



PHARMA DEVILS

SOP FOR VERIFICATION OF WEIGHING BALANCES

PROTOCOL No.:

1.0 OBJECTIVE:

To lay down procedure for verification of balances.

2.0 SCOPE:

The standard operating procedure is applicable to the verification of balances. (See table-I)

Table -I

| Equipment no. | Make | Capacity | Location |
|----------------------|----------------|-----------------|---------------------|
| | Mettler Toledo | 150/300 kg | RM Dedusting area |
| | Mettler Toledo | 15/30 kg | RM Dedusting area |
| | Mettler Toledo | 30/60 Kg | RM Dispensing booth |
| | Mettler Toledo | 7100 gm | RM Dispensing booth |
| | Mettler Toledo | 220 gm | RM Dispensing booth |
| | Mettler Toledo | 75/150 kg | PM Stores receipt |
| | Mettler Toledo | 75/150 kg | Scrap Weighing |

3.0 RESPONSIBILITY:

Store executive / supervisor shall be responsible for implementing the SOP for verification of balances.

4.0 PROCEDURE:

4.1 Before starting of the verification of weighing balances ensure the following.

4.2.1 That the Balance has been kept "ON" for at least for 30 minutes before starting the activity.

4.2.2 That the balance is properly cleaned.

4.2 Cleaning procedure for balance

4.2.1 Clean spilled material with help of cotton cloth before any weighing.

4.2.2 After performing each weighing process, clean the balance pan and surrounding with cotton cloth.

4.2.3 If required clean the balance with lint free moistened cloth with 70% isopropyl alcohol: water mixture. Ensure that the mixture is not spilled on the balance.

4.2.4 **Cleaning procedure for standard weights.**



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4.2.4.1 Before calibration take out weights and clean them with lint free cloth moistened with 70 % Isopropyl alcohol mixture. Leave weight to air dry.

4.2.4.2 After cleaning, place them back in poly bag covers.

Frequency: once in a month.

4.3 Self calibration procedure for Tag no.....

4.3.1 Put the balance on and allow 60 minutes as stabilization time.

4.3.2 Calibrating with the internal weight.

4.3.3 Select 'cal int' on the panel.

4.3.4 Ensure that there is no load on the weighing pan.

4.3.5 Press and hold the "Cal/menu" key down until "cal" appears on the screen then release the key.

4.3.6 The balance adjusts automatically. The adjusting is finished when the message "cal done" appears on the screen followed by "0.0000g".

4.4 Daily verification of weighing balances.

4.4.1 Take the standard weight as per the table-I according to the capacity of the balance.

Table II

Standard weights to be taken for daily verification

| S.No. | Standard weight for daily verification in kg | Capacity of balance | All reading should be within below range (Weight in Kgs) | |
|-------|--|---------------------|--|--------|
| 1. | 5.00 | 30 /15 kg | 4.998 | 5.002 |
| 2. | 10.00 | 30/60 kg | 9.995 | 10.005 |
| 3. | 20.00 | 75/150 kg. | 19.990 | 20.010 |
| 4. | 50.00 | 150/300 kg | 49.980 | 50.020 |
| 5. | 0.500 | 7.1 kg | 0.499 | 0.501 |

4.5 Check the leveling of the balances from the spirit level.

4.6 If not leveled, level them as mentioned in the step "leveling of the balance".

4.7 Record the observation in annexure –I.

4.8 Check the balance against the weight mentioned in table I.

4.9 Record the observation in annexure-I.

4.10 If the displayed reading found not within specified limit then affix label "out of order" and inform to the store executive who will further inform to the Engineering Department.

Frequency: Daily for all balances.



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4.12 Monthly verification of weighing balances

- 4.12.1 Check the linearity-B of the balance monthly as mentioned in step “Linearity”.
- 4.12.2 Record the observation of linearity-B in the format provided in the annexure-II to VII.
- 4.12.3 Check the Repeatability of the balance monthly as mentioned in step “Repeatability”.
- 4.12.4 Record the observation of Repeatability in annexure – II to VII.
- 4.12.5 Check the hysteresis error for the balance as mentioned in step “hysteresis”
- 4.12.6 Record the observation of hysteresis error in annexure- II to VII.
- 4.12.7 Check the eccentricity of the balance as mentioned in step “Eccentricity”
- 4.12.8 Record the observations of eccentricity check in annexure- II to VII.
- 4.12.9 After getting all observations found within specified limit affix label “monthly verification Tag” on the balance.
- 4.12.10 If the observation found not within specified limit then affix label “out of order” and inform to the production executive.
- 4.12.11 Any balance “out of order” shall be used only after calibration.

4.13 Leveling of balance

- 4.13.1 Level the balance with the help of leveling screws.
- 4.13.2 While leveling, ensure that bubble of spirit level is positioned in the center.
- 4.13.3 If it is not in the center, adjust it with help of moving screws.
- 4.13.4 In case, spirit level is not provided on the balance, keep the external spirit level on the balance for leveling.

4.14 Linearity

- 4.14.1 Verify the balance against the standards weights monthly as per annexure – II to VII for specific balances (linearity)
- 4.14.2 Zero the weighing equipment.
- 4.14.3 Apply the first test load to the center of the balance and weighing reading in the column “observation” in the table for linearity in the annexure II to VII for the specific balance.
- 4.14.4 Repeat the step from 4.14.2 to 4.14.3
- 4.14.5 Check that all the readings are within the acceptable range.
- 4.14.6 If all readings are found within the acceptable range put an X in pass box otherwise put an X in the fail box.

4.15 Repeatability



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- 4.15.1 Repeatability test shall be carried out within pre-defined range of balance as defined in annexure II to VII.
- 4.15.2 Tare the balance.
- 4.15.3 Verify the balance against the standard weight as defined in table I and record the weight in the column under heading "Loaded" in the table for repeatability in annexure II to VII for the specific balance.
- 4.15.4 Remove the weight from the balance. Do not tare the balance.
- 4.15.5 Record the reading on the scale without the weight in the column under heading "unloaded" in the table for repeatability in annexure II to VII for the specific balance.
- 4.15.6 Repeat from step 4.15.3 to 4.15.5 at 5 weighing of same mass.
- 4.15.7 Calculate the mean and the standard deviation of weight taken as per formula given below.

The standard deviation "s" is given as the quantity for repeatability:

$$s = \sqrt{\frac{1}{n-1} \cdot \sum_{i=1}^n (x_i - \bar{x})^2}$$

n = total number of measurements

xi = individual results measured

\bar{x} = mean value of the individual results measured:

$$\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^n x_i$$

| S.No. | Capacity of balance | Equipment tag no | Standard deviation acceptable (Gms) |
|-------|---------------------|------------------|-------------------------------------|
| 1. | 150/300 kg | S/007 | 20/50 |
| 2 | 15/30 kg | S/008 | 2/5 |
| 3 | 30/60 Kg | S/009 | 5/10 |
| 4 | 7100 gm | S/010 | 1.0 |
| 5 | 220 gm | S/011 | 0.0001 |
| 6 | 75/150 kg | S/012 | 10/20 |
| 7 | 75/150 kg | S/013 | 10/20 |

If the Standard deviation calculated is within the range for both loaded and unloaded column then put a X in the pass box otherwise put the X in the box provided next to fail in the format provided in the annexure II to VII for the respective balance

Hysteresis

- 4.16.1 Histeresis shall be tested at a minimum of three points covering range of balance as defined in the annexure II to VII for the specific balances under the table for Hysteresis.
- 4.16.2 Tare the balance so that it reads zero.

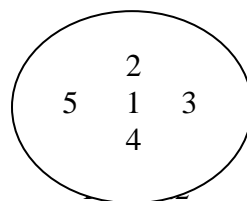
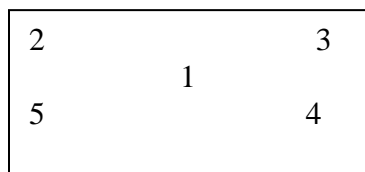


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- 4.16.3 Add the weight as mentioned and record the observation in the column for “observed reading” in the format as provided in annexure II to VII.
- 4.16.4 Record all readings in the format provided in annexure II to VII for the specific balance in use.
- 4.16.5 Acceptance criteria: As defined in the annexure II to VII for the balances.
- 4.16.6 **Eccentricity**
- 4.17.1 Eccentricity shall be performed at with the weight as defined in the table for Eccentricity in the format II to VII for the specific balance.
- 4.17.2 Tare the balance by pressing “T” option.
- 4.17.3 Take the test load as mentioned in the annexure II to VII for the specific balances and place it in the center and record the weight in the format provided in the annexure.
- 4.17.4 The weight is then moved to test points 2,3,4 and 5 as shown in figure 1 and 2 in turn and is recorded in annexure- II to VII.



Eccentricity test position on square and round balance pan

Acceptance criteria: As defined in the acceptance criteria for the balances in annexure II to VII.

4.16 Frequency for check parameters

| S.No. | Parameters | Frequency |
|-------|--------------------|-----------|
| 1 | Leveling | Daily |
| 2 | Daily verification | Daily |
| 3 | Linearity | Monthly |
| 4 | Repeatability | Monthly |
| 5 | Histeresis | Monthly |
| 6 | Eccentricity | Monthly |

- 4.19 All balances shall be affixed with “daily verification Tag” and “monthly verification tag”.

5.0 SAFETY AND PRECAUTIONS

- 5.1 Check the balance for cleanliness before verification.
- 5.2 Material should not be kept spilled over the pan and the balance.
- 5.3 Operating range for the balance should not be less than 100 times the least count and not more than 80% of the capacity.



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- 5.4 Ensure that the balance is calibrated before the start of the first weighing or after any event that might disturb the balance calibration (shifting of balance)
- 5.5 Use the balance within operating range of weighing balance.

6.0 REVISION HISTORY:

| Revision No. | Reason for Revision | Superseded from & date |
|---------------------|----------------------------|-----------------------------------|
| 00 | New SOP | |

7.0 REFERENCES:

Not applicable

8.0 ABBREVIATIONS:

SOP-Standard operating procedure

S- Standard deviation

% - Percentage.

9.0 ANNEXURES:

Annexure –I Daily verification format for weighing balance

Annexure-II Monthly verification format for weighing balance

Annexure-III Monthly verification format for weighing balance

Annexure-IV Monthly verification format for weighing balance



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Monthly verification format for weighing balance

| Equipment Tag no.: - | | | Maximum operating range: 80% of balance capacity: 5680 grams | | | | | | Month: - | | |
|-----------------------|---------------------------|----------------------|--|---------------------------|----------------------|------------------------------------|-----------------|----------------------|-------------------------------------|----------|--------|
| Make: -Mettler Toledo | | | Min operating Range: 100 x verification interval: 100 grams | | | | | | Date- | | |
| Capacity: - 7100 g | | | Verification interval: 1 grams | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 2400 grams | | | Repeatability: Test load 2400 grams | | |
| Test load in grams | Acceptable range in grams | Observation in grams | Test load in gram | Acceptable range in grams | Observation in grams | Segment positions | Tolerance Grams | Observation in grams | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 100 | 99 to 101 | | 00 | -1 to 1 | | 1 | 2399 to 2401 | | 1 | | |
| 500 | 499 to 501 | | 2400 | 2399 to 2401 | | 2 | 2399 to 2401 | | 2 | | |
| 5000 | 4999 to 5001 | | 5800 | 5799 to 5801 | | 3 | 2399 to 2401 | | 3 | | |
| | | | 2400 | 2399 to 2401 | | 4 | 2399 to 2401 | | 4 | | |
| | | | 00 | -1 to 1 | | 5 | 2399 to 2401 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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**ANNEXURE -III
Monthly verification format for weighing balance**

| Equipment Tag no.: - | | | Maximum operating range: 80% of balance capacity: 24 kg | | | | | | Month: - | | |
|-----------------------|------------------------|-------------------|---|------------------------|-------------------|-------------------------------|---------------|-------------------|----------------------|----------|--------|
| Make: -Mettler Toledo | | | Min operating Range: 100 x verification interval: 500 grams | | | | | | Date- | | |
| Capacity: - 15/30kg | | | Verification interval: 2/5 grams | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 10 kg | | | Repeatability: 10 kg | | |
| Test load in kgs | Acceptable range in kg | Observation in kg | Test load in kg | Acceptable range in kg | Observation in kg | Segment positions | Tolerance kgs | Observation in kg | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 500 g | 0.498- 0.502 | | 00 | -0.002 – 0.002 | | 1 | 9.998-10.002 | | 1 | | |
| 5 kg | 4.998-5.002 | | 12 | 11.998-12.002 | | 2 | 9.998-10.002 | | 2 | | |
| 15 kg | 14.998-15.002 | | 24 | 23.995 – 24.005 | | 3 | 9.998-10.002 | | 3 | | |
| | | | 12 | 11.998-12.002 | | 4 | 9.998-10.002 | | 4 | | |
| | | | 00 | -0.002 – 0.002 | | 5 | 9.998-10.002 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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PROTOCOL No.:

**ANNEXURE -IV
Monthly verification format for weighing balance**

| Equipment Tag no.: | | | Maximum operating range: 80% of balance capacity: 48 kg | | | | | | Month: - | | |
|------------------------|------------------------|-------------------|---|------------------------|-------------------|-------------------------------|---------------|-------------------|----------------------|----------|--------|
| Make: - Mettler Toledo | | | Min operating Range: 100 x verification interval: 1000grams | | | | | | Date- | | |
| Capacity: - 30/60 kg | | | Verification interval: 5/10 grams | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 20 kg | | | Repeatability: 20 kg | | |
| Test load in kgs | Acceptable range in kg | Observation in kg | Test load in kg | Acceptable range in kg | Observation in kg | Segment positions | Tolerance kgs | Observation in kg | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 1 Kg | 0.995-1.005 | | 00 | -0.005 – 0.005 | | 1 | 19.995-20.005 | | 1 | | |
| 20 kg | 19.995-20.005 | | 24 | 23.995-24.005 | | 2 | 19.995-20.005 | | 2 | | |
| 40 kg | 39.990-40.010 | | 48 | 47.990-48.010 | | 3 | 19.995-20.005 | | 3 | | |
| | | | 24 | 23.995-24.005 | | 4 | 19.995-20.005 | | 4 | | |
| | | | 00 | -0.005 – 0.005 | | 5 | 19.995-20.005 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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PROTOCOL No.:

**ANNEXURE -V
Monthly verification format for weighing balance**

| Equipment Tag no.: - | | | Maximum operating range: 80% of balance capacity: 176g | | | | | | Month: - | | |
|------------------------|------------------------|------------------|--|-----------------------|------------------|------------------------------|--------------------|------------------|---------------------|----------|--------|
| Make: - Mettler Toledo | | | Min operating Range: 100 x verification interval: 0.01 g | | | | | | Date- | | |
| Capacity: - 220g | | | Verification interval: 0.0001 g | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 100g | | | Repeatability: 100g | | |
| Test load in gm | Acceptable range in gm | Observation in g | Test load in g | Acceptable range in g | Observation in g | Segment positions | Tolerance g | Observation in g | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 1 | 0.9999-1.0001 | | 00 | -0.0001-0.0001 | | 1 | 99.9999 – 100.0001 | | 1 | | |
| 50 | 49.9999 – 50.0001 | | 85 | 84.9999-85.0001 | | 2 | 99.9999 – 100.0001 | | 2 | | |
| 100 | 99.9999 – 100.0001 | | 170 | 169.9999-170.0001 | | 3 | 99.9999 – 100.0001 | | 3 | | |
| | | | 85 | 84.9999-85.0001 | | 4 | 99.9999 – 100.0001 | | 4 | | |
| | | | 00 | -0.0001-0.0001 | | 5 | 99.9999 – 100.0001 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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PROTOCOL No.:

**ANNEXURE -VI
Monthly verification format for weighing balance**

| Equipment Tag no.: | | | Maximum operating range: 80% of balance capacity: 240 kg | | | | | | Month: - | | |
|------------------------|------------------------|-------------------|--|------------------------|-------------------|--------------------------------|---------------|-------------------|-----------------------|----------|--------|
| Make: -Mettler Toledo | | | Min operating Range: 100 x verification interval: 5000 grams | | | | | | Date- | | |
| Capacity: - 150/300 kg | | | Verification interval: 20/50 grams | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 100 kg | | | Repeatability: 100 kg | | |
| Test load in kgs | Acceptable range in kg | Observation in kg | Test load in kg | Acceptable range in kg | Observation in kg | Segment positions | Tolerance kgs | Observation in kg | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 5kg | 4.98 – 5.02 | | 00 | -0.02 – 0.02 | | 1 | 99.98-100.02 | | 1 | | |
| 50 kg | 49.98-50.02 | | 120 | 119.98-120.02 | | 2 | 99.98-100.02 | | 2 | | |
| 150 kg | 149.95-150.05 | | 240 | 239.95 – 240.05 | | 3 | 99.98-100.02 | | 3 | | |
| | | | 120 | 119.98 – 120.02 | | 4 | 99.98-100.02 | | 4 | | |
| | | | 00 | -0.02– 0.02 | | 5 | 99.98-100.02 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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PROTOCOL No.:

**ANNEXURE -VII
Monthly verification format for weighing balance**

| Equipment Tag no.: | | | Maximum operating range: 80% of balance capacity: 120 kg | | | | | | Month: - | | |
|-----------------------|------------------------|-------------------|--|------------------------|-------------------|-------------------------------|---------------|-------------------|----------------------|----------|--------|
| Make: -Mettler Toledo | | | Min operating Range: 100 x verification interval: 2000 grams | | | | | | Date- | | |
| Capacity: - 75/150kg | | | Verification interval: 10/20 grams | | | | | | Location: -- | | |
| Linearity | | | Histerisis | | | Eccentricity: Test load 40 kg | | | Repeatability: 40 kg | | |
| Test load in kgs | Acceptable range in kg | Observation in kg | Test load in kg | Acceptable range in kg | Observation in kg | Segment positions | Tolerance kgs | Observation in kg | Scale reading | | |
| | | | | | | | | | # | Unloaded | Loaded |
| 15 Kg | 14.990 – 15.010 | | 00 | -0.010 – 0.010 | | 1 | 39.990-40.010 | | 1 | | |
| 60 kg | 59.990-60.010 | | 60 | 59.990-60.010 | | 2 | 39.990-40.010 | | 2 | | |
| 120 kg | 119.980-120.020 | | 120 | 119.980-120.020 | | 3 | 39.990-40.010 | | 3 | | |
| | | | 60 | 59.990-60.010 | | 4 | 39.990-40.010 | | 4 | | |
| | | | 00 | -0.010 – 0.010 | | 5 | 39.990-40.010 | | 5 | | |
| | | | | | | | | | SD | | |
| Pass | | Fail | | Pass | | Fail | | Pass | | Fail | |
| Done By | | | Date | | | | Checked by | | | Date | |



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Annexure –VIII

Label for monthly verification tag

Monthly verification Tag

Balance tag no.-

Location –

Min.weighing capacity-

Maximum weighing capacity-

Date of verification-

Due date of verification-

Done by-

Checked by -