

## CALIBRATION CERTIFICATE

Service report no.: 4

AS LEFT

Certificate no.: K490/LPN\_000111.2

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|                                          |                                                                  |           |                                                     |            |     |
|------------------------------------------|------------------------------------------------------------------|-----------|-----------------------------------------------------|------------|-----|
| Customer:                                | Dandiat<br>Baldershøj 19, DK-2635<br>Ishøj<br>QA<br>Tove Søgaard |           |                                                     |            |     |
| Department, if informed:                 |                                                                  |           |                                                     |            |     |
| Contact name:                            |                                                                  |           |                                                     |            |     |
| Pipette Name:                            | Sartorius mLINE SCM 100 - 1000 µl                                |           |                                                     |            |     |
| Manufacturer/model/(internal)/vol. range |                                                                  |           |                                                     |            |     |
| Serial No.:                              | 6551044                                                          | ID:       | ID 36 / In-situ 01                                  |            |     |
| Calibration level:                       | 10.3                                                             | Tip info: | Supplier: Dandiat<br>Sartorius Optifit tips 1000 µl |            |     |
| Mode:                                    | P                                                                | Speed In: | n/a                                                 | Speed Out: | n/a |
| Dandiat A/S procedure no.:               | CAL-PIP-001                                                      | Ref.:     | ISO 8655-7:2022 Annex A.2                           |            |     |

## Specifications: Manufacturer's Specification

| Volume  | Systematic error ± | Random error ± | Systematic error ± | Random error ± |
|---------|--------------------|----------------|--------------------|----------------|
|         | %                  |                | µl                 |                |
| 100 µl  | 2,5                | 0,6            | 2,5                | 0,6            |
| 500 µl  | 0,8                | 0,2            | 4,0                | 1,0            |
| 1000 µl | 0,7                | 0,2            | 7,0                | 2,0            |

## Calibration equipment:

|             |                                      |
|-------------|--------------------------------------|
| Balance     | ID_55                                |
| Readability | Resolution of the balance: 0,00001 g |

## Environmental conditions:

|                       |              |           |
|-----------------------|--------------|-----------|
| Barometric pressure   | ID_101 (P1)  | 1000 hPa  |
| Temperature, air      | ID_99 (T2)   | 21,44 °C  |
| Temperature, water    | ID_94        | 21,11 °C  |
| Humidity, air         | ID_99 (H1)   | 55,91 %RH |
| Z-factor (calculated) | 1,0031 µl/mg |           |

Calibration place: Dandiat A/S, Baldershøj 19, DK-2635 Ishøj

Calibration date: 2025-01-03

## Measurements:

Test volume [µl]

| Meas. No.              | 100      | 500      | 1000      |
|------------------------|----------|----------|-----------|
| 1                      | 100,0091 | 499,9450 | 1001,0938 |
| 2                      | 100,4103 | 500,2460 | 1001,6957 |
| 3                      | 100,3100 | 500,0454 | 1001,4950 |
| 4                      | 100,8116 | 500,4466 | 1001,9966 |
| 5                      | 100,6109 | 499,9450 | 1002,1972 |
| 6                      | 100,8116 | 500,3463 | 1002,6988 |
| 7                      | 100,5106 | 500,5469 | 1002,2975 |
| 8                      | 100,6109 | 500,3463 | 1002,2975 |
| 9                      | 100,3100 | 500,6472 | 1002,9997 |
| 10                     | 100,4103 | 500,2460 | 1002,6988 |
| Meas. vol. (mean) [µl] | 100,4810 | 500,2760 | 1002,1470 |
| Random error (SD) [µl] | 0,246    | 0,240    | 0,591     |


  
 Calibrated by: Line Paaske Nielsen

## Results:

| Test Vol. [µl] | Mean meas. vol. [µl] | Uncertainty* ±U [µl] | Random error CV% | Systematic error [%] | Uncertainty* ±U [%] | Pass/Fail** |
|----------------|----------------------|----------------------|------------------|----------------------|---------------------|-------------|
| 100            | 100,48               | 0,30                 | 0,25             | 0,48                 | 0,30                | PASS        |
| 500            | 500,28               | 0,82                 | 0,05             | 0,06                 | 0,16                | PASS        |
| 1000           | 1002,1               | 1,5                  | 0,06             | 0,22                 | 0,15                | PASS        |

\* Uncertainty, U, is based on a coverage factor, k = 2 see last page for more information.

\*\* The uncertainty is not taken into account when determining compliance with specifications, see last page.

## Remarks:

Service: Yes  
Adjustment: No

Form: Template02AKK\_SCTS Program version: 1.55

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### Accreditation

Dandiag A/S calibration laboratory is accredited by DANAK under registration CAL No. 490 and meets the requirements of DS/EN ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*.

DANAK is signatory to the EA MLA agreement on CAL (calibration), and this service is comprised by the agreement on mutual recognition of reports and certificates.

This certificate may only be reproduced in full, except with the prior permission in writing, by the issuing calibration laboratory. Calibration certificates without signature are not valid.

### Method

The calibration is performed according to the gravimetric method described in:

*DS / EN ISO 8655 - 7:2022 Piston - operated volumetric apparatus for the determination of volume(Annex A.2)*

A Part 7 calibration is fully compatible/comparable with a Part 6 reference calibration if performed in the Dandiag calibration laboratory and the condition is either a 10.3 calibration in P mode(10 measurements at 10, 50 and 100 % of max.volume) or a 10.1 calibration in D mode(10 measurements at 10 % of max.volume).

Deviation from part 6: The tips are not changed.

The calibration water used is according to DS/EN ISO 3696, grade 3 (1995)

The conversion from mass to volume is done by using formula {F1} in Annex F in DS/EN ISO 8655-7:2022.

### Uncertainty

The reported expanded uncertainty ( $\pm U$ ) is given as the measurement standard uncertainty, multiplied with a coverage factor,  $k$  which corresponds to a coverage probability of approximately 95%. The  $k$ -factor value is reported under results.

The standard measurement uncertainty is determined in accordance with publication EA-4/02 M:2022 and Technical Report ISO/TR 20461:2023.

### If statements of Pass or Fail has been agreed

The uncertainty of measurement is not taken into account when determining compliance with specifications as per accordance to ILAC G8:09/2019 section 4.2.1.

### Traceability

The traceability of the measurement process is based on accredited calibration of balance and environmental equipment, which can be traced to (inter)national standards.