

# Pipette Performance Data Sheet



## Eppendorf Reference® 2

Choose the Eppendorf Reference 2 mechanical pipette with ergonomic single-button operation and benefit from its high precision and accuracy with reduced operating efforts. Its smooth surface and full autoclavability guarantee efficient decontamination - making it the ideal companion when working under sterile conditions. Available as a single-channel pipette in fixed or variable volume, and as 8- and 12-channel pipettes - all with time-saving single-button operation. Once you have experienced this unique operating philosophy you will not want to change back!

## Features

- > Mechanical air-cushion pipette with outstanding precision and accuracy - operated with just one button for volume selection, pipetting and tip ejection
- > With its innovative one-button operation, the Reference 2 allows fast and ergonomic handling with reduced operating efforts and active aerosol reduction. A clear haptic feedback helps to avoid accidental tip ejection
- > 4-digit display with magnifying window for quick and secure volume setting and identification (clearly visible from every angle), incl. volume lock
- > Spring-loaded tip cones improve user-to-user reproducibility and ergonomics by lowering the tip attachment & ejection force
- > The unique smooth surface and full autoclavability guarantee efficient decontamination - making it the ideal companion when working under sterile conditions
- > A temporary adjustment allows for an easy adjustment of your Reference 2 to accurately pipette challenging liquids or in changing external conditions without the need for a full calibration
- > Available as single-channel pipette with fixed or variable volume as well as 8- and 12-channel pipette
- > The Reference 2 multi-channel variants offer high flexibility incl. spring-loaded tip cones which can be switched on/off

## Applications

- > Forward pipetting
- > Reverse pipetting
- > Removal of supernatants
- > Sample mixing
- > Phase extraction
- > Filling of plates, gels, and reaction vessels

## Technical Specifications

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intended use                          | Precise micropipettes with fast and ergonomic single-button operation for general laboratory use. Intended for transferring liquids in the specified volume range in combination with matching tips.                                                                                                                                                                                                                                                     |
| Pipetting type                        | Air-cushion pipette                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Channel options                       | 1, 8, 12                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Volume range                          | 0.1 µL – 10,000 µL                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Volume increments                     | 0.002 µL – 10 µL                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Operation                             | Mechanical (1 button for volume selection, pipetting & tip ejection), 4-digit volume display                                                                                                                                                                                                                                                                                                                                                             |
| Volume lock                           | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Autoclavable                          | Fully autoclavable (121 °C, 1 bar, 20 min)                                                                                                                                                                                                                                                                                                                                                                                                               |
| UV resistance                         | Yes (254 nm)                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Consumables                           | epT.I.P.S.® pipette tips                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Open system (3rd party consumables)   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Conforms with                         | ISO 8655                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Temporary adjustment                  | Easy adjustment for liquid types, elongated tips or altitude                                                                                                                                                                                                                                                                                                                                                                                             |
| Storage accessories (sold separately) | <ul style="list-style-type: none"> <li>&gt; Pipette Carousel for 6 pipettes</li> <li>&gt; Pipette Stand (with optional holder)</li> <li>&gt; Pipette Holder for Carousel, Stand or wall mounting</li> </ul>                                                                                                                                                                                                                                              |
| Storage & transport conditions        | <ul style="list-style-type: none"> <li>&gt; Temperature: -5 °C – 45 °C</li> <li>&gt; Humidity: 10 % – 95 %</li> </ul>                                                                                                                                                                                                                                                                                                                                    |
| Operating conditions                  | <ul style="list-style-type: none"> <li>&gt; Temperature: 5 °C – 40 °C</li> <li>&gt; Humidity: 10 % – 95 %</li> </ul>                                                                                                                                                                                                                                                                                                                                     |
| Others                                | <ul style="list-style-type: none"> <li>&gt; Spring-loaded tip cones for easy tip attachment &amp; ejection (up to 1 mL)</li> <li>&gt; High chemical resistance &amp; special lower parts with resistance to different chemicals available</li> <li>&gt; Sturdy housing with smooth surfaces and optimal decontamination properties</li> <li>&gt; Easy maintenance; spare parts, accessories and calibration services available from Eppendorf</li> </ul> |

## Dimensions

|                       |                                                            |
|-----------------------|------------------------------------------------------------|
| Length                | 251 mm (1-channel, 1,000 µL)<br>248 mm (8-channel, 300 µL) |
| Weight                | 97 g (1-channel, 1,000 µL)<br>171 g (8-channel, 300 µL)    |
| Packaging (W x H x D) | 28 cm x 16 cm x 11 cm<br>(max., depending on model)        |
| Shipping weight       | 250 g – 770 g (depending on model)                         |

## Measurement Deviations

**Eppendorf Reference® 2**, single-channel, fixed volume

| Volume range | Color code                             | Volume  | Systematic error <sup>1)</sup> |           | Random error <sup>1)</sup> |           |
|--------------|----------------------------------------|---------|--------------------------------|-----------|----------------------------|-----------|
| 1 µL         | ■ dark gray (for epT.I.P.S.® 10 µL)    | 1 µL    | ±2.5 %                         | ±0.025 µL | ±1.8 %                     | ±0.018 µL |
| 2 µL         |                                        | 2 µL    | ±2.0 %                         | ±0.04 µL  | ±1.2 %                     | ±0.024 µL |
| 5 µL         |                                        | 5 µL    | ±1.2 %                         | ±0.06 µL  | ±0.6 %                     | ±0.03 µL  |
| 10 µL        |                                        | 10 µL   | ±1.0 %                         | ±0.1 µL   | ±0.5 %                     | ±0.05 µL  |
| 10 µL        | ■ yellow (for epT.I.P.S.® 20 µL)       | 10 µL   | ±1.2 %                         | ±0.12 µL  | ±0.6 %                     | ±0.06 µL  |
| 20 µL        | ■ light gray (for epT.I.P.S.® 20 µL L) | 20 µL   | ±0.8 %                         | ±0.16 µL  | ±0.3 %                     | ±0.06 µL  |
| 20 µL        | ■ yellow (for epT.I.P.S.® 200 µL)      | 20 µL   | ±1.0 %                         | ±0.2 µL   | ±0.3 %                     | ±0.06 µL  |
| 25 µL        |                                        | 25 µL   | ±1.0 %                         | ±0.25 µL  | ±0.3 %                     | ±0.075 µL |
| 50 µL        |                                        | 50 µL   | ±0.7 %                         | ±0.35 µL  | ±0.3 %                     | ±0.15 µL  |
| 100 µL       |                                        | 100 µL  | ±0.6 %                         | ±0.6 µL   | ±0.2 %                     | ±0.2 µL   |
| 200 µL       |                                        | 200 µL  | ±0.6 %                         | ±1.2 µL   | ±0.2 %                     | ±0.4 µL   |
| 200 µL       | ■ blue (for epT.I.P.S.® 1,000 µL)      | 200 µL  | ±0.6 %                         | ±1.2 µL   | ±0.2 %                     | ±0.4 µL   |
| 250 µL       |                                        | 250 µL  | ±0.6 %                         | ±1.5 µL   | ±0.2 %                     | ±0.5 µL   |
| 500 µL       |                                        | 500 µL  | ±0.6 %                         | ±3.0 µL   | ±0.2 %                     | ±1.0 µL   |
| 1000 µL      |                                        | 1000 µL | ±0.6 %                         | ±6.0 µL   | ±0.2 %                     | ±2.0 µL   |
| 2 mL         | ■ red for epT.I.P.S.® 2.5 mL)          | 100 µL  | ±0.6 %                         | ±12 µL    | ±0.2 %                     | ±4 µL     |
| 2.5 mL       |                                        | 100 µL  | ±0.6 %                         | ±15 µL    | ±0.2 %                     | ±5 µL     |

<sup>1)</sup> The error data, according to EN ISO 8655, only apply if original Eppendorf tips are used.  
Technical specifications are subject to change. Errors and omissions excepted.

## Single-channel pipettes, variable volume

**Eppendorf Reference® 2**, single-channel, variable volume, incl. epT.I.P.S.® Box 2.0 with 96 pipette tips

| Volume range | Color code                                | Volume  | Systematic error <sup>1)</sup> |           | Random error <sup>1)</sup> |            |
|--------------|-------------------------------------------|---------|--------------------------------|-----------|----------------------------|------------|
| 0.1–2.5 µL   | ■ dark gray<br>(for epT.I.P.S.® 10 µL)    | 0.1 µL  | ±48.0 %                        | ±0.048 µL | ±12.0 %                    | ± 0.012 µL |
|              |                                           | 0.25 µL | ±12.0 %                        | ±0.03 µL  | ±6.0 %                     | ±0.015 µL  |
|              |                                           | 1.25 µL | ±2.5 %                         | ±0.031 µL | ±1.5 %                     | ±0.019 µL  |
|              |                                           | 2.5 µL  | ±1.4 %                         | ±0.035 µL | ±0.7 %                     | ±0.018 µL  |
| 0.5–10 µL    | ■ medium gray<br>(for epT.I.P.S.® 20 µL)  | 0.5 µL  | ±8.0 %                         | ±0.04 µL  | ±5.0 %                     | ±0.025 µL  |
|              |                                           | 1 µL    | ±2.5 %                         | ±0.025 µL | ±1.8 %                     | ±0.018 µL  |
|              |                                           | 5 µL    | ±1.5 %                         | ±0.075 µL | ±0.8 %                     | ±0.04 µL   |
|              |                                           | 10 µL   | ±1.0 %                         | ±0.10 µL  | ±0.4 %                     | ±0.04 µL   |
| 2–20 µL      | ■ light gray<br>(for epT.I.P.S.® 20 µL L) | 2 µL    | ±3.0 %                         | ±0.06 µL  | ±1.5 %                     | ±0.03 µL   |
|              |                                           | 10 µL   | ±1.0 %                         | ±0.10 µL  | ±0.6 %                     | ±0.06 µL   |
|              |                                           | 20 µL   | ±0.8 %                         | ±0.16 µL  | ±0.3 %                     | ±0.06 µL   |
| 2–20 µL      | ■ yellow<br>(for epT.I.P.S.® 200 µL)      | 2 µL    | ±5.0 %                         | ±0.10 µL  | ±1.5 %                     | ±0.03 µL   |
|              |                                           | 10 µL   | ±1.2 %                         | ±0.12 µL  | ±0.6 %                     | ±0.06 µL   |
|              |                                           | 20 µL   | ±1.0 %                         | ±0.2 µL   | ±0.3 %                     | ±0.06 µL   |
| 10–100 µL    |                                           | 10 µL   | ±3.0 %                         | ±0.3 µL   | ±0.7 %                     | ±0.07 µL   |
|              |                                           | 50 µL   | ±1.0 %                         | ±0.5 µL   | ±0.3 %                     | ±0.15 µL   |
|              |                                           | 100 µL  | ±0.8 %                         | ±0.8 µL   | ±0.2 %                     | ±0.2 µL    |
| 20–200 µL    |                                           | 20 µL   | ±2.5 %                         | ±0.5 µL   | ±0.7 %                     | ±0.14 µL   |
|              |                                           | 100 µL  | ±1.0 %                         | ±1.0 µL   | ±0.3 %                     | ±0.3 µL    |
|              |                                           | 200 µL  | ±0.6 %                         | ±1.2 µL   | ±0.2 %                     | ±0.4 µL    |
| 30–300 µL    | ■ orange<br>(for epT.I.P.S.® 300 µL)      | 30 µL   | ±2.5 %                         | ±0.75 µL  | ±0.7 %                     | ±0.21 µL   |
|              |                                           | 150 µL  | ±1.0 %                         | ±1.8 µL   | ±0.3 %                     | ±0.45 µL   |
|              |                                           | 300 µL  | ±0.6 %                         | ±1.8 µL   | ±0.2 %                     | ±0.6 µL    |
| 100–1000 µL  | ■ blue<br>(for epT.I.P.S.® 1,000 µL)      | 100 µL  | ±3.0 %                         | ±3.0 µL   | ±0.6 %                     | ±0.6 µL    |
|              |                                           | 500 µL  | ±1.0 %                         | ±5.0 µL   | ±0.2 %                     | ±1.0 µL    |
|              |                                           | 1000 µL | ±0.6 %                         | ±6.0 µL   | ±0.2 %                     | ±2.0 µL    |

<sup>1)</sup> The error data, according to EN ISO 8655, only apply if original Eppendorf tips are used.  
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## Measurement Deviations

**Eppendorf Reference® 2**, single-channel, variable volume, incl. epT.I.P.S.® sample bag with 10 pipette tips

| Volume range | Color code                             | Volume  | Systematic error <sup>1)</sup> |         | Random error <sup>1)</sup> |         |
|--------------|----------------------------------------|---------|--------------------------------|---------|----------------------------|---------|
| 0.25–2.5 mL  | ■ red<br>(for epT.I.P.S.® 2.5 mL)      | 0.25 mL | ±4.8 %                         | ±1 µL 2 | ±1.2 %                     | ±3 µL   |
|              |                                        | 1.25 mL | ±0.8 %                         | ±10 µL  | ±0.2 %                     | ±2.5 µL |
|              |                                        | 2.5 mL  | ±0.6 %                         | ±15 µL  | ±0.2 %                     | ±5 µL   |
| 0.5–5 mL     | ■ violet<br>(for epT.I.P.S.® 5 mL)     | 0.5 mL  | ±2.4 %                         | ±12 µL  | ±0.6 %                     | ±3 µL   |
|              |                                        | 2.5 mL  | ±1.2 %                         | ±30 µL  | ±0.25 %                    | ±6 µL   |
|              |                                        | 5.0 mL  | ±0.6 %                         | ±30 µL  | ±0.15 %                    | ±7.5 µL |
| 1–10 mL      | ■ turquoise<br>(for epT.I.P.S.® 10 mL) | 1.0 mL  | ±3.0 %                         | ±30 µL  | ±0.6 %                     | ±6 µL   |
|              |                                        | 5.0 mL  | ±0.8 %                         | ±40 µL  | ±0.2 %                     | ±10 µL  |
|              |                                        | 10.0 mL | ±0.6 %                         | ±60 µL  | ±0.15 %                    | ±15 µL  |

## 8- & 12-channel pipettes, for 96 well plates

**Eppendorf Reference® 2**, 8- or 12-channel, variable volume, incl. epT.I.P.S.® Box 2.0 with 96 pipette tips

| Volume range | Color code                               | Volume | Systematic error <sup>1)</sup> |          | Random error <sup>1)</sup> |          |
|--------------|------------------------------------------|--------|--------------------------------|----------|----------------------------|----------|
| 0.5–10 µL    | ■ medium gray<br>(for epT.I.P.S.® 20 µL) | 0.5 µL | ±12.0 %                        | ±0.06 µL | ±8.0 %                     | ±0.04 µL |
|              |                                          | 1 µL   | ±8.0 %                         | ±0.08 µL | ±5.0 %                     | ±0.05 µL |
|              |                                          | 5 µL   | ±4.0 %                         | ±0.2 µL  | ±2.0 %                     | ±0.1 µL  |
|              |                                          | 10 µL  | ±2.0 %                         | ±0.2 µL  | ±1.0 %                     | ±0.1 µL  |
| 10–100 µL    | ■ yellow<br>(for epT.I.P.S.® 200 µL)     | 10 µL  | ±3.0 %                         | ±0.3 µL  | ±2.0 %                     | ±0.2 µL  |
|              |                                          | 50 µL  | ±1.0 %                         | ±0.5 µL  | ±0.8 %                     | ±0.4 µL  |
|              |                                          | 100 µL | ±0.8 %                         | ±0.8 µL  | ±0.3 %                     | ±0.3 µL  |
| 30–300 µL    | ■ orange<br>(for epT.I.P.S.® 300 µL)     | 30 µL  | ±3.0 %                         | ±0.9 µL  | ±1.0 %                     | ±0.3 µL  |
|              |                                          | 150 µL | ±1.0 %                         | ±1.5 µL  | ±0.5 %                     | ±0.75 µL |
|              |                                          | 300 µL | ±0.6 %                         | ±1.8 µL  | ±0.3 %                     | ±0.9 µL  |

<sup>1)</sup> The error data, according to EN ISO 8655, only apply if original Eppendorf tips are used.  
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