



Title: Operation and Calibration of Micropipette

SOP NUMBER :	SOP/PMH/017-00
EFFECTIVE DATE :	17/04/2026
DEPARTMENT:	Microbiology
PAGE NUMBER:	01 of 05

1.0 OBJECTIVE

To lay down the procedure for operation and calibration of micropipette.

2.0 SCOPE

This procedure is applicable for operation and calibration of micropipettes in microbiology laboratory of Pharma Micro Hub Pvt Ltd.

3.0 RESPONSIBILITY

3.1 Microbiologist is responsible for operation and calibration of micropipette in Microbiology laboratory are adherence with this procedure.

4.0 ACCOUNTABILITY

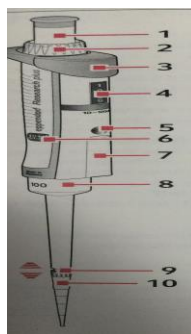
4.1 Head Microbiology or his designee is accountable for overall compliance of this procedure.

5.0 PROCEDURE:

5.1 Precautions:

- 5.1.1 Using excessive force to turn the control button out of specified range may jam the mechanism and eventually damage the pipette.
- 5.1.2 Push and release the control button slowly at all times.
- 5.1.3 Don't lay down/tilt a loaded pipette it sideways.
- 5.1.4 Never allow the control button to snapback.
- 5.1.5 Make sure that tip is firmly attached to the tip cone of micropipette.
- 5.1.6 Check for the foreign particles in the tip.
- 5.1.7 Hold the pipette in an upright position while aspirating liquid.
- 5.1.8 The grippy should rest on index finger.
- 5.1.9 Check for the material compatibility before Use.

5.2 Micropipette parts:





Title: Operation and Calibration of Micropipette

SOP NUMBER :	SOP/PMH/017-00
EFFECTIVE DATE :	17/04/2026
DEPARTMENT:	Microbiology
PAGE NUMBER:	02 of 05

- | | |
|-------------------------|---------------------------|
| 1: Control knob | 6: Adjustment display |
| 2: Volume setting wheel | 7: Labeling field |
| 3: Ejector | 8: Ejector sleeve |
| 4: Volume display panel | 9: Spring-loaded tip cone |
| 5: Adjustment opening | 10: Micro Pipette tip |

5.3 Base on the volume size, micropipette divided into two categories.

- 1) Fixed volume Micropipettes(100 μ L,1000 μ L)
- 2) Adjustable volume Micropipettes (0.5-10 μ L,2-20 μ L,10-100 μ L, 100-1000 μ L, 0.5 mL to 5 mL).

5.4 Operation Procedure :

- 5.4.1 Set the required volume of particular volume range of micropipette using the adjustment wheel on the top of the pipette.
- 5.4.2 Turn the volume setting wheel counter anti clockwise to increase the deliver volume.
- 5.4.3 Turn the volume setting ring clockwise to decrease the deliver volume.
- 5.4.4 Make sure that the desired volume clicks into place and that the digits are completely visible in the display window.
- 5.4.5 Note: Volume adjustment is only applicable for adjustable volume micropipette.
- 5.4.6 Fit the required volume of sterile pipette tips on the tip cone of pipette by applying light pressure.
- 5.4.7 Press down the control knob to the first stop.
- 5.4.8 Immerse the pipette tip vertically in to the aspirating liquid.
- 5.4.9 To aspirate liquid, allow the control button to slide back slowly. Maintain the immersion depth, so that no air aspirated.
- 5.4.10 In the case of large volumes: before removing the pipette tip from the liquid, wait for approx. 5 seconds. To ensure the maximum precision and accuracy.
- 5.4.11 Remove the tip slowly from the liquid.
- 5.4.12 While dispensing liquid, press the control button slowly until the first stop and wait until the flow of liquid stops.
- 5.4.13 To empty the tips completely, press down the control button until the second stop (blow-out).
- 5.4.14 During the pipette out of the solution or sample don't touch the inner wall or solution of the test tube.
- 5.4.15 Let the control button slide back slowly outside of the tube/vessel.



Title: Operation and Calibration of Micropipette

SOP NUMBER :	SOP/PMH/017-00
EFFECTIVE DATE :	17/04/2026
DEPARTMENT:	Microbiology
PAGE NUMBER:	03 of 05

5.4.16 To eject the tips, press the ejector.

5.5 Calibration procedure:

5.5.1 Calibration shall be performed by external agency.

5.5.2 Frequency: once in 6 months \pm 3 days.

5.5.3 After receiving the calibrated Micropipette along with the calibrated certificate, verify the vendor provided calibrated certificate values against the acceptance criteria for each operating volume of Micropipette mentioned in below table.

Operational Range	Testing Volume	Error limits	
		Systematic or Inaccuracy Limit (%)	Random or Imprecision Limit (%)
0.5 to 10 μ L	1 μ L	\pm 2.5	\pm 1.8
	5 μ L	\pm 1.5	\pm 0.8
	10 μ L	\pm 1.0	\pm 0.4
2 to 20 μ L	2 μ L	\pm 5	\pm 1.5
	10 μ L	\pm 1.2	\pm 0.6
	20 μ L	\pm 1.0	\pm 0.3
10 to 100 μ L	10 μ L	\pm 2	\pm 1
	50 μ L	\pm 1	\pm 0.3
	100 μ L	\pm 0.8	\pm 0.2
Operational Range	Testing Volume	Error limits	
		Systematic or Inaccuracy Limit (%)	Random or Imprecision Limit (%)
100 to 1000 μ L	100 μ L	\pm 3	\pm 0.6
	500 μ L	\pm 1	\pm 0.2
	1000 μ L	\pm 0.6	\pm 0.2
0.5 mL to 5 mL	0.5 mL	\pm 2.4	\pm 0.6
	2.5 mL	\pm 1.2	\pm 0.25
	5 mL	\pm 0.6	\pm 0.15
100 μ L	100 μ L	\pm 0.6	\pm 0.6
1000 μ L	1000 μ L	\pm 0.6	\pm 0.2



Title: Operation and Calibration of Micropipette

SOP NUMBER :	SOP/PMH/017-00
EFFECTIVE DATE :	17/04/2026
DEPARTMENT:	Microbiology
PAGE NUMBER:	04 of 05

5.5.4 If vendor provided calibrated certificate values meet the acceptance criteria, then use the respective Micropipettes for regular usage.

5.5.5 After verification calibrated certificate of respective micro pipette, duly sign with a receiving date and file the calibration certificate.

5.5.6 If Micropipette not meeting the acceptance criteria during calibration and any malfunction of the Micropipette observed, inform to the immediate supervisor/Head Microbiology and initiate incident.

5.6 Cleaning procedure:

5.6.1 Carefully wipe off the outer surfaces with disinfectant solution before daily usage.

5.6.2 Note : When a micropipette is utilized for culture preparation, it shall be autoclaved at 121°C for 15 minutes both prior to use and after use.

6.0 ABBREVIATIONS

6.1 mL : Milliliter

6.2 μ L : Micro liter

6.3 mg :Milligram

7.0 ANNEXURES

7.1 Calibration record for micropipette.

8.0 REFERENCES

8.1 Micropipette Operation Manual.

9.0 CHANGE HISTORY

9.1 New SOP

END OF DOCUMENT



Title: Operation and Calibration of Micropipette

SOP NUMBER :	SOP/PMH/017-00
EFFECTIVE DATE :	17/04/2026
DEPARTMENT:	Microbiology
PAGE NUMBER:	05 of 05

**ANNEXURE-1
CALIBRATION RECORD FOR MICROPIPETTE**

Micropipette ID No.			Calibration Done on:	
Range			Calibration Due On:	
Temperature measured			Water Density	

Balance ID No.:

Calculations:

$$V = \frac{(W_2 - W_1)}{D}$$

- Where,
V = Pipetted volume of the water (mL)
W₂-W₁ = Weight of the pipetted water (mg)
D = Density of water (g/mL)

Set Volume	W1	W2	W2-W1	V= $\frac{(W_2 - W_1)}{D}$

Set Volume µl	Pipetted volume(V)										Avg.	Acceptance Limits
	1	2	3	4	5	6	7	8	9	10		

Result: Average weights of all the set volume are within / not within the acceptable limit

Done By (Sign/Date):

Checked By (Sign/Date):