



SOP
0623

Dispensette®

Standard Operating Procedure

Table of contents

1	Introduction	3
2	Preparation	4
2.1	Instrument type and serial number	4
2.2	Minimum required equipment	4
2.3	Cleaning	4
2.4	Visual inspection for damage and leaks.....	4
3	Test instruments and accessories	5
4	Gravimetric testing	6
5	Evaluation of gravimetric test results	7
5.1	Possible volume error	8
5.2	Temperature and factor Z.....	8
5.3	Manufacturer's error limits for Dispensette®	9
5.4	ISO error limits for bottle top dispenser	9
5.5	Error limits to be defined by the user.....	9
6	Test report for volumetric instruments	10
7	Appendix	12
7.1	Abbreviations, units, and notations	12
7.2	Declaration on the Absence of Health Hazards	13
7.3	BRAND Calibration Service	14
7.3.1	Range of instruments.....	14
7.3.2	Testing in accordance with DIN EN ISO 8655.....	14
7.4	Accredited calibration laboratory D-K-18572-01-00 by BRAND	15
7.4.1	Volumetric instruments with DAkkS calibration certificates issued by BRAND.....	15
7.5	EASYCAL™ Calibration software – test equipment monitoring made easy.....	16

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	Types	Relevant standards
Dispensette® S	Digital	ISO 8655:2022
Dispensette® S Organic	Analog	
Dispensette® S Trace Analysis		

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. 14*'). 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:



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 type and serial number

1. Determine instrument type and nominal volume. Enter the result in the test report: 
2. Read off the serial number. The serial number is located on the Valve block . Enter the result in the test report: 
3. Read customers identification, if available. Enter the result in the test report: 

2.2. Minimum required equipment

You need at least the following minimum equipment of this laboratory instrument to test the Dispensette®:

- + Dispenser
- + Discharge tube
- + Filling tube
- + Installation tool

In addition, a balance and other test equipment is required. These are specified under 'Test instruments and accessories, p. 5' .
Use only original parts

2.3. Cleaning

1. Rinse the laboratory instrument with cleaning solution. Then rinse several times with distilled water. Select cleaning solution according to the previously dispensed medium.
2. Wipe the outside of the laboratory instrument. According to the instructions for use, unscrew the dispensing piston, and pull it out completely. Remove deposits from the dispensing cylinder and piston.

2.4. Visual inspection for damage and leaks

- + Housing
- + Discharge tube
- + Filling tube
- + Recirculation valve
- + Controls
- + Leakage

Enter the result in the test report.

Possible errors and the actions that can be taken as a result:

Error	Measures
Bent, defective discharge tube or suction tube	May pose a safety risk; the part should therefore be replaced (see "Accessories" in instructions for use).
Leakage	May pose a safety risk; the instrument should therefore be sent for repair.
Defective controls	Send instrument for repair.

3. Test instruments and accessories

- + Dispensette®
- + Bottle (at least 500 ml) filled with distilled or deionized water (in accordance with ISO 3696, at least quality 3, ambient temperature). Adjustment of water and ambient temperature
- + Fill the collecting vessel (e.g., Erlenmeyer flask, narrow-necked) with a small amount of water
- + Thermometer with a max. measuring deviation: $\pm 0.2^{\circ}\text{C}$
- + Place the instrument in the test chamber for at least 1 h (not packed). Allow instrument to adjust to ambient temperature.
- + Balance, recommended specifications:

Nominal volume of the instrument to be tested	Resolution of the display	Repeatability	Expanded measurement uncertainty: in use
V	mg	mg	mg
$20\ \mu\text{l} < V \leq 200\ \mu\text{l}$	0.01	0.025	0.05
$200\ \mu\text{l} < V \leq 10\ \text{ml}$	0.1	0.2	0.4
$10\ \text{ml} < V \leq 1,000\ \text{ml}$	1	2	4

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

1. Determine the temperature of the test water. Enter the result in the test report [4](#).
2. Set the nominal volume on the instrument.
3. Dispense some liquid into a separate vessel, wipe off the drop that is on the discharge tube onto the vessel wall .
4. Place the collecting vessel on the balance and tare.
5. Place the collecting vessel under the discharge tube.
6. Pull the piston to the upper stop. Slow and steady speed
7. Press the piston down to the lower stop. Slow and steady speed
8. Strip the discharge tube from the collecting vessel.
9. Place the collecting vessel on the balance, and note the weight value. Enter the result in the test report [5](#).
10. Re-tare the balance.
11. Repeat steps 2 through 10 ten times.
12. Then dispense 50 or 10% of the nominal volume 10 times in the same way .

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: $\bar{V} = \bar{x} * z$	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: $A\% = \frac{\bar{V} - V_0}{V_0} * 100$	Enter the result in the test report 6c .
5.	Coefficient of variation: $CV\% = \frac{100 s}{\bar{V}}$	Enter the result in the test report 6d .
	Actual/nominal value comparison: For error limits, see 'Manufacturer's error limits for Dispensette®, p. 9' and 'ISO error limits for bottle top dispenser, p. 9' 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.

If the calculated values are greater than the error limits:

- + Check that all instructions have been carried out correctly.
- + Follow the instructions in the "Troubleshooting" section of the instructions for use.

If these measures do not lead to success, we recommend that you use the BRAND calibration service (see 'BRAND Calibration Service, p. 14').

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. Possible volume error

Possible volume errors and the actions that can be taken:

Error	Possible causes	Measures
Volume too large	Drop hangs on the discharge tube.	Before weighing, wipe off any drops on the collecting vessel. Tare the balance.
	Dispensed unevenly.	Dispense slowly and evenly.
	When aspirating, one drop has already been dispensed.	Carefully move the piston against the upper stop.
Volume too small	Instrument leaking.	Repeat function test; retighten or replace valves; mount discharge tube or suction tube correctly.
	Air bubbles in the instrument.	Vent the instrument.
Other influencing variables	Irregular dispensing	Gently pull up and gently press down the piston when dispensing. Slowly approach the upper and lower stops so that no drop comes off the discharge tube.
	Temperature calibration of instrument, ambient, and water temperature not completed.	Perform temperature adjustment.

5.2. 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			

5.3. Manufacturer's error limits for Dispensette®

Dispensing volume		Error limit for the systematic measurement deviation ¹⁾	Error limit for the random measurement deviation ¹⁾
Nominal volumes	Setting as a percentage of the nominal volume		
ml	%	±% (accuracy)	% (coefficient of variation)
1-100	100	0.50	0.10
	50	1.0	0.20
	10	5.0	1.0

¹⁾ To calculate the deviations in milliliter units, multiply the error limit by the selected volume.

5.4. ISO error limits for bottle top dispenser

Dispensing volume		Error limit for the systematic measurement deviation ¹⁾	Error limit for the random measurement deviation ¹⁾
Nominal volumes	Setting as a percentage of the nominal volume		
ml	%	±% (accuracy)	% (coefficient of variation)
> 0,5...200	100	0.60	0.2
	50	1.2	0.4
	10	6.0	2.0

¹⁾ To calculate the deviations in milliliter units, multiply the error limit by the selected volume.

5.5. 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's error limits for Dispensette®, p. 9' 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. 9' 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

<input type="checkbox"/> Titrette®	Type	Nominal volume:
<input type="checkbox"/> Burette Digital	<input type="checkbox"/> fixed	<input type="text"/>
<input type="checkbox"/> Dispensette®	<input type="checkbox"/> variable	Serial number:
<input type="checkbox"/> Transferpette®		<input type="text"/>
<input type="checkbox"/> Transferpette® S	<input type="checkbox"/> analog	Customer's marking:
<input type="checkbox"/> Transferpette® electronic	<input type="checkbox"/> digital	<input type="text"/>
<input type="checkbox"/> Transferpettor		

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

4

Environment

Water temperature:

Balance:

Thermometer:

Continued on next page

Relative humidity: (at least 45%):

Correction factor Z:

5 Weight values of the gravimetric test

Weight value No.	At 10% in mg	At 50% in mg	For nominal volume in mg
X ₁ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₂ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₃ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₄ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₅ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₆ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₇ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₈ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₉ :	<input type="text"/>	<input type="text"/>	<input type="text"/>
X ₁₀ :	<input type="text"/>	<input type="text"/>	<input type="text"/>

6 Evaluation of the gravimetric test

Calculated value		At 10%	At 50%	For nominal volume
6a	\bar{V}	<input type="text"/>	<input type="text"/>	<input type="text"/>
6b	s	<input type="text"/>	<input type="text"/>	<input type="text"/>
6c	A [%] actual	<input type="text"/>	<input type="text"/>	<input type="text"/>
6d	CV [%] actual	<input type="text"/>	<input type="text"/>	<input type="text"/>
6e	A [%] target	<input type="text"/>	<input type="text"/>	<input type="text"/>
6e	CV [%] target	<input type="text"/>	<input type="text"/>	<input type="text"/>
6g	Result	<input type="text"/>	<input type="text"/>	<input type="text"/>

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...1,000 hPa Prevents sign confusion (i.e., en dash as 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
W1	Tare weight of the weighing vessel
W2	Weight of the weighing vessel filled with the medium to be weighed.
A	Correctness
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. We therefore ask for your understanding that we do not perform calibrations | Repairs can be carried out only if we have received this declaration completely filled in and signed.

ATTENTION: 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 instrument shipment from | To delivery slip 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

Other:

Decontamination measures:

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.



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 accreditation certificate



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 cm³ to 100 cm³

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.

BRAND GMBH + CO KG

Postfach 1155 | 97861 Wertheim | Germany
T +49 9342 808 0 | F +49 9342 808 98000 | info@brand.de | www.brand.de



BRAND.For lab.For life®

BRAND®, BRAND. For lab. For life.® and the word/image mark BRAND are trademarks or registered trademarks of BRAND GMBH + CO KG, Germany. All other trademarks shown or reproduced are the property of their respective owners.

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.

© 2023 BRAND GMBH + CO KG | Printed in Germany | 0623



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.



BRAND (Shanghai) Trading Co., Ltd.
Shanghai, China

Tel.: +86 21 6422 2318
info@brand.com.cn
www.brand.cn.com

BRAND Scientific Equipment Pvt. Ltd.
Mumbai, India

Tel.: +91 22 42957790
customersupport@brand.co.in
www.brand.co.in

BrandTech® Scientific, Inc.
Essex, CT. United States of America

Tel.: +1 860 767 2562
info@brandtech.com
www.brandtech.com