# Deutsche Akkreditierungsstelle GmbH

# Annex to the Accreditation Certificate D-K-18572-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from:** **28.03.2023**

Date of issue: 28.03.2023

Holder of accreditation certificate:

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

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and confirm generally with the principles of DIN EN ISO 9001.

Calibration in the fields:

**Chemical and medical quantities**

**Chemical analysis, reference materials**

- **Volume of liquids**

The testing laboratory is permitted to use the standardized or equivalent test procedures marked with * with different issue dates without being required to inform and obtain prior approval from DAkkS. The test laboratory has an up-to-date list of all test procedures in the flexible accreditation area.

## Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

| Measurement quantity / Calibration item | Range | Measurement conditions / procedure | Expanded uncertainty of measurement | Remarks |
|---|---|---|---|---|
| **Piston-operated volumetric apparatus** Piston pipettes* | 0.10 µL to < 0.15 µL | Adjusted to deliver | 8.0 % a) b) c) | The CMC refers to nominal volume. To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid. a) Instruments with fixed volume or upper test volume ($V_P = 1.0 \cdot V_N$) for instruments with variable volume b) Medium test volume (e.g. $V_P = 0.5 \cdot V_N$) for instruments with variable volume c) Lower test volume (e.g. $V_P = 0.1 \cdot V_N$) for instruments with variable volume $V_N$: Nominal volume, ml $V_P$: Test volume, ml |
| | 0.15 µL to < 0.25 µL | Gravimetric method | 4.0 % a) b) c) | |
| | 0.25 µL to < 0.75 µL | DIN EN ISO 8655-6: 2022 and DKD-R 8-1:2011 | 1.6 % a)<br>1.2 % b) c) | |
| | 0.75 µL to < 2.5 µL | | 0.80 % a)<br>0.60 % b)<br>0.40 % c) | |
| | 2.5 µL to < 21 µL | | 0.40 % a)<br>0.30 % b)<br>0.20 % c) | |
| | 21 µL to 50 µL | | 0.30 % a)<br>0.23 % b)<br>0.15 % c) | |
| | > 50 µL to 100 µL | | 0.18 % a)<br>0.15 % b)<br>0.090 % c) | |
| | > 100 µL to 10 mL | | 0.12 % a)<br>0.090 % b)<br>0.060 % c) | |
| Multichannel piston pipettes * | 0.10 µL to < 0.15 µL | | 15 % a) b) c) | |
| | 0.15 µL to < 0.25 µL | | 7.5 % a) b) c) | |
| | 0.25 µL to < 0.75 µL | | 3.0 % a)<br>2.3 % b) c) | |
| | 0.75 µL to < 2.5 µL | | 1.5 % a)<br>1.1 % b)<br>0.80 % c) | |
| | 2.5 µL to < 21 µL | | 0.78 % a)<br>0.59 % b)<br>0.39 % c) | |
| | 21 µL to < 100 µL | | 0.46 % a)<br>0.35 % b)<br>0.23 % c) | |
| | 100 µL to 1250 µL | | 0.18 % a)<br>0.12 % b)<br>0.090 % c) | |

## Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

| Measurement quantity / Calibration item | Range | Measurement conditions / procedure | Expanded uncertainty of measurement | Remarks |
|---|---|---|---|---|
| **Automated Liquid-Handling-Systems** Single channel units | 5.0 µL to 50 µL | Adjusted to deliver<br>Gravimetric method SOP 1935:2021 | 0.60 % a)<br>0.40 % b)<br>0.20 % c) | The CMC refers to nominal volume.<br>To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid.a)<br>Instruments with fixed volume or upper test volume ($V_P = 1.0 \cdot V_N$) for instruments with variable volume<br>b) Medium test volume (e.g. $V_P = 0.5 \cdot V_N$) for instruments with variable volume<br>c) Lower test volume (e.g. $V_P = 0.1 \cdot V_N$) for instruments with variable volume<br>$V_N$: Nominal volume<br>$V_P$: Test volume |
| | > 50 µL to 200 µL | | 0.35 % a)<br>0.30 % b)<br>0.20 % c) | |
| | > 200 µL to 1.0 mL | | 0.24 % a)<br>0.20 % b)<br>0.12 % c) | |
| Multichannel units | 5.0 µL to 50 µL | | 0.60 % a)<br>0.40 % b)<br>0.30 % c) | |
| | > 50 µL to 300 µL | | 0.50 % a)<br>0.30 % b)<br>0.20 % c) | |
| | >300 µL to 1000 µL | | 0.27 % a)<br>0.20 % b)<br>0.14 % c) | |
| **Piston-operated volumetric apparatus** Dispensers, dilutors* | 1.0 µL to < 2.5 µL | Adjusted to deliver; dilutors also adjusted to contain<br>gravimetric method DIN EN ISO 8655-6: 2022 DKD-R 8-3:2020 | 3.0 % | The CMC refers to nominal volume.<br>To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid. |
| | 2.5 µL to < 7.5 µL | | 1.0 % | |
| | 7.5 µL to < 25 µL | | 0.80 % | |
| | 25 µL to < 75 µL | | 0.40 % | |
| | 75 µL to < 250 µL | | 0.30 % | |
| | 250 µL to < 500 µL | | 0.23 % | |
| | 500 µL to 1250 µL | | 0.19 % | |
| | >1250 µL to 200 mL | | 0.14 % | |

## Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

| Measurement quantity / Calibration item | Range | Measurement conditions / procedure | Expanded uncertainty of measurement | Remarks |
|---|---|---|---|---|
| Multiple-delivery dispensers* | 1.0 µL to < 2.5 µL | Adjusted to deliver<br>DIN EN ISO 8655-6:2022<br>DKD-R 8-2:2018 | 1.5 % | The CMC refers to selected volume.<br>To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid. |
| | 2.5 µL to < 7.5 µL | | 0.50 % | |
| | 7.5 µL to < 50 µL | | 0.25 % | |
| | 50 µL to < 250 µL | | 0.20 % | |
| | 250 µL to < 500 µL | | 0.15 % | |
| | 500 µL to < 750 µL | | 0.12 % | |
| | 750 µL to 5 mL | | 0.080 % | |
| | > 5 mL to 200 mL | | 0.070 % | |
| **Piston-operated volumetric apparatus**<br>Piston burettes* | 1.0 µL to < 2.5 µL | Adjusted to deliver<br>DIN EN ISO 8655-6:2022<br>DKD-R 8-3:2020 | 1.5 % | The CMC refers to nominal volume.<br>To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid. |
| | 2.5 µL to < 7.5 µL | | 0.70 % | |
| | 7.5 µL to < 25 µL | | 0.50 % | |
| | 25 µL to < 250 µL | | 0.20 % | |
| | 250 µL to < 750 µL | | 0.15 % | |
| | 750 µL to < 10 mL | | 0.050 % | |
| | 10 mL to 15 mL | | 0.030 % | |
| | > 15 mL to 30 mL | | 0.020 % | |
| | >30 mL to 200 mL | | 0.014 % | |
| **Pycnometer made of glas**<br>Pycnometers with ground stopper, oxygen flasks Winkler pattern | 1.0 cm³ to < 2.0 cm³ | Adjusted to contain<br>Gravimetric method<br>SOP1088:2017 | $((0.01\% \cdot V_N)^2 + (0.027\ mm^3 \cdot D^2)^2)^{0,5}$ | $V_N$ Nominal Volume<br>$D$ Value of the nominal diameter of the glass joint in mm<br>The CMC refers to nominal volume. |
| | 2.0 cm³ to < 100 cm³ | | $((0.007\% \cdot V_N)^2 + (0.027\ mm^3 \cdot D^2)^2)^{0,5}$ | |
| | 100 cm³ to 300 cm³ | | $((0.005\% \cdot V_N)^2 + (0.027\ mm^3 \cdot D^2)^2)^{0,5}$ | |

## Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

| Measurement quantity / Calibration item | Range | Measurement conditions / procedure | Expanded uncertainty of measurement | Remarks |
|---|---|---|---|---|
| **Volumetric glassware incl. special designs** bulb pipettes and graduated pipettes * | 10 µL to < 500 µL | Adjusted to contain<br>Gravimetric method<br>DIN EN ISO 4787:2022 | $((0.03\ \mu L)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | $V_N$: Nominal volume<br>$D$: Value of the nominal neck diameter in mm<br>The CMC refers to nominal volume. |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL | | $((0.005\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| Reischauer-type pycnometers * Volumetric flasks * | 100 µL to < 500 µL | | $((0.03\ \mu L)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL to 10000 mL | | $((0.005\% \cdot V_N)^2 + (0.045\ \mu L \cdot D^2)^2)^{0,5}$ | |
| Graduated cylinders* | 100 µL to < 500 µL | | $((0.03\ \mu L)^2 + (0.09\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.09\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.09\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL to 10000 mL | | $((0.005\% \cdot V_N)^2 + (0.09\ \mu L \cdot D^2)^2)^{0,5}$ | |
| Bulb pipettes, graduated pipettes* | 10 µL to < 500 µL | Adjusted to deliver<br>Gravimetric method<br>DIN EN ISO 4787:2022 | $((0.03\ \mu L)^2 + (0.13\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.13\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.13\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL | | $((0.005\% \cdot V_N)^2 + (0.13\ \mu L \cdot D^2)^2)^{0,5}$ | |
| Burettes* | 100 µL to < 500 µL | | $((0.03\ \mu L)^2 + (0.068\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.068\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.068\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL | | $((0.005\% \cdot V_N)^2 + (0.068\ \mu L \cdot D^2)^2)^{0,5}$ | |
| **Plastic volumetric instruments incl. special designs** Volumetric flasks, graduated cylinders * | 100 µL to < 500 µL | Adjusted to contain<br>Gravimetric Method<br>DIN EN ISO 4787:2022 | $((0.03\ \mu L)^2 + (0.18\ \mu L \cdot D^2)^2)^{0,5}$ | $V_N$: Nominal volume<br>$D$: Value of the nominal neck diameter in mm<br>The CMC refers to nominal volume.<br>To state the best CMC value the reference temperature shall be set equal to the temperature of the test liquid. |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.18\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.18\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL to 10000 mL | | $((0.005\% \cdot V_N)^2 + (0.18\ \mu L \cdot D^2)^2)^{0,5}$ | |
| Bulb pipettes, graduated pipettes, burettes * | 100 µL to < 500 µL | Adjusted to deliver<br>Gravimetric method<br>DIN EN ISO 4787:2022 | $((0.03\ \mu L)^2 + (0.27\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 500 µL to < 2.0 mL | | $((0.01\% \cdot V_N)^2 + (0.27\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 2.0 mL to < 100 mL | | $((0.007\% \cdot V_N)^2 + (0.27\ \mu L \cdot D^2)^2)^{0,5}$ | |
| | 100 mL | | $((0.005\% \cdot V_N)^2 + (0.27\ \mu L \cdot D^2)^2)^{0,5}$ | |

**Abbreviations used:**

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|---|---|
| CMC | Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten) |
| DIN | German Institute for Standard e.V. |
| DKD-R | Guideline of the German Calibration Service (DKD) |
| EN | European Norms |
| ISO | International Standard Organization |
| SOP | Standard operating procedure |