settings again, the *C* will disappear.

1. Press the **Start** key to switch on the Top Buret.
2. Press and hold the **Start** and ▼ keys at the same time for 3 seconds to activate the reset function.
  - The display *C* disappears.
  - The factory settings have been restored.



**7 Troubleshooting**  
**7.1 Troubleshooting**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
<ul style="list-style-type: none"> <li>• Air is aspirated.</li> <li>• There are air bubbles in the titrated liquid.</li> </ul>	<ul style="list-style-type: none"> <li>• The dispenser has not been sufficiently deaired.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Deair the dispenser (see p. 26).</li> </ul>
	<ul style="list-style-type: none"> <li>• The telescopic aspirating tube is not fully mounted.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Push the telescopic aspirating tube firmly onto the connection opening.</li> </ul>
	<ul style="list-style-type: none"> <li>• The telescopic aspirating tube is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Shorten the telescopic aspirating tube or replace it.</li> </ul>
	<ul style="list-style-type: none"> <li>• The telescopic aspirating tube does not immerse into the liquid.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Make the telescopic aspirating tube longer until it immerses into the liquid.</li> </ul>
	<ul style="list-style-type: none"> <li>• The connection opening is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Send the dispenser for repair.</li> </ul>
No liquid is aspirated.	<ul style="list-style-type: none"> <li>• The connection opening is blocked.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Clean the dispenser.</li> </ul>
The titrating volume is too small.	<ul style="list-style-type: none"> <li>• The telescopic aspirating tube is not fully mounted.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Push the telescopic aspirating tube firmly onto the connection opening.</li> </ul>
	<ul style="list-style-type: none"> <li>• The telescopic aspirating tube is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Shorten the telescopic aspirating tube or replace it.</li> </ul>
	<ul style="list-style-type: none"> <li>• The dispenser is adjusted incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Set the dispenser to factory adjustment.</li> </ul>
	<ul style="list-style-type: none"> <li>• The connection opening is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Send the dispenser for repair.</li> </ul>
The  icon appears on the display.	<ul style="list-style-type: none"> <li>• The batteries are empty.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Replace the batteries.</li> </ul>

## 8 Maintenance

### 8.1 Cleaning the dispenser

---



**CAUTION! Personal injury due to contact with reagents.**

The feeding mechanism, valves, telescopic aspirating tube and discharge tube are filled with reagents. Reagents enter the bottle with the cleaning solution. Contact with reagents may be harmful to eyes or skin.

- ▶ Wear your personal protective equipment.
  - ▶ Discard the cleaning solution after cleaning.
- 



The feeding mechanics is inside the device and consists of hoses and valves. Hoses and valves can get heavily contaminated. The feeding mechanics must only be cleaned by authorized skilled personnel. If the feeding mechanics need to be cleaned, please contact the authorized service.



Replace the discharge tube if it is heavily contaminated or damaged.



Clean the dispenser with a suitable disinfectant, e.g., 70 % ethanol.

Clean the dispenser in the following situations:

- Before a change of reagent.
- Prior to storage.
- Before maintenance and repairs.
- Daily, if concentrated alkaline solutions were used.
- Daily, if solutions which are prone to crystallization were used.
- The dispensing wheels are hard to rotate.
- The dispenser is heavily contaminated.

### 8.1.1 Standard cleaning

#### Prerequisites

- The dispenser is empty.
  - A neutral cleaning solution is available.
  - Distilled water is available.
1. Mount the dispenser onto a bottle filled with a neutral cleaning solution.
  2. Place a collection vessel below the discharge tube.
  3. Switch the toggle to titration.
  4. Rotate the dispensing wheels at least 10 times slowly and evenly forward.
  5. Switch the toggle to deairing.
  6. Rotate the dispensing wheels at least 10 times slowly and evenly forward.
  7. Remove the dispenser from the bottle.
  8. Rotate the dispensing wheels until the dispenser is completely emptied.
  9. Screw the dispenser onto a bottle filled with distilled water.
  10. Repeat steps 2 to 6.
  11. Remove the dispenser from the bottle.
  12. Rotate the dispensing wheels until the dispenser is completely emptied.

### 8.1.2 Intensive cleaning

Perform intensive cleaning in the following situations:

- The dispenser is heavily contaminated.
- The dispensing wheels are hard to rotate.
- You have titrated a highly crystalline liquid.

#### Prerequisites

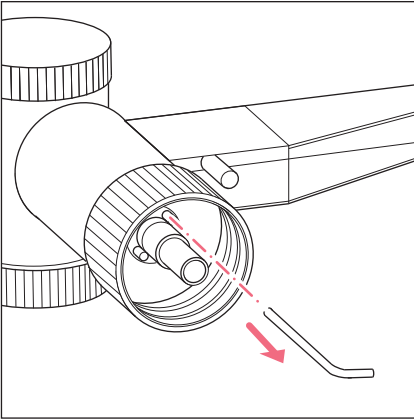
- The dispenser has been cleaned according to the standard procedure.
  - The dispenser has been disassembled.
1. Clean the telescopic aspirating tube with a soft bottle brush.
  2. Clean all parts with a soft brush and a mild cleaning agent.
  3. Wipe the housing without the control panel with a damp cloth and a mild cleaning agent.
  4. Rinse all parts with distilled water.
  5. Allow all assembly parts to dry.
  6. Reassemble the dispenser.  
 Carry out assembly in the reverse order to disassembly.
  7. Using distilled water, check that the dispenser is not leaking and that it is functioning correctly.
  8. Adjust the dispenser.

## 8.2 Disassembling the dispenser

- i** When disassembling the canula arm, be careful not to bend the discharge tube.

### Prerequisites

- The dispenser has been cleaned according to the standard procedure.




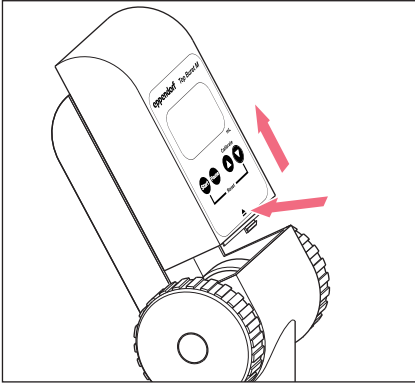
1. Unscrew the dispenser from the bottle in a counterclockwise direction.
2. Remove the telescopic aspirating tube from the connection opening.
3. Remove the recirculation tube from the front hole in the valve head.
4. Rotate the discharge valve toggle to deairing and remove it upwards.
5. Pull off the canula arm in an upward motion.
6. Unscrew the discharge tube knurled nut from the discharge valve thread.
7. Remove the discharge tube from the discharge valve.
8. Remove the discharge tube from the canula holder and canula arm.
9. Remove the canula holder from the canula arm.
10. Pull the discharge valve out of the valve head.

### 8.3 Replacing the batteries

#### Prerequisites

- New batteries are available.

If the battery capacity is exhausted, the  icon will appear on the display. The batteries must be replaced.



1. Press and hold the opening symbol.
2. Slide the control panel upwards and remove it.
3. Remove the battery compartment lid at the back of the control panel.
4. Replace the batteries.
5. Replace the battery compartment lid.
6. Attach the control panel and slide it downwards until it engages.
7. Dispose of the old batteries in an environmentally friendly manner.

**9 Technical data**  
**9.1 Ambient conditions**

Environment	For indoor use only.
Ambient temperature	15 °C – 40 °C
Relative humidity	0 % – 90 %, non-condensing.
Atmospheric pressure	Use up to a height of 2000 m above sea level.

**9.2 Errors of measurement**

Model M	Testing volume	Error			
		Systematic error		Random error	
		± %	± mL	± %	± mL
0.01 mL – 999.9 mL	2.5 mL	2.0	0.05	1.0	0.025
	12.5 mL	0.4	0.05	0.2	0.025
	25 mL	0.2	0.05	0.1	0.025

Model H	Testing volume	Error			
		Systematic error		Random error	
		± %	± mL	± %	± mL
0.01 mL – 999.9 mL	5 mL	2.0	0.1	1.0	0.05
	25 mL	0.4	0.1	0.2	0.05
	50 mL	0.2	0.1	0.1	0.05

**9.3 Parameters for titratable liquids**

Medium temperature	15 °C – 40 °C
Maximum density	2.2 g/cm <sup>3</sup>
Maximum vapor pressure	50 kPa

#### 9.4 Conditions for calibration

Test conditions and test evaluation in accordance with ISO 8655, part 6. Test with analytical balance with evaporation protection, approved by the board of weights and measures.

The errors were determined under the following conditions:

Liquid	Water according to ISO 3696
Number of determinations	10
Ambient temperature	20 °C – 25 °C; ± 0.5 °C
Liquid dispensing	Dispensing on the tube inner wall

## 10 Transport, storage and disposal

### 10.1 Transport

#### Decontamination before shipment

If you are shipping the device to the authorized Technical Service for repairs or to your authorized dealer for disposal please note the following:



#### **WARNING! Risk to health from contaminated device.**

1. Observe the information in the decontamination certificate. It is available as a PDF document on our webpage ([www.eppendorf.com/decontamination](http://www.eppendorf.com/decontamination)).
2. Decontaminate all the parts you are going to dispatch.
3. Include the fully completed decontamination certificate in the shipment.



#### **NOTICE! Damage due to incorrect packing.**

Eppendorf AG is not liable for any damage caused by improper packing.

- ▶ Only store and transport the device in its original packing.

	<b>Air temperature</b>	<b>Relative humidity</b>	<b>Atmospheric pressure</b>
General transport	15 °C – 40 °C	0 % – 90 %, non-condensing.	Up to a height of 2000 m above sea level.
Air freight	-20 °C – 50 °C	0 % – 90 %, non-condensing.	Up to a height of 12200 m above sea level.

### 10.2 Storage

	<b>Air temperature</b>	<b>Relative humidity</b>	<b>Atmospheric pressure</b>
Storage	15 °C – 40 °C	0 % – 90 %, non-condensing.	Up to a height of 2000 m above sea level.



### 10.3 Disposal

In case the product is to be disposed of, the relevant legal regulations are to be observed.

#### **Information on the disposal of electrical and electronic devices in the European Community:**

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2002/96/EC pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. They are marked with the following symbol to indicate this:

As disposal regulations may differ from country to country within the EU, please contact your supplier if necessary.



#### **WARNING! Risk of explosion or fire due to overheated batteries and rechargeable batteries.**

- ▶ Do not heat rechargeable batteries and other batteries to temperatures above 60 °C and do not throw them into a fire.

#### **Disposing of accumulators and batteries**

Do not dispose of accumulators and batteries as household waste. Dispose of accumulators and batteries according to the locally applicable legal regulations.



**Ordering information**

Top Buret™ M/H

English (EN)

**11 Ordering information****11.1 Dispenser**

<b>Order no. (International)</b>	<b>Description</b>
4965 000.017	<b>Eppendorf Top Buret M</b> 25 mL
4965 000.025	<b>Eppendorf Top Buret H</b> 50 mL

**11.2 Spare parts**

<b>Order no. (International)</b>	<b>Description</b>
4965 612.004	<b>Discharge tube</b> with knurled nut
4965 611.008	<b>Tube holder</b>
4965 616.000	<b>Discharge valve</b> with toggle
4960 805.009	<b>Telescopic aspirating tube</b> 2.5 mL, 5 mL, 10 mL, 25 mL, 50 mL, 100 mL
4960 851.000	<b>Drying tube</b> without drying agent
4965 620.007	<b>Air vent cover/filter connection</b>
4965 625.009	<b>Battery</b> LR03/AAA, 1.5 V, 2 pieces

### 11.3 Thread adapters

- GL – round thread DIN 138 for glass threads. Number indicates the maximum outer diameter of the male thread.
- S – buttress thread. Thread type for glass bottles seals which is to prevent them becoming loose unintentionally due to vibrations.
- NS – glass vessel with ground glass joint. 1st digit is the inner diameter of the roughened glass, 2nd digit is the length into the vessel.

Order no. (International)	Description
4960 800.040 4960 800.139 4960 800.058 4960 800.120 4960 800.155 4960 800.147 4960 800.082 4960 800.090 4960 800.104	<b>Bottle thread adapter</b> PP from GL 32 to GL 25, from GL 32 to GL 27 from GL 32 to GL/S 28 from GL 45 to GL 32 from GL 45 to GL 38 from GL 45 to S 40 from GL 32 to NS 19/26 from GL 32 to NS 24/29 from GL 32 to NS 29/32
4960 832.006	<b>Thread adapter</b> for 5 L-jerrycan, ETFE from 45 mm to 17/8" thread



# Eppendorf Certificate

## Declaration of Conformity – China RoHS 2 for Eppendorf Top Buret™ M/H

Eppendorf AG has made reasonable efforts to ensure that hazardous materials and substances may not be used in the Eppendorf Top Buret™ M/H.

In order to determine the concentration of hazardous substances in all homogeneous materials of the subassemblies, a “Product Conformity Assessment” (PCA) procedure was performed. As defined in GB/T 26572 the “Maximum Concentration Value” limits (MCV) apply to these restricted substances:

- Lead (Pb): 0.1%
- Mercury (Hg): 0.1%
- Cadmium (Cd): 0.01%
- Hexavalent Chromium (Cr(+VI)): 0.1%
- Polybrominated Biphenyls (PBB): 0.1%
- Polybrominated Diphenyl Ethers (PBDE): 0.1%

### Environmental Friendly Use Period (EFUP)

EFUP defines the period in years during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions. During normal use by the user such electrical and electronic products will not cause serious environmental pollution, serious bodily injury or damage to the user's assets.

The Environmental Friendly Use Period for Eppendorf Top Buret™ M/H is 40 years.



Products manufactured by Eppendorf may become components of other devices or can be used with other appliances. With these third-party products and devices in particular, please note the EFUP labeled on these products. Eppendorf will not take responsibility for the EFUP of those products and devices.

# Eppendorf Certificate

此表格是按照 SJ/T 11364-2014 中规定所制定的。  
This table is created according to SJ/T 11364-2014.

MATERIAL CONTENT DECLARATION (产品中有害物质名称和含量表)						
有害物质 / Hazardous Substances						
部件名称 Part Name	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr(+VI)	多溴联苯 PBB	多溴二苯醚 PBDE
包装 / Packaging	O	O	O	O	O	O
塑料外壳 / 组件 Plastic Housing/ Parts	O	O	O	O	O	O
电池 / Battery	O	O	O	O	O	O
玻璃 / Glass	O	O	O	O	O	O
电子电气组件 / Electrical and Electronic Parts	X	X	X	O	O	O
金属外壳 / 组件 Metal Housing / Parts	X	O	O	O	O	O
电机 / Motor	X	O	O	O	O	O
配件 / Accessories	X	O	O	O	O	O

注释：此表格适用于所有产品。以上列出的元件或组件不一定都属于所附产品的组成。  
Note: Table applies to all products. Some of the components or parts listed above may not be part of the enclosed product.  
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。  
O: Indicates that the above mentioned hazardous substance contained in all homogeneous materials of the part is below the required limit as defined in GB/T 26572.  
X: 表示该有毒有害物质至少在该部件某一均质材料中的含量超出GB/T 26572规定的限量要求。  
X: Indicates that the above mentioned hazardous substance contained in at least one of the homogeneous materials of this part is above the required limit as defined in GB/T 26572.

除上表所示信息外，还需声明的是，这些部件并非是有意图用铅 (Pb)、汞 (Hg)、铬 (Cd)、六价铬 (Cr(+VI))、多溴联苯 (PBB) 或多溴二苯醚 (PBDE) 来制造的。

Apart from the disclosures in the above table, the subassemblies are not intentionally manufactured or formulated with Lead (Pb), Mercury (Hg), Cadmium (Cd), hexavalent Chromium (Cr(+VI)), polybrominated Biphenyls (PBB), and polybrominated Diphenyl Ethers (PBDE).

Date: Hamburg, December 19, 2018

Page 2 of 2

Dr. B. Schreiber  
Vice President Quality Management  
& Regulatory Affairs

Dipl. Wirt.-Ing. C. Markau  
Business Manager  
Manual Liquid Handling

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Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany  
E-mail: [eppendorf@eppendorf.com](mailto:eppendorf@eppendorf.com)

ISO 9001  
Certified

ISO 13485  
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ISO 14001  
Certified

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# 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 Top Buret™ M/H 4965

**Product type:**

bottletop buret

**Relevant directives / standards:**

2014/35/EU: EN 61010- 1

2014/30/EU: EN 61326- 1

2011/65/EU: EN 50581

Date: February 22, 2016



Management Board



Portfolio Management

Your local distributor: [www.eppendorf.com/contact](http://www.eppendorf.com/contact)  
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[eppendorf@eppendorf.com](mailto:eppendorf@eppendorf.com)

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# Evaluate Your Manual

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