



**STANDARD OPERATING PROCEDURE**

|  |                        |
|--|------------------------|
| <b>Department:</b> Microbiology          | <b>SOP No.:</b>        |
| <b>Title:</b> Operation of Dhona Balance | <b>Effective Date:</b> |
| <b>Supersedes:</b> Nil                   | <b>Review Date:</b>    |
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**1.0 OBJECTIVE**

1.1 To lay down the procedure for operation of dhona balance.

**2.0 SCOPE**

2.1 This procedure is applicable for Microbiology Laboratory.

**3.0 RESPONSIBILITY**

3.1 Microbiologist is responsible for operation of dhona balance.

**4.0 ACCOUNTABILITY**

4.1 Head Microbiology

**5.0 EHS CONSIDERATIONS**

1.1.1 The dhona balance should be kept on a dust free & non vibrating surface.

**6.0 PROCEDURE**

**6.1 Operation:**

- 6.1.1 Check the level indicator of balance and ensure that the air bubble is centered in the circle. If not, then adjust by four corner adjusting knobs.
- 6.1.2 Switch on the balance.
- 6.1.3 Check for the "Zero" position. If not, then set the "Zero" position by zero adjusting knob.
- 6.1.4 Put butter paper in the weighing pan and close the side door.
- 6.1.5 Once the reading gets stabilized, adjust the center position of reading by "mg" adjusting knob.
- 6.1.6 Note down the paper weight.
- 6.1.7 Set the quantity by adjusting knobs provided in the front panel and reading will show "Tare".
- 6.1.8 Start adding sample to the paper till the reading goes to the paper weight reading.
- 6.1.9 Switch off the balance and take out the weighed sample.



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6.1.10 Make the all readings in zero positions.

6.1.11 Clean the balance with help of brush or tissue paper and close the door.

6.1.12 Make an entry in the Annexure I.

### 6.2 Verification:

6.2.1 Verify the balance with certified weights of 100 mg, 500 mg, 2 gm, 5 gm, 10 gm, 50 gm and 100 gm.

6.2.2 Pick up the certified weight of 100 mg with a forceps, place it carefully in the center of the balance pan and weigh it and note down the reading.

6.2.3 Similarly weigh certified weights of 500mg, 2gm, 5gm, 10gm, 50gm, 100gm and note down the readings.

6.2.4 Acceptance criteria: as per Table 1

**Table I**

| S.No. | Standard Weight | Acceptance Criteria    |
|-------|-----------------|------------------------|
| 1.    | 100 mg          | ± 0.1 mg of mass value |
| 2.    | 200 mg          | ± 0.2 mg of mass value |
| 3.    | 2 gm            | ± 2 mg of mass value   |
| 4.    | 5 gm            | ± 5 mg of mass value   |
| 5.    | 10 gm           | ± 10 mg of mass value  |
| 6.    | 50 gm           | ± 50 mg of mass value  |
| 7.    | 100 gm          | ± 100 mg of mass value |

6.2.5 Calculate the deviation as follows:

$$\% \text{ Deviation} = \frac{\text{Difference between Certified weight and observed weight} \times 100}{\text{Certified weight}}$$

6.2.6 If a deviation is greater than the tolerance limit, discontinue its use and immediately report the same to the relevant supervisor and lodge a complaint with the service engineer.

6.2.7 Record all results in Annexure II.

6.2.8 Frequency– Daily



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**6.3 Measurement Uncertainty**

6.3.1 Weigh specified weight (100 mg & 20 gm) 10 times each. Record the reading and determine the standard deviation.

6.3.2 Calculate the measurement uncertainty as given below:

$$\text{Standard Deviation} = \sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$$

Where n = 10

Random error = 3 x standard deviation

Systematic error = observed weight (Average) – Actual weight

$$\text{Measurement of Uncertainty} = \frac{\text{Random error} + \text{systematic error}}{\text{actual weight}}$$

6.3.3 Acceptance Criteria: The measurement uncertainty should not be more than  $\pm 0.1\%$

OR

$$\text{Measurement Uncertainty} = \frac{3 \times \text{Standard Deviation}}{\text{actual weight}}$$

6.3.4 Acceptance Criteria: The measurement uncertainty should not be more than 0.001

6.3.5 If a deviation is greater than the tolerance limit, discontinue its use and immediately.

6.3.6 Report the same to the relevant supervisor and lodge a complaint with the service engineer.

6.3.7 Record all results in Annexure III.

6.3.8 Frequency– Monthly

6.3.9 If the instrument is ‘Out of Order’, tag the instrument with “UNDER MAINTENANCE” label. Inform to the service engineer for rectification. Perform the measurement uncertainty of the instrument after rectification.



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**7.0 DEFINITIONS AND ABBREVIATIONS**

7.1 NA

**8.0 REFERENCE**

8.1 NA

**9.0 ANNEXURES**

- 9.1 Annexure I : Dhona balance usage record
- 9.2 Annexure II : Verification record of Dhona balance
- 9.3 Annexure III : Measurement uncertainty report of Dhona balance

**10.0 DISTRIBUTION DETAILS**

10.1 Controlled copy of this SOP shall be distributed to Quality Assurance and Microbiology Department.

**11.0 REVISION HISTORY**

| Supersedes SOP No. | Change Control No. | Reason for revision |
|--------------------|--------------------|---------------------|
|                    |                    |                     |





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### ANNEXURE II VERIFICATION RECORD OF DHONA BALANCE

|                        |               |                               |       |
|------------------------|---------------|-------------------------------|-------|
| <b>Instrument Name</b> | Dhona Balance | <b>Model No.</b>              |       |
| <b>Instrument ID</b>   |               | <b>Verification Frequency</b> | Daily |

| Date | Std. Weight | Certified Weight | Weight found | Deviation | Acceptable limit | Verified By | Reviewed By |
|------|-------------|------------------|--------------|-----------|------------------|-------------|-------------|
|      | 100 mg      |                  |              |           | ± 0.1%           |             |             |
|      | 500 mg      |                  |              |           |                  |             |             |
|      | 2 g         |                  |              |           |                  |             |             |
|      | 5 g         |                  |              |           |                  |             |             |
|      | 10 g        |                  |              |           |                  |             |             |
|      | 50 g        |                  |              |           |                  |             |             |
|      | 100 g       |                  |              |           |                  |             |             |



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### ANNEXURE III MEASUREMENT UNCERTAINTY REPORT OF DHONA BALANCE

|                        |                      |                                  |  |
|------------------------|----------------------|----------------------------------|--|
| <b>Instrument Name</b> | <b>Dhona Balance</b> | <b>Date of Verification</b>      |  |
| <b>Instrument ID</b>   |                      | <b>Next Date of Verification</b> |  |

| <b>Standard Weight</b> :  |                | <b>Standard Weight</b> :  |                |
|---------------------------|----------------|---------------------------|----------------|
| <b>Certified Value</b> :  |                | <b>Certified Value</b> :  |                |
| S.No.                     | Observed Value | S.No.                     | Observed Value |
| 1.                        |                | 1.                        |                |
| 2.                        |                | 2.                        |                |
| 3.                        |                | 3.                        |                |
| 4.                        |                | 4.                        |                |
| 5.                        |                | 5.                        |                |
| 6.                        |                | 6.                        |                |
| 7.                        |                | 7.                        |                |
| 8.                        |                | 8.                        |                |
| 9.                        |                | 9.                        |                |
| 10.                       |                | 10.                       |                |
| Average                   |                | Average                   |                |
| Standard Deviation        |                | Standard Deviation        |                |
| %RSD                      |                | %RSD                      |                |
| Random Error :            |                | Random Error :            |                |
| Systematic Error :        |                | Systematic Error :        |                |
| Measurement Uncertainty : |                | Measurement Uncertainty : |                |

**Acceptance Criteria :** The measurement uncertainty should not be more than  $\pm 0.1\%$

**Conclusion :**

**Done By**  
**Date :**

**Reviewed By**  
**Date :**