

MICROLAB TECHNOLOGIES LIMITED
STANDARD OPERATING PROCEDURE
DILUTER/DISPENSER SERVICE & CALIBRATION
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STANDARD OPERATING PROCEDURE FOR THE SERVICE AND VALIDATION OF HAMILTON MICROLAB® 500 DILUTER/DISPENSERS

1 Preparation for testing and visual examination

1.1 Type and serial number

Read instrument type and note syringe combination. Enter in Test Record (1).

Read Serial Number (embossed on rear) Enter in Test Record (1).

Read customer's identification, if present Enter in Test Record (1).

Purpose: Clear identification of each instrument.

2.1 Cleaning

Clean the exterior of extraneous residues

Remove, check & clean valve block

Has liquid penetrated into the instrument? Disassemble and clean the instrument

2.2 Visual examination for damage

(Corrosion to internal structure, signs of electrical corrosion, mechanical obstructions)

Housing General damages?

Drive shaft obstruction

Actuator alignment & operation

Drive belt alignment

Voltage irregularity

2.3 Temperature adjustment

Measure and record distilled water temperature, measure room temperature.

2.4 Equipment required for testing

Analytical 4/5 place balance, digital

(Required accuracy of the balance: Approx. 10 times the accuracy of the instrument)

Testing volume versus Balance display Reproducibility and linearity

> 0,1 to 10 □ 6-digit ± 0.002 mg

> 10 to 100 □ 5-digit ± 0.02 mg

> 100 to 1000 □ 4-digit ± 0.2 mg

> 1 to 10 ml 4-digit ± 0.2 mg

> 10 to 50 ml 3-digit ± 2 mg

Digital barometer, accuracy 1mbar

Digital thermometer, accuracy 0.2 °C

PC Volume software & lap top computer

Recipient vessel filled with deionised water. Match temperature of room, water and instrument (e.g., 250ml beaker/Erlenmeyer flask)

Weighing vessel.

Purpose: Matching of test results to national standards through the use of calibrated testing devices (balance and thermometer and barometer)

3. Functional test

3.1 Prepare test setup

Attach new dispense tubing line

Attach test syringes

3.2 As Found Test

Enter instrument parameters, read variables (temperature & barometric pressure)
Dispense aliquot of distilled water into vessel to determine initial evaporation value.
Dispense aliquots (4) to determine instrument as found performance.
If pass value realised, continue test program for calibration/verification.
If fail value realised, record data, carry out service and corrective action and calibrate/verify..... Inform user of failure.

Repeat for drive B if present

Sampling Test Procedure (aliquot dispense)

Fill syringe from reservoir

Dispense volumes at 4/10/30% syringe capacity, repeat 4 to 10 times, record data.

Sampling Test Procedure (Pipette dispense)

Immerse tip approx. 5 to 10 mm into the liquid.

Aspirate volume in tubing line.

Hold the filled dispense tube vertically and observe if any liquid escapes to determined efficacy of seals (valve, syringes and tubing lines).

Release the testing liquid into test vessel.

Evaluation of gravimetric test results

The values obtained by weighing during the gravimetric test are only the mass values of dispensed volume. In order to obtain the actual volume, an adjustment calculation must be carried out. To facilitate calculations and evaluations, MicroLab Technologies Limited use PC-volume software which is a validated system for monitoring and record data for precision liquid handling instruments. If calculated values A [%] and CV [%] are smaller than or equal to the tolerance limits of the instrument it would be deemed to have passed its test and be in good working order.

Observe and conduct any remedial action

If these measures are not successful, the instrument may need to be removed for further investigation or repair.

The following calculations are carried out:

1. Mean weight
2. Mean volume
3. Standard deviation
4. Accuracy
5. Coefficient of variation
6. Comparison actual/nominal values

Tolerance limits and accuracy shown on test record.

Volume tolerances

The stated volume tolerances are final test values relative to the nominal capacity. These tolerances refer to instruments under optimized testing conditions (qualified operators and standardized ambience conditions).

Notes Record:

1. Damage:

None

Type of damage:

Damage repaired

2. Functional defects:

None

Type of functional defect:

Functional defect repaired

3. Engineer Record

Name

Date, Signature