



STANDARD OPERATING PROCEDURE

Department: Microbiology	SOP No.:
Title: Procedure for Operation and Calibration of pH Meter	Effective Date:
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1.0 OBJECTIVE:

To lay down a Procedure for Operation and Calibration of pH Meter Make: LABINDIA Model No.: PICO⁺.

2.0 SCOPE:

This SOP is applicable for Operation and Calibration of pH Meter Make: LABINDIA Model No.: PICO⁺ in QC Microbiology Laboratory.

3.0 RESPONSIBILITY:

Officer / Executive- Microbiology

4.0 ACCOUNTABILITY:

Head-QC

5.0 ABBREVIATIONS:

CAL	Calibration
ID No.	Identification Number
Ltd.	Limited
ml	Milliliter
mV	Millivolt
NMT	Not More Than
No.	Number
QC	Quality Control
QA	Quality Assurance
SOP	Standard Operating Procedure

6.0 OPERATING PROCEDURE:



6.1 To ensure that the instrument is clean and power supply attach properly, and Switch 'ON' the instrument, and check the LCD display status after power on main screen only two keys are active i.e. RESET and MODE.

6.2 RESET key is used to initialize the pH meter. By pressing the RESET key pH meter gives beep and Display reads:-



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LABINDIA INSTRUMENT
Version PICO+ V2.24

6.3 Press key “**MODE**” display will show “**pH Mode**”.

6.4 Select pH mode press key “**ENTER**”.

6.5 The instrument functional Keys are described:-

**MEM
CLEAR**

: To Clear the Stored Reading/Calibration data of the selected Mode from pH meter memory

RESET

: To reset the pH meter

CAL

: To perform CALIBRATION within the selecting operating Mode.

**FWD
TEMPC**

: This key has dual function, (a) to check the readings in scan mode (b) To select Auto/Manual temperature compensation

SCAN

: To SCAN/read the stored readings with the help of FWD/TEMCO key

MODE

: To select pH Meter operating Mode

ENTER

: To acknowledge the Entered value

CE BACK

: To clear the wrong entry & to go backward for previous display screen.

GLP

: To select the GLP or Standard Mode Between sample measurement & storage GLP Mode. In this selection, the Sample related detail such as Sample Name and ID No. can be entered after each measurement.

6.6 Calibration :

6.6.1 Press **CAL** key screen show “NO DATA”. Than press enter key and the display will show Enter Buf-1 put value 4.01 in display by numeric keys, as soon as the value gets stable, press **ENTER** key. Than instrument read the value of buffer and wait for stabilization,

6.6.2 After stabilization press **ENTER** key again display show Enter Buf-2, put value 6.87 in display by numeric keys, wash electrode with purified water and put it in 6.87 buffers, as



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soon as the value gets stable, press ENTER key. Then instrument read the value of buffer and wait for stabilization,

- 6.6.3** After stabilization press ENTER key again display show Enter Buf-3, put value 9.18 in display by numeric keys, wash electrode with purified water and put it in 9.18 buffers, as soon as the value gets stable, press ENTER key. Then instrument read the value of buffer and wait for stabilization,
- 6.6.4** After stabilization press enter, display shows Enter Buf-4 than press CE BACK key. Than display show **Wait- Xfering**, after this instrument is calibrated. Limit of the slope of calibration will be from 90% to 110%. If the slope is within limits, display will read satisfactory, and then your instrument is ready for pH measurement.
- 6.6.5** If calibration had done successfully than display coming in pH mode, otherwise display show "Buf-1" again.
- 6.6.6** Remove the pH Electrode and Temperature Probe from buffer and rinse with Purified Water.
- 6.6.7** Wipe the Electrode with Tissue Paper without touching the Bulb of pH Electrode.

6.7 Verification:

- 6.7.1** Insert the pH Electrode and Temperature probe in a solution of 4.01, 6.87 and 9.18 pH buffer and verifying the same solution.
- 6.7.2** Wait until stabilized reading and record the observation.
- 6.7.3** Remove the pH Electrode and Temperature Probe and rinse with Purified Water. Wipe the electrode with Tissue Paper without touching the Bulb of pH Sensor.
- 6.7.4** Dip the electrode in saturated potassium chloride solution at rest.
- 6.7.5** Record the Verification Details in "**Verification Record of pH Meter**" as per **Annexure No.-1**

6.8 Calculation of Slope:

- 6.8.1** Determination of pH value and mV potential for buffer solution pH 4.01, 6.87 & 9.18.
- 6.8.2** Calculate the difference in mV between the higher buffer value (i.e. pH 6.87) and lower buffer value. (i.e. 4.01)
- 6.8.3** Subtract mV potential of higher pH value by mV potential of lower pH value.
- 6.8.4** Subtract higher pH value by lower pH value
- 6.8.5** Divide the difference in mV potential by the difference in pH value.



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6.8.6 Divide this number by the theoretical maximum 59.16 mV pH unit @25°C multiply by 100 to get a percentage slope value.

6.8.7 **Calculation:** S1: 4.01 & 6.87
S2: 9.18 & 6.87

$$E = \frac{\text{Difference in mV potential between two pH buffers}}{\text{Difference in pH between two pH buffers}}$$

$$\text{Slope} = E/59.16 * 100 = \quad \%$$

6.8.8 **Acceptance Criteria of Slope:** 90 % to 110%

6.9 **pH Measurement:**

6.9.1 To ensure the instrument setup is properly before starting the pH measurement.

6.9.2 Select the pH Mode-The instrument Display reads→ Wait stabilizing→pH=ABCD (mV=PQRS).

6.9.3 Before performing the pH measurement, select the Temperature compensation Type by pressing 'FWD TEMPCO' key.

6.9.4 The user has two options for temperature selection at which the Automatic Temperature.

6.9.5 Compensation is to be considered during calibration.

ATC at: 1 1)25°C 2)20°C

For e.g.-Compensation with respect to 25°C Press '1' OR for 20°C Press '2'

6.9.6 For Manual Temperature Compensation, Measure the solution temperature with thermometer and then enter the correct

6.9.7 Rinse the pH electrode and Temperature probe 2-3 times with purified water and wipe with tissue paper.

6.9.8 Than dip/touch the pH electrode with solution/ media and note the pH value in usage log.

6.9.9 Rinse the pH electrode and Temperature probe with purified water and wipe with tissue paper after every pH.

6.9.10 Record the details in format "**pH Meter Usage Log**" as shown in **Annexure –II**.

6.9.11 After usage, place the pH Electrode into the Electrode Storage solution with 3M KCL solution.

6.9.12 Prepare Solution weekly and, If whenever is required.



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6.9.13 All the measurement shall be carried out at temperature $25 \pm 2^\circ\text{C}$.

6.9.14 Calibration of temperature probe shall be performed by external party on yearly basis ± 30 days.

6.9.15 Rinse the pH electrode each time with purified water and wipe dry with tissue paper to dry.

6.9.16 After Calibration of pH meter affix duly filled and signed instrument status label as per SOP, Titled "**Receipt, Qualification, Uses, Maintenance and Disposal of Quality Control Instruments**".

6.9.17 If Calibration not found satisfactory i.e. all result not come with in Acceptance criteria during calibration, inform to Head of Department and affix 'Out of Order' label on the Instrument.

6.10 Frequency of Calibration and Verification: Daily working day and whenever if required.

7.0 ANNEXURES:

ANNEXURE No.	TITLE OF ANNEXURE	FORMAT No.
Annexure -I	Verification Record of pH Meter	
Annexure -II	pH Meter Usage Log	

ENCLOSURES: SOP Training Record

8.0 DISTRIBUTION:

- Controlled Copy No. 01 Quality Assurance
- Controlled Copy No. 02 Microbiology Laboratory
- Master Copy Quality Assurance

9.0 REFERENCES:

Instruction manual.

10.0 REVISION HISTORY:

CHANGE HISTORY LOG

Revision No.	Change Control No.	Details of Changes	Reason for Change	Effective Date	Updated By



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ANNEXURE – I VERIFICATION RECORD OF pH METER

Instrument ID. No.		Calibration Frequency	Daily working day
Make	LABINDIA	Calibration Done On	
Model	PICO+	Calibration Due Date	

Temperature of the Buffer in 25°C ± 2°C

S.No.	pH Buffer solution	Observed Value		Limit (within acceptance criteria ±0.05)	pH Probe Slope S1 & S2 should be 90 to 110 %
		pH	mV		
1.	4.01			3.96 to 4.06	S1 =
2.	6.87			6.82 to 6.92	S2 =
3.	9.18			9.13 to 9.23	

$$E (S1 \& S2) = \frac{\text{Difference in mV potential between two pH buffer}}{\text{Difference in pH between two pH buffers}}$$

$$\% S1 \& S2 = \frac{E}{59.16} \times 100$$

Conclusion: Instrument is Calibrated / Not Calibrated.

Done By
Sign & Date:

Checked By
Sign & Date:

