



STANDARD OPERATING PROCEDURE

Department: Microbiology	SOP No.:
Title: Operation & Calibration of Analytical Balance	Effective Date:
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1.0 OBJECTIVE :

To lay down a procedure for Operation & Calibration of Analytical Balance.

2.0 SCOPE:

This procedure is applicable for Operation & Calibration of Electronic Weighing Balance in microbiology Laboratory.

Capacity : 210g
Make : Essae.
Model : FB-200
Operating Range : 1.0 g to 200 g

3.0 RESPONSIBILITY :

Executive, Officer – Quality Control.
Head-Quality Control.

4.0 PROCEDURE:

4.1 Operation:

- 4.1.1 Ensure that instrument is clean and free from dust.
- 4.1.2 Switch 'ON' the mains using POWER ON/OFF switch provided on rear side of the balance.
- 4.1.3 This enables balance to complete diagnostic routine and show 0.000g on display. Allow 20 minutes warm-up to get consistent weight reading.

4.2 Weighing:

- 4.2.1 Before weighing on the balance ensure the spirit level (bubble position) in center & Ensure that daily calibration of the balance is performed and the entry is made.
- 4.2.2 If the display shows other than 0.000 press 0/T key, now display shows 0.000 and Zero and stable indicators are ON.
- 4.2.3 Place weighing paper on the balance in the centre of the pan, tare it, then add the material to the weighing paper and record the weight. Transfer the weighed material to the flask or required container and then reweigh the original weighing paper by



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placing it in the same position on the pan [Note: Do not change the set tare of the balance between these two weighing]. The second weight represents the untransformed material and is subtracted from the total material weight to determine the weight of transferred material.

4.3 Calibration:

- 4.3.1 Calibrate the weighing balance using calibrated certified weights only. Use hand gloves wherever required.
- 4.3.2 If the standard weights are showing results out of pre-defined values, recalibrate the balance and if it is again out of tolerance, inform to Head-Quality Control for further action.
- 4.3.3 Update the Calibration Status label (Monthly).
- 4.3.4 Make entry in the respective log book.
- 4.3.5 **Frequency:** Daily Verification- Daily, Calibration-Monthly.

4.4 Daily Verification:

- 4.4.1 Verification of weighing balance shall be done daily before using for weighing.
- 4.4.2 Check the balance spirit level. (If the level is disturbed, correct it by adjusting the base screws). Record it on the annexure - I as ok /not ok.
- 4.4.3 Check for the zero error on the display by pressing '0/T' key to shown 0.000 g constantly. Record it on the annexure - I as ok /not ok.
- 4.4.4 Place the 1.0 g certified calibrated weight on the pan with help of forceps.
- 4.4.5 Note the displayed weight after the display is stable.
- 4.4.6 Repeat operation with 50 g, 100 g and 200 g standard weights.
- 4.4.7 Note the displayed weight after the display is stable & record in Annexure-I.

4.5 Tolerance:

- 4.5.1 Daily verification of balance $\pm 0.10\%$ of actual certified weight.

4.6 Monthly Calibration:

4.6.1 Accuracy:

- 4.6.1.1 Tare the balance and place the standard weight of 1g by means of forceps on the weighing pan and record the observation in Annexure-II.
- 4.6.1.2 Similarly place the Standard weights of 2 g , 5 g, 10 g, 20g, 50 g, 100 g, 200 g, record the observations Annexure-II



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4.6.1.3 Calculate the Percentage variation by using the following formula:

$$\frac{\text{Observed Weight} - \text{Actual Weight (As per certificate)} \times 100}{\text{Actual Weight (As per certificate)}}$$

4.6.1.4 Acceptance criteria: Percentage variation shall not be more than $\pm 0.10 \%$

4.7 Measurement of uncertainty:

4.7.1 Tare the balance and place the standard calibrated weight of 10.0 g by means of forceps in the centre of pan of balance. Repeat this exercise nine more times in replicate and record the observation in the Annexure- II

4.7.2 If the repeatability obtained is smaller than 0.41 d, where d is the scale interval, replace the standard deviation with 0.41 d.

4.7.3 Calculate the measurement of uncertainty by using the formula as given below:

$$\text{Measurement Uncertainty} = \frac{2 \times \text{Standard deviation}}{\text{Actual weight}} \times 100$$

$$\text{Where, Standard deviation} = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Where, x = each observed weight
 \bar{x} = Mean observed weight.
 n = No. of observations.

4.7.4 Acceptance Criteria: Uncertainty shall not be more than 0.10 %

4.8 Eccentricity:

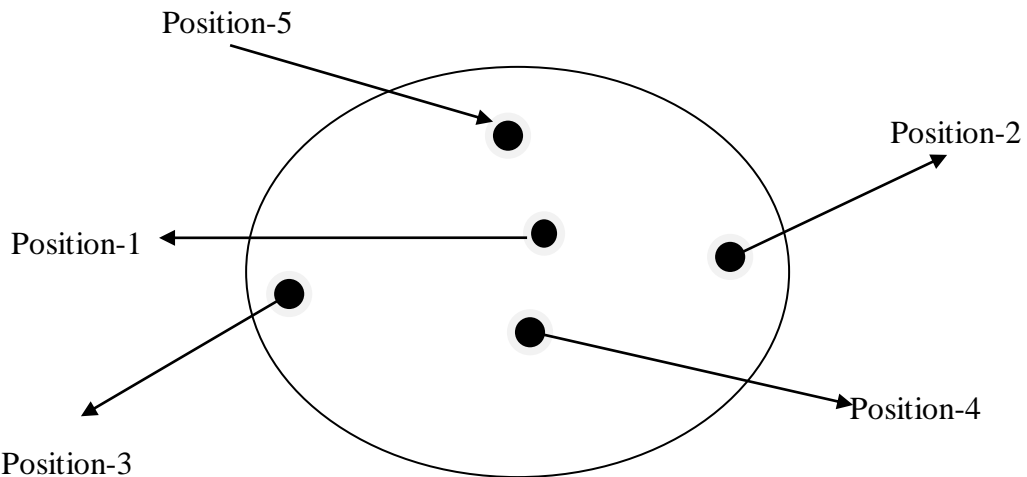
4.8.1 Tare the balance and place 100.0 g standard weight in the centre of pan this is position 1

4.8.2 Then remove the weight from position-1 and place the standard weight in position 2, 3, 4 and 5 (one by one) as shown below and record the observations in Annexure- II.



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- 4.8.3 Acceptance Criteria: Not more than 0.2 mg difference from the position-1
- 4.8.4 If balance is out of calibration, affix “UNDER MAINTENANCE” or “DO NOT USE” label on the balance and immediately inform to maintenance & call service engineer.
- 4.8.5 If instrument is out of calibration, put an “OUT OF CALIBRATION” tag, and proceed as per SOP.

4.9 Precaution:

- 4.9.1 Balance should be placed on stable, vibration free and leveled support.
- 4.9.2 Balance should not be placed in hazardous area.
- 4.9.3 Clean the pan properly before and after use.
- 4.9.4 Keep the glass doors of the balance closed.

5.0 ANNEXURE (S):

- Annexure–I : Daily verification record of analytical balance
- Annexure–II : Monthly Calibration

6.0 REFERENCE (S):

SOP: Preparation, Approval, Distribution control, revision and Destruction of Standard operating Procedure (SOP).

7.0 ABBREVIATION (S)/DEFINITION (S):

- g – gram
- QC – Quality Control.



PHARMA DEVILS
MICROBIOLOGY DEPARTMENT

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QA – Quality Assurance.

d - Scale Interval.

REVISION CARD

S.No.	REVISION No.	REVISION DATE	DETAILS OF REVISION	REASON (S) FOR REVISION	REFERENCE CHANGE CONTROL No.
1.	00	---	---	New SOP	---



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Annexure I

DAILY VERIFICATION RECORD OF ANALYTICAL BALANCE

Location		Model No.	
Manufactured By		Identification No.	
Capacity		Month & Year	
Least Count		Frequency	

Calibrated weight box Certificate No.: _____ **Validity:** _____

Limit: ± 0.10 % of mass / actual weight

Standard Weight	1.0 g	50.0g	100.0g	200.00g	Done by	Checked by
Actual Weight						
Limits (g)						

Date	*Balance Level	*Zero display	Observed Weight (in mg/g)					

Note: *Record the balance level (Bubble position in center) and Zero display as ok/ not ok



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Annexure II
MONTHLY CALIBRATION

1.0 ACCURACY:

Calibrated weight box Certificate No.: _____ **Validity:** _____

S.No.	Weight in Used(mg/ g)	Actual Certificate Weight (g)	Observed Weight	Percentage Variation
1	1.0			
2	2.0			
2	5.0			
3	10.0			
4	50.0			
5	100.0			
6	200.0			

The instrument calibration is OK / Not OK

Note: *Record the balance level as Ok / Not Ok (Bubble position in center)

Acceptance Criteria: Percentage Variation shall not be more than ± 0.10 %. Calculate the percentage variation by using the formula:

$$\frac{\text{Observed Weight} - \text{Actual Weight (As per certificate)}}{\text{Actual Weight (As per certificate)}} \times 100$$



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2.0 Measurement of Uncertainty:

Used in weight : _____ Actual Certificate Weight g _____

S.No.	Observed Weight
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Average	
Standard Deviation	

If the repeatability obtained is smaller than 0.41 d, where d is the scale interval, replace the standard deviation with 0.41 d.

Calculate the measurement of uncertainty by using the below mentioned formula:

$$\text{Measurement Uncertainty} = \frac{2 \times \text{Standard deviation}}{\text{Actual weight}} \times 100$$

$$\text{Measurement Uncertainty} = 2 \times \frac{\text{Standard deviation}}{\text{Actual weight}} \times 100 = \text{ (Limit=NMT 0.10\%)}$$



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3.0 Eccentricity

Used In Weight: _____ **Actual Certificate Weight g** _____

S.No.	Position	Observed Weight	Difference between Position
1	Position 1		
2	Position 2		
3	Position 3		
4	Position 4		
5	Position 5		

Acceptance Criteria: Not more than 0.2 mg difference from the position-1

Calibrated By:	Checked By :	Approved By :
Date :	Date :	Date :