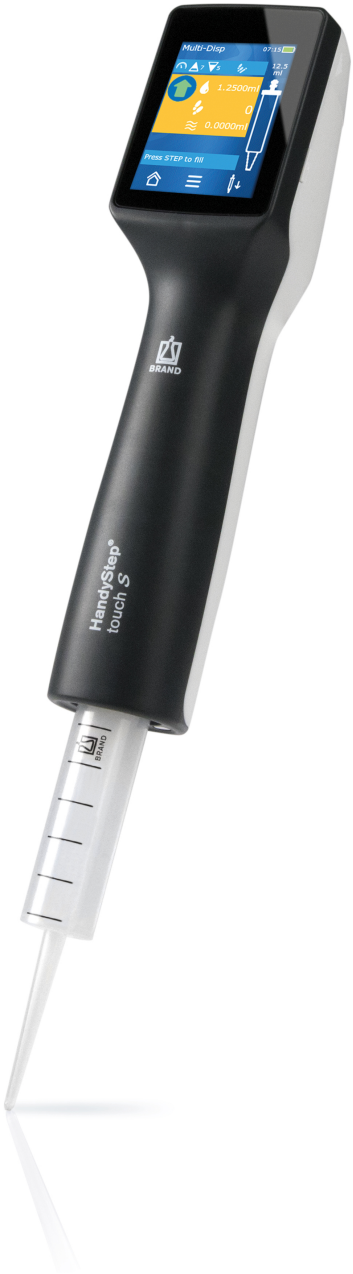
English



SOP
0624

HandyStep®

Standard Operating Procedure

Table of contents

1 Introduction 3

2 Preparation 4

2.1 Instrument identification 4

2.2 Minimum required equipment 4

2.3 Cleaning 4

2.4 Visual inspection for damage 4

2.5 Functional test 5

2.5.1 HandyStep® touch / touch S and HandyStep® electronic 5

2.5.2 HandyStep® S 6

3 Test instruments and accessories 7

4 Gravimetric testing 8

4.1 HandyStep® touch and HandyStep® touch S 8

4.2 HandyStep® electronic 9

4.3 HandyStep® S 10

5 Evaluation of gravimetric test results 11

5.1 Temperature and factor Z 12

5.2 Manufacturer error limits for HandyStep 12

5.3 ISO error limits for HandyStep 14

5.4 Error limits to be defined by the user 14

6 Test report for volumetric instruments 15

7 Appendix 17

7.1 Abbreviations, units, and notations 17

7.2 Declaration on the Absence of Health Hazards 18

7.3 BRAND Calibration Service 19

7.3.1 Range of instruments 19

7.3.2 Testing in accordance with DIN EN ISO 8655 19

7.4 Accredited calibration laboratory D-K-18572-01-00 by BRAND 19

7.4.1 Volumetric instruments with DAkkS calibration certificates issued by BRAND 20

7.5 EASYCAL™ Calibration software – test equipment monitoring made easy 21

1. Introduction

The test instruction transfers standards relevant to the test into a practical form. It can therefore be used as a basis for test equipment monitoring according to DIN EN ISO 9001, DIN EN ISO 10012, and DIN EN ISO/IEC 17 025.

Basically, we recommend an inspection every 3…12 months. However, the testing interval may be adjusted to your individual requirements. In the case of high frequency of use or the use of aggressive media, it is advisable to check the instruments more frequently.

The following instruments can be checked using these test instructions:

Instruments	Relevant standards
HandyStep® S HandyStep® electronic HandyStep® touch/touch S	ISO 8655:2022

For the regular checks according to DIN EN ISO 9001, DIN EN ISO 10 012, and DIN EN ISO/IEC 17 025 as well as the GLP Guidelines, we offer a calibration service (see *'BRAND Calibration Service, p. 19'*). This calibration service saves you time and internal effort, especially if you still have to perform calibrations in addition to ongoing operation.

Legend

In order to simplify the collection of the relevant data, the SOP refers to the respective items in the test report. The following graphics indicate to these positions:

Example:

Position in the test report:

Instrument

In the appendix, you will also find the health clearance form required to send in equipment as well as information about our accredited calibration laboratory and EASYCAL™ 5 calibration software.

2. Preparation

2.1. Instrument identification

+ Read serial number (laser-etched on the housing). Enter in the test report: 1.
+ Read PD-Tip size. Enter in the test report: 1.
+ Read customers identification, if available. Enter in the test report: 1.

2.2. Minimum required equipment

+ One of the following instruments:
  HandyStep® touch/touch S
  HandyStep® electronic
  HandyStep® S
+ PD-Tips
  Use only suitable dispenser tips. For best results, use original PD-Tips from BRAND.

2.3. Cleaning

+ Clean the housing adequately.
  Clean with a moist cloth (water or diluted soapy solution).
  Do not disassemble the instrument!
  See instructions for use.

2.4. Visual inspection for damage

Troubleshooting

Possible malfunction	Cause	Solution
PD-Tip dripping	PD-Tip leaking	Replace PD-Tip
Damage to important parts of the instrument	Mechanical or chemical damage	Send instrument in for repair

2.5. Functional test

2.5.1. HandyStep® touch / touch S and HandyStep® electronic

1. Insert a new PD-Tip.

→ The PD-Tips is recognized automatically or, in the case of compatible dispenser tips, the volume size can be selected.

2. Change the volume to be dispensed.

3. Fill the PD-Tip. Immerse the PD-Tip into the test liquid. Aspirate liquid at a steady rate.

4. Hold the instrument vertically for approx. 10 seconds and observe if a drop forms on the tip.

→ If a drop forms: note the information in the following table.

5. Gradually dispense the test liquid again.

→ The liquid must be dispensed at a steady rate.

6. Empty the PD-Tip completely and remove it.

7. Enter the result into the test report (3).

Possible malfunction	Cause	Solution
PD-Tip dripping	PD-Tip leaking	Replace PD-Tip
After dispensing liquid, air is discharged in the final step.	PD-Tip leaking	Replace PD-Tip
Damage to important parts of the instrument	Mechanical or chemical damage	Send instrument in for repair

If the instrument displays an error message, follow the instructions for use.

2.5.2. HandyStep® S

1. Insert a new PD-Tip.

2. Does the piston properly lock into place?

→ The dispensing lever must move smoothly and jolt-free.

3. Can the volume be adjusted?

4. Fill the PD-Tip. Immerse the PD-Tip into the test liquid and fill the PD-Tip. The dispensing lever must move smoothly and jolt-free.

5. Hold the instrument vertically for approx. 10 seconds and observe if a drop forms on the tip.

→ If a drop forms: note the information in the following table.

6. Gradually dispense the test liquid again.

→ Check number of dispensing steps:
Example at level 5: 10 steps (1 backlash compensation +9 test steps) Operating lever must move easily and smoothly.

7. Empty the PD-Tip completely and remove it.

8. Enter the result into the test report (3).

Possible malfunction	Cause	Solution
PD-Tip cannot be inserted.	+ Filling/locking lever not pushed down to bottom position and not tilted upward. + Piston of the PD-Tip not inserted completely.	Push filling/locking lever all the way to the bottom, and tilt upward. Push piston of the PD-Tip into the cylinder completely.
Filling/locking lever cannot be pushed upward.	+ Filling/locking lever not completely pushed in (closed).	Push piston of the PD-Tip into the instrument completely. Close the filling/locking lever.
PD-Tip dripping.	+ PD-Tip is leaking.	Replace PD-Tip.

Further checks and settings can be found in the respective instructions for use.

3. Test instruments and accessories

+ A test room with the following features:
  draft-free
  low temporal and spatial temperature fluctuations
  Taking into account the measuring tolerance of the hygrometer, a relative humidity of 45…80% should be reached.
  Ambient temperature of max. 20 ± 3°C
+ Place the instrument to be tested with accessories unpacked in the test room for at least 2 h so that the instrument and accessories can adjust to the ambient temperature.
+ A recipient vessel filled with deionized or distilled water (e. g. Erlenmeyer flask) (water quality in accordance with ISO 3696, at least quality 3) Consider the following aspects:
  Adjust the water and ambient temperature by max. 0.5°C.
  Prevent the water in the vessel from cooling down as a result of evaporation.
+ Provide a weighing vessel (e.g., Erlenmeyer flask). Fill this with a small amount of water.
  Make sure at least the bottom is covered.
  Provide evaporation protection for < 100 µl test volume.
+ Measuring instruments in accordance with DIN ISO 8655-6:

Instrument	**Resolution:**
Thermometer for liquids	0.1°C
Thermometer for ambient temperature	0.1°C
Hygrometer	1% relative air humidity
Barometer	0.1 kPa
Timer	1 s

+ Balance in accordance with DIN EN ISO 8655-6:

Nominal volume of the instrument to be tested	**Resolution of the display**	**Repeatability and linearity**	**Standard measurement uncertainty**
V	**mg**	**mg**	**mg**
1 µl < V ≤ 10 µl	0.001	0.002	0.002
10 µl < V ≤ 100 µl	0.01	0.02	0.02
100 µl < V ≤ 1,000 µl	0.1	0.2	0.2
1 ml < V ≤ 10 ml	0.1	0.2	0.2

Traceability of test results to the national standard

By using calibrated test equipment (balance and thermometers), the requirement of DIN EN ISO 9001, DIN EN ISO 10 012, and DIN EN ISO/IEC 17 025 for traceability of the test to the national standard is fulfilled. The calibration of the balance can be done by DAkkS calibration, a direct official calibration of the balance, or by calibrating the balance with correspondingly traced weights (corresponding precision). The thermometer can also be calibrated by means of a DAkkS calibration, an official calibration, or by comparison with corresponding traceable thermometers (under defined conditions).

4. Gravimetric testing

4.1. HandyStep® touch and HandyStep® touch S

This test can be carried out with PD-Tips of any size. However, a 5 ml PT-Tip is normally used for this purpose.

1.	Set the nominal volume.	Select Multi-Dispensing mode. Insert a 5 ml PD-Tip.
2.	Determine the temperature of the deionized water.	Enter the temperature into the test report.
3.	Prime the PD-Tip before use.	Set the step volume to 5 ml. Fill the tip with liquid and empty it again. Small air bubbles in the area of the piston after priming do not affect the results.
4.	Fill the PD-Tip.	Immerse PD-Tip vertically into the testing liquid and press the STEP button to aspirate the liquid. After aspirating the liquid, the HandyStep® touch / touch S will automatically compensate for play to reduce tension in the tip. Caution: Aspirating air: If air is discharged in the final step, the tip is not leak tight. Replace the tip and repeat the process.
5.	Place the weighing vessel (containing a small amount of deionized water) on the balance and tare the balance.	
6.	Remove the weighing vessel from the balance.	
7.	Dispense the first step into the weighing vessel.	Up to a volume of 5 ml, lean the PD-Tip against the wall of the vessel at an angle of approx. 30…45°. Then wipe it off over a length of approx. 10 mm. Volumes above 5 ml can be dispensed in open stream.
8.	Place the weighing vessel onto the scale.	Enter the result in the test report (6 V_1)
9.	Re-tare the balance.	
10.	Repeat steps 5 through 8 ten times.	Enter the result in the test report (6 V_1)
11.	Repeat the same testing procedure at 50 % and 10 % of nominal volume.	At 50% (V_2) and 10% (V_3) of nominal volume, there is no need to refill the instrument after each measurement, since volumes are dispensed in steps. Enter the weight values into the test report. This amounts to 30 weight values in total.

4.2. HandyStep® electronic

This test can be carried out with PD-Tips of any size. However, a 5 ml PT-Tip is normally used for this purpose.

1.	Set the nominal volume.	
2.	Determine the temperature of the deionized water.	Enter the temperature into the test report.
3.	Prime the PD-Tip before use.	Set the step volume to 5 ml. Fill the tip with a minimal amount of liquid and empty it again. Small air bubbles in the area of the piston after priming do not affect the results.
4.	Fill the PD-Tip.	Immerse PD-Tip vertically into the testing liquid and press the STEP button to aspirate the liquid. After aspirating the liquid, the HandyStep® electronic will automatically compensate for play to reduce tension in the tip. In doing so, a small amount of deionized water is dispensed.
5.	Place the weighing vessel (containing a small amount of deionized water) on the balance and tare the balance.	
6.	Remove the weighing vessel from the balance.	
7.	Dispense the first step into the weighing vessel.	Up to a volume of 5 ml, lean the PD-Tip against the wall of the vessel at an angle of approx. 30…45°. Then wipe it off over a length of approx. 10 mm. Volumes above 5 ml can be dispensed in open stream.
8.	Place the weighing vessel onto the scale.	Enter the result in the test report (6 V_1)
9.	Re-tare the balance.	
10.	Repeat steps 5 through 8 ten times.	Enter the result in the test report (6 V_1)
11.	Repeat the same testing procedure at 50 % and 10 % of nominal volume.	At 50 % (V_2) and 10 % (V_3) of nominal volume, there is no need to refill the HandyStep® electronic after each measurement, since volumes are dispensed in steps. Enter the weight values into the test report. This amounts to 30 weight values in total.

4.3. HandyStep® S

This test can be carried out with PD-Tips of any size. However, a 5 ml PT-Tip is normally used for this purpose.

1.	Set level 5 on the HandyStep® S.	
2.	Determine the temperature of the deionized water.	Enter the temperature into the test report.
3.	Prime the PD-Tip before use.	Fill the tip with a minimal amount of liquid and empty it again. Small air bubbles in the area of the piston after priming do not affect the results.
4.	Fill the PD-Tip.	Immerse the PD-Tip vertically into the test liquid.
5.	Discard the first step; it only serves to compensate for play to reduce surface tension in the tip.	
6.	Place the weighing vessel (containing a small amount of deionized water) on the balance and tare the balance.	
7.	Remove the weighing vessel from the balance.	
8.	Dispense the second step into the weighing vessel.	Up to a volume of 5 ml, lean the PD-Tip against the wall of the vessel at an angle of approx. 30…45°. At an even speed, press the dispensing lever to the first stop and hold. Then wipe it off over a length of approx. 10 mm. Volumes above 5 ml can usually be dispensed in open stream.
9.	Place the weighing vessel onto the balance.	Enter the result in the test report (6 V_1)
10.	Re-tare the balance.	
11.	Repeat steps 6 through 9 ten times.	Enter the weight values into the test report. This amounts to 30 weight values in total. Note: With the Step 5 setting, the PD-Tip has to be filled/aspirated again for dispensing the tenth step.
12.	Repeat the test with the Step 3 (V_2) and Step 1 (V_3) settings.	

5. Evaluation of gravimetric test results

The weight values obtained during the gravimetric test are only the mass values of the dispensed volume. In order to obtain the actual volume, an adjustment calculation must be carried out. The following calculations must be carried out:

Step	Calculation	Remark
1.	**Mean weight**: (Example for 10 weight values) $\bar{x} = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10}}{10}$	
2.	**Mean volume**: $\overline{V} = \bar{x} * Z$	Factor Z (see Table 1). Enter the result in the test report 6a.
3.	**Standard deviation**: $s = Z * \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$	Factor Z (see Table 1). Enter the result in the test report 6b.
4.	**Accuracy**: $A\% = \frac{\overline{V} - V_0}{V_0} * 100$	Enter the result in the test report 6c.
5.	**Coefficient of variation**: $CV\% = \frac{100\ s}{\overline{V}}$	Enter the result in the test report 6d.
	Actual/nominal value comparison: For error limits, see *'Manufacturer error limits for HandyStep, p. 12'* and *'ISO error limits for HandyStep, p. 14'* and the following accuracy tables for the respective instrument, or define your own error limits.	Enter the result in the test report 6e.
	Result:	Enter the result in the test report 6g.

If the calculated values (A% and CV%) are less than or equal to the error limits, the instrument is in good working order.

We recommend using software to help perform the calculation and evaluation. For this purpose, BRAND offers the EASY-CAL™ calibration software (see here). This convenient software runs on Windows and speeds up the calculation considerably.

5.1. Temperature and factor Z

Extract from DIN EN ISO 8655

Table refers to 1,013 hPa.

In the validity range from 950 hPa to 1040 hPa.

Temperature: ° C	Factor Z ml/g		Temperature: ° C	Factor Z ml/g
15	1.0020		23	1.0035
15.5	1.0020		23.5	1.0036
16	1.0021		24	1.0038
16.5	1.0022		24.5	1.0039
17	1.0023		25	1.0040
17.5	1.0024		25.5	1.0041
18	1.0025		26	1.0043
18.5	1.0026		26.5	1.0044
19	1.0027		27	1.0045
19.5	1.0028		27.5	1.0047
20	1.0029		28	1.0048
20.5	1.0030		28.5	1.0050
21	1.0031		29	1.0051
21.5	1.0032		29.5	1.0052
22	1.0033		30	1.0054
22.5	1.0034			

5.2. Manufacturer error limits for HandyStep

Volumetric error limits for repetitive pipettes

The stated error limits refer to new instruments under optimized testing conditions (qualified personnel and standardized ambient conditions).

HandyStep® touch and HandyStep® touch S

PD tip size	Volume range	Test volume (A* ≤ ± %)			Test volume (CV* ≤ %)		
		100%	50%	10%	100%	50%	10%
0.1 ml	1…100 µl	1.0	1.0	1.6	0.5	1.0	2.0
0.5 ml	5…500 µl	0.9	0.9	1.0	0.3	0.6	1
1.0 ml	10 µl…1 ml	0.6	0.9	1.0	0.3	0.5	0.8
1.25 ml	12.5…1250 µl	0.6	0.6	0.9	0.2	0.5	0.7
2.5 ml	25…2500 µl	0.5	0.6	0.7	0.15	0.3	0.6
5.0 ml	50…5,000 µl	0.5	0.5	0.7	0.15	0.4	0.7
10.0 ml	100 µl…10 ml	0.4	0.5	0.7	0.15	0.5	0.8
12.5 ml	125 µl…12.5 ml	0.5	0.5	0.8	0.15	0.6	1.4
25.0 ml	250 µl…25 ml	0.5	0.5	0.6	0.15	0.3	1.0
50.0 ml	500 µl…50 ml	0.5	0.5	0.5	0.15	0.4	1.2

*A = Accuracy, CV = Coefficient of Variation

The nominal volume is the maximum volume printed on the PD-Tip.

Error limits related to the nominal volume and to partial volumes as a function of the PD-Tip at the same temperature (20°C) of the instrument, environment, and distilled water with uniform handling. The error limits specified in ISO 8655 are not exceeded.

HandyStep® electronic

PD tip size	Volume range	Test volume (A* ≤ ± %)			Test volume (CV* ≤ %)		
		100%	50%	10%	100%	50%	10%
0.1 ml	1…100 µl	1.0	1.0	1.6	0.5	1.0	2.0
0.5 ml	5…500 µl	0.9	0.9	1.0	0.3	0.6	1
1.0 ml	10 µl…1 ml	0.6	0.9	1.0	0.3	0.5	0.8
1.25 ml	12.5…250 µl	0.6	0.6	0.9	0.2	0.5	0.7
2.5 ml	25…2500 µl	0.5	0.6	0.7	0.15	0.3	0.6
5.0 ml	50…5,000 µl	0.5	0.5	0.7	0.15	0.4	0.7
10.0 ml	100 µl…10 ml	0.4	0.5	0.7	0.15	0.5	0.8
12.5 ml	125 µl…12.5 ml	0.5	0.5	0.8	0.15	0.6	1.4
25.0 ml	250 µl…25 ml	0.5	0.5	0.6	0.15	0.3	1.0
50.0 ml	500 µl…50 ml	0.5	0.5	0.5	0.15	0.4	1.2

*A = Accuracy, CV = Coefficient of Variation

The nominal volume is the maximum volume printed on the PD-Tip.

Error limits related to the nominal volume and to partial volumes as a function of the PD-Tip at the same temperature (20°C) of the instrument, environment, and distilled water with uniform handling. The error limits specified in ISO 8655 are not exceeded.

HandyStep® S

PD-tip size:	Volume range µl	A* ≤ ± % Stroke setting % of nominal volume			CV* ≤ % Stroke setting % of nominal volume		
		1≙2%	3≙ 6%	5≙10%	1≙2%	3≙6%	5≙10%
0.1 ml	2…10	4.0	2.4	1.6	6.0	3.0	2.0
0.5 ml	10…50	2.5	1.5	1.0	2.5	1.5	1.0
1 ml	20…100	2.5	1.5	1.0	2.0	1.2	0.8
1.25 ml	25…125	2.5	1.4	0.9	2.0	1.1	0.7
2.5 ml	50…250	1.8	1.1	0.7	1.5	0.9	0.6
5 ml	100…500	1.8	1.1	0.7	1.5	0.9	0.7
10 ml	200…1,000	1.8	1.1	0.7	2.0	1.2	0.8
12.5 ml	250…1250	1.8	1.1	0.8	3.2	2.0	1.4
25 ml	500…2500	1.5	0.9	0.6	3.0	1.5	1.0
50 ml	1,000…5,000	1.5	0.8	0.5	5.0	1.8	1.2

*A = Accuracy, CV = Coefficient of Variation

The nominal volume is the maximum volume printed on the PD-Tip.

Error limits in relation to the set partial volume depending on the PD-Tip size, at equal temperature (20°C) of instrument, tip, ambient environment and distilled water, and with uniform, jolt-free handling. Calibration is carried out in accordance with DIN EN ISO 8655-5.

5.3. ISO error limits for HandyStep

Nominal volume µl	**1**	**2**	**3**	**10**	**20**	**50**	**100**	**200**	**500**
A±%	5	5	2.5	2.0	1.5	1.0	1.0	1.0	1.0
CV%	5	5	3.5	2.5	2.0	1.5	1.0	1.0	0.6
Nominal volume ml	**1.0**	**2.0**	**5.0**	**10**	**25**	**50**			
A±%	1	0.8	0.6	0.5	0.5	0.5			
CV%	0.4	0.4	0.3	0.3	0.3	0.25			

5.4. Error limits to be defined by the user

For calibration, the applicable error limits must be defined by the user. Different methods can be applied to accomplish this:

If the application requires it and the optimized test conditions exist for measurement, the error limits specified in the *'Manufacturer error limits for HandyStep, p. 12'* can also be expected in the case of used, intact volumetric instruments.

In accordance with the German Calibration Law, however, it is also admissible to apply operational limits. The operational limits equate to double the calibration error limits. This means that the values of the manufacturer's error limits*', p. 12'* must be doubled. Users may also define their own individual error limits related to their particular application, which their calibrated (adjusted) measuring instrument should adhere to.

This procedure meets the requirements of DIN EN ISO 9001, DIN EN ISO 10 012, and DIN EN ISO/IEC 17 025.

6. Test report for volumetric instruments

1 Instrument

Instrument
- ☐ HandyStep® electronic
- ☐ HandyStep® S
- ☐ HandyStep® touch
- ☐ HandyStep® touch S

PD-Tip size
- ☐ 0.1 ml
- ☐ 0.5 ml
- ☐ 1.0 ml
- ☐ 1.25 ml
- ☐ 2.5 ml
- ☐ 5.0 ml
- ☐ 25.0 ml
- ☐ 12.5 ml
- ☐ 10.0 ml
- ☐ 25.0 ml
- ☐ 50.0 ml

Other:

Nominal volume:

Serial number:

Customer's marking:

Other:

2 Damage

Nominal volume:

Serial number:

Customer's marking:

3 Operating defects

- ☐ Type of damage
- ☐ Damage remedied
- ☐ none
- ☐ Type of functional defect
- ☐ Functional defect eliminated

(Continued on next page)

4 Environment

Water temperature:

Balance:

Thermometer:

Correction factor Z:

Relative humidity (at least 35%):

5 Weight values of the gravimetric test

Weight value No.	V_1=	V_2=	V_3=
x_1:			
x_2:			
x_3:			
x_4:			
x_5:			
x_6:			
x_7:			
x_8:			
x_9:			
x_{10}:			

6 Evaluation of the gravimetric test

Calculated value		V_1=	V_2=	V_3=
6a	$\overline{V}$			
6b	s			
6c	A [%] actual			
6d	CV [%] actual			
6e	A [%] target			
6e	CV [%] target			
6g	Result			

The test was carried out according to DIN EN ISO 8655 and DIN EN ISO 4787.

Date: Signature:

7. Appendix

7.1. Abbreviations, units, and notations

The following abbreviations are used in this or other test instructions:

Symbol	A < B: A is less than B A ≤ B: A is less than or equal to B
Ranges	Example: 980…1000 hPa Avoids sign confusion: Hyphen as a minus sign
	Example: 20 µl < V < 100 µl The volume V is between 20 µl and 100 µl (V is larger than 20 µl and smaller than 100 µl).
Materials	PFP: Perfluorinated pentacene
	PMP Polymethylpentene
	PFA Perfluoroalkoxy polymer
	Boro 3.3 Borosilicate glass
	AR-GLAS®: A soda-lime glass from SCHOTT AG, 55122 Mainz, Germany
	PUR: Polyurethane
W_1	Tare weight of the weighing vessel
W_2	Weight of the weighing vessel filled with the medium to be weighed.
A	Accuracy
CV	Coefficient of variation:
V	Volume
s	Second
l	Liter
ml	Milliliter(s)
µl	Microliters
g	Gram(s)
mg	Milligrams(s)

7.2. Declaration on the Absence of Health Hazards

Please enclose with the instrument or send as an e-mail to service@brand.de.

BRAND GMBH + CO KG

Otto-Schott-Str. 25
97877 Wertheim

service@brand.de
F +49 9342 808 91290

We are required by law to protect our employees against hazards caused by contaminated instruments. Therefore, we thank you for understanding that we can only perform calibrations| repairs when this declaration is completed, signed and provided to us.

CAUTION! If you are a customer outside of Germany, please contact our local service partner in your country. Please send in instruments from outside Germany only after being requested to do so. Unsolicited instruments cannot be processed.

To the equipment shipment from | To the delivery note number

Instrument | Serial Number

The undersigned hereby declares:

+ That the instruments have been carefully cleaned and decontaminated before shipment.
+ That the instruments pose no danger through bacteriological, viral, chemical, and/or radioactive contamination.

Applications

Media used:

- ☐ Acids
- ☐ Bases
- ☐ Solvents
- ☐ Serum, blood
- ☐ Cell culture media, buffers
- ☐ Other:

Measures for decontamination:

Company / laboratory (official stamp)

Name:

Pos.

Date / legally binding signature:

Tel. / fax / e-mail

_____

7.3. BRAND Calibration Service

BRAND offers a complete service that includes calibration and adjustment of BRAND and third-party instruments as well as any necessary maintenance and repair of BRAND instruments. This saves time and money, with the added benefit of testing by an independent laboratory. Find more information and the order form for the repair and calibration service on brand.de.

7.3.1. Range of instruments

1. Piston-operated pipettes (single- and multi-channel)
2. Bottle-top dispensers
3. Bottle-top burettes
4. Repetitive pipettes

7.3.2. Testing in accordance with DIN EN ISO 8655

A team of qualified staff, working in temperature and humidity controlled rooms and using state-of-the-art balances and calibration software, calibrates Liquid Handling instruments, regardless of their make, in accordance with DIN EN ISO 8655.

Variable volume instruments such as the HandyStep®Touch, HandyStep®Touch S, HandyStep® electronic, Transferpette®, Transferpette®S, Transferpette®electronic, Transferpette®-8/-12, Transferpette®-8/-12 electronic, Transferpette®S -8/-12, Transferpettor, Dispensette®, digital burettes, or Titrette® are checked at nominal volume, 50% of the nominal volume, and at 10% or 20% of the nominal volume.

To document the results, a detailed test report that fully complies with all relevant regulations is compiled.

The BRAND Calibration Service provides:

1. Calibration of Liquid Handling instruments, regardless of their make
2. Detailed calibration certificate
3. Return of instrument within a few working days
4. Cost-efficient implementation

7.4. Accredited calibration laboratory D-K-18572-01-00 by BRAND

Precise measurement results are essential in all areas – both for internal quality assurance and to meet various standard requirements.

BRAND has been accredited since 1998 – first by the DKD (German Calibration Service) and since 2013 by the DAkkS (German Accreditation Body) as a calibration laboratory for volumetric instruments in accordance with DIN EN ISO/IEC 17025.

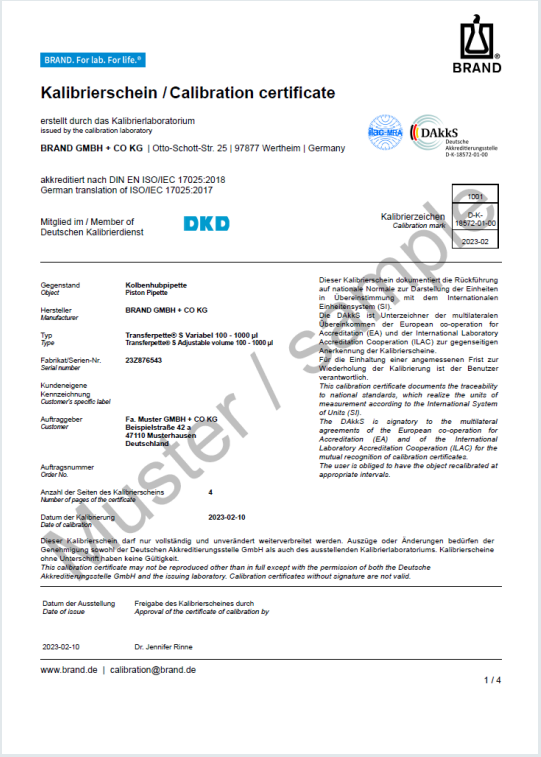
ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-K-18572-01-00

Thanks to these many years of experience in the calibration of volumetric instruments as well as liquid handling instruments, customers also find BRAND a trustworthy service provider for test equipment monitoring

Standards (e.g., DIN EN ISO 9001 and DIN EN ISO/IEC 17 025) require that measured values are metrologically traceable to international units. Proof of this is provided by calibration certificates issued by accredited laboratories (often also called DAkkS or DKD calibration certificates).

With the calibration certificate in accordance with DIN EN ISO/IEC 17025, our customers receive a calibration that is internationally recognized as metrologically traceable in many countries. This is possible thanks to the membership of DAkkS in the EA (European Cooperation for Accreditation) and ILAC (International Laboratory Accreditation Cooperation).

Calibration certificate according to DIN EN ISO/IEC 17025



BRAND. For lab. For life.®

BRAND

Kalibrierschein / Calibration certificate

erstellt durch das Kalibrierlaboratorium
issued by the calibration laboratory

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akkreditiert nach DIN EN ISO/IEC 17025:2018
German translation of ISO/IEC 17025:2017

Mitglied im / Member of Deutschen Kalibrierdienst

DKD

Kalibrierzeichen / *Calibration mark*: 1001 | D-K-18572-01-00 | 2023-02

Gegenstand / *Object*	**Kolbenhubpipette** / **Piston Pipette**
Hersteller / *Manufacturer*	**BRAND GMBH + CO KG**
Typ / *Type*	**Transferpette® S Variabel 100 - 1000 µl** / **Transferpettet® S Adjustable volume 100 - 1000 µl**
Fabrikat/Serien-Nr. / *Serial number*	**23Z876543**
Kundeneigene Kennzeichnung / *Customer's specific label*	
Auftraggeber / *Customer*	**Fa. Muster GMBH + CO.KG** **Beispielstraße 42 a** **47110 Musterhausen** **Deutschland**
Auftragsnummer / *Order No.*	
Anzahl der Seiten des Kalibrierscheins / *Number of pages of the certificate*	**4**
Datum der Kalibrierung / *Date of calibration*	**2023-02-10**

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitssystem (SI).
Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.
The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle GmbH als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.
This calibration certificate may not be reproduced other than in full except with the permission of both the Deutsche Akkreditierungsstelle GmbH and the issuing laboratory. Calibration certificates without signature are not valid.

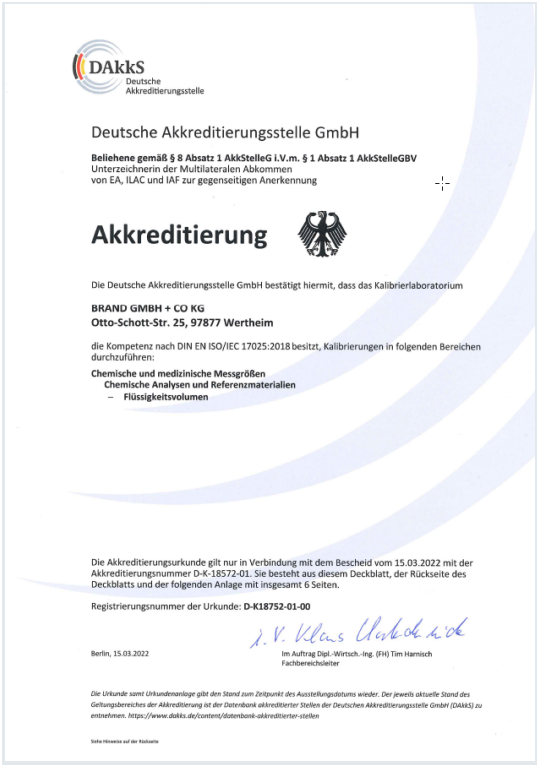
Datum der Ausstellung / *Date of issue*	Freigabe des Kalibrierscheines durch / *Approval of the certificate of calibration by*
2023-02-10	Dr. Jennifer Rinne

www.brand.de | calibration@brand.de

1 / 4

Muster / sample

BRAND accreditation certificate



DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Kalibrierlaboratorium

BRAND GMBH + CO KG
Otto-Schott-Str. 25, 97877 Wertheim

die Kompetenz nach DIN EN ISO/IEC 17025:2018 besitzt, Kalibrierungen in folgenden Bereichen durchzuführen:

Chemische und medizinische Messgrößen
Chemische Analysen und Referenzmaterialien
– **Flüssigkeitsvolumen**

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 15.03.2022 mit der Akkreditierungsnummer D-K-18572-01. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 6 Seiten.

Registrierungsnummer der Urkunde: **D-K18752-01-00**

Berlin, 15.03.2022

Im Auftrag Dipl.-Wirtsch.-Ing. (FH) Tim Harnisch
Fachbereichsleiter

Die Urkunde samt Urkundenanlage gibt den Stand zum Zeitpunkt des Ausstellungsdatums wieder. Der jeweils aktuelle Stand des Geltungsbereiches der Akkreditierung ist der Datenbank akkreditierter Stellen der Deutschen Akkreditierungsstelle GmbH (DAkkS) zu entnehmen. https://www.dakks.de/content/datenbank-akkreditierter-stellen

Siehe Hinweise auf der Rückseite

BRAND performs the calibration of liquid handling equipment in accordance with the gravimetric reference method in compliance with all requirements of DIN EN ISO 8655-6:2022.

For volumetric instruments made of glass or plastic, we work in accordance with DIN EN ISO 4787:2022 or, if necessary, in accordance with accredited in-house procedures.

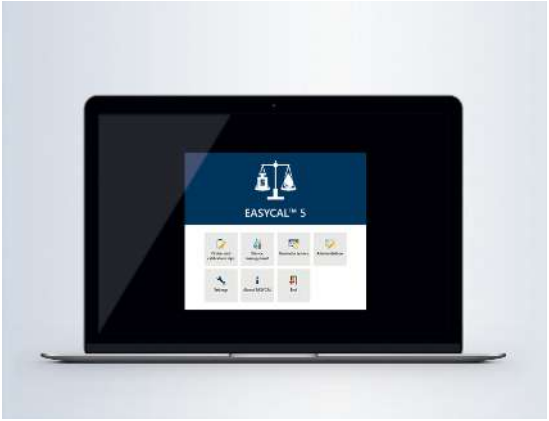
As a rule, and unless otherwise requested by our customers, our calibration results are assessed for conformity on the basis of the ILAC-G8:03/2009 decision rule. For this purpose, the measurement result is evaluated taking into account the expanded measurement uncertainty with 95% overlap probability in relation to relevant standard or manufacturer tolerances. This provides our customers with good assistance in assessing whether the test equipment meets their own quality requirements.

7.4.1. Volumetric instruments with DAkkS calibration certificates issued by BRAND

BRAND calibrates the following volumetric instruments (new or already in use and regardless of make):

+ **Piston-operated pipettes**, from 0.1 µl to 10 ml
+ Multi-channel piston-operated pipettes from 0.1 µl to 300 µl
+ **Piston-operated burettes**, from 5 µl to 200 ml
+ Dispensers and dilutors from 5 µl to 200 ml
+ **Glass volumetric instruments**, adjusted to contain (TC, In) from 1 µl to 10,000 ml
+ **Glass volumetric instruments**, adjusted to deliver (TD, Ex) from 100 µl to 100 ml
+ **Plastic volumetric instruments**, adjusted to contain (TC, In) from 1 ml to 2,000 ml
+ **Plastic volumetric instruments**, adjusted to deliver (TC, Ex) from 1 ml to 100 ml
+ **Glass pycnometers**, from 1 cm^3 to 100 cm^3

7.5. EASYCAL™ Calibration software – test equipment monitoring made easy



The EASYCAL™ 5 calibration software facilitates the monitoring of liquid handling instruments (piston-stroke instruments such as pipettes, dispensers, burettes, and manual dispensers) as well as volumetric instruments made of glass or plastic according to GLP/GMP and DIN EN ISO 9001. EASYCAL™ 5 can be used not only for BRAND instruments but also for the instruments of all manufacturers.

EASYCAL™ 5 performs all calculations automatically and compares them with the tolerances from the current standards or their individually defined limits. The tolerances of numerous instruments and the interface settings of over 100 test instruments (e.g., balances) are already stored for you.

Choose between a stand-alone version for working on one workstation (recommended for small laboratories where calibration is done by a single person) or a client/server version for parallel, distributed work on multiple workstations (floating licenses are installed on the server).

Functions:

+ Testing of liquid handling instruments and volumetric instruments made of glass and plastic in accordance with ISO 8655, ISO 4787, and others.
+ Open software, suitable for all volumetric instruments – regardless of manufacturer.
+ Extensive library with instrument specifications from well-known manufacturers can be expanded and modified by the user.
+ Scope of testing can be individually defined by the user via test plans. An extensive library of test plans is included to help you get started with EASYCAL™ 5 and minimize data entry time.
+ Instrument management – quickly and easily search and find the owner, test history, and next test date.
+ Continuous control of the current actual state during the test by graphical representations and ad hoc calculation of statistical values.
  Reminder function for upcoming tests with automatic notification of the instrument owner via e-mail.
+ Integration of the address data of your customers and suppliers in a business partner database User administration with user roles (e.g., auditor, supervisor, system administrator) and access restriction to EASYCAL functions.
  Dual-control principle for the release of critical data such as test plans, calibration orders before certificate printing, and instrument specification.
+ Interface connection via RS232 of measuring instruments such as balances, thermometers, barometers, and hygrometers with automatic transmission of the measured values.
+ In the integrated certificate editor, you can customize the certificates, and test reports supplied to your needs and create the design.

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We want to inform and advise our customers through our technical writings. However, the transferability of general empirical values and results under test conditions to the specific application depends on a variety of factors beyond our control. We therefore ask for your understanding that no claims can be derived from our advice. The transferability must therefore be checked very carefully by the user himself in each individual case.

Technical changes, errors and misprints excepted.

At store.brand.de you will find accessories and spare parts, user manuals, test instructions (SOP) and videos for the product.

For more information on products and applications, please visit our Youtube channel mylabBRAND.

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