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Standard Operating Procedure (SOP) for operation and calibration of analytical balances. As per USP, balance calibration parameters are Internal adjustments, Linearity, Sensitivity, Repeatability (Uncertainty), and Accuracy, etc.  SOP for Analytical Balance: Operation and Calibration 1.0 PURPOSE The purpose of this SOP is to describe the procedure of Operation, Calibration, and Maintenance of Analytical balance in the Quality Control Department. 2.0 SCOPE This SOP is applicable to the analytical balances for operation and calibration of balances in the Quality Control Department. 3.0 REFERENCES : Operation Manual supplied by the manufacturer. SOP for Handling of Out of Calibration USP Weights and balances. SOP for Maintenance of Laboratory Instruments USP Weighing on an analytical balance. SOP for Preparation of internal and external (Third Party) Calibration schedule and calibration practices. SOP for Instrument / Equipment usage log book. 4.0 RESPONSIBILITY : QC Analyst shall be responsible for- The operation, calibration, and maintenance of the instrument as per the SOP. Maintaining the history card, Instrument usage logbook, and weight prints as per the SOP. QC Head shall be responsible to ensure that the instrument is operated, calibrated and maintained and the related documentation is done as per the SOP. QA shall be responsible to ensure the implementation of the system as per the SOP. Plant Head and Quality Head shall be responsible for the approval of the SOP. 5.0 ABBREVIATIONS : “Cal Int” : Internal Calibration “Cal done” : Calibration Done NIST : National Institute of Science and Technology 6.0 DEFINITION : Hysteresis: Hysteresis of the mechanical parts occurs during weighing. (Note: Hysteresis in the balance is caused by excessive stretching of the springs, and it is primarily due to overloading or to the accidental dropping of an object onto the pan.) Also read: SOP for Audit Trail Review and Privilege Policy The balance door should not be open during weighing. Temperatures of the balance and the material to be weighed should the same. Do not expose Hygroscopic material more time in the air during weighing. Air currents should not present near the balance. Level properly the balance. Hysteresis of the mechanical parts should not occur. Do not cause vibration during Laboratory operations. Place the weight in the center of the balance pan to eliminate the corner-weighing difference. Do not overload the balance pan more than the capacity of the balance. Many chemicals, such as salts are corrosive, and material of this nature should not spill on the balance pan or inside the balance housing.  Before weighing or calibration, the balance should exactly in a horizontal position (check the level indicator, which should be in the center). If any unevenness is observed in its location. Correct it by turning leveling feet until the level bubble is in the center of the indicator. The weight class chosen for the calibration should be such that the tolerance of the weights used does not exceed 0.1% of the amount weighed. All the weights taken should be ± 10% of the target weight as specified in the individual monograph. The analyst shall always use the calibrated weight box for calibration purposes. Calibrate weight boxes by outside agency yearly ± 30 days. After the receipt of the calibrated weight box along with the calibration certificate limit for allowable tolerance limit (for external calibration) should be calculated as minimum and maximum weight from the limit in terms of % mentioned in Attachment-1 for all the weight which require for the calibration. e.g. Actual mass value found after calibration is 200.0050 gm, then 199.8050 gm to 200.2050 gm is the minimum and maximum weight limit as per ±0.1% of the actual mass value. Every time after calibration of weight box format of Annexure -1 shall be reprinted and implemented including following. Minimum and Maximum limit calculated as above for all weights Weight box no Valid up to date Similarly, Reprint Annexure -2 and implemented including the following. Actual mass value & theoretical weight Weight box no. Valid up to date. The analyst shall update the calibration status label and make an entry in the instrument usage log book. If the weight print facility of balance is not working, then inform the service engineer for rectification of this problem. Till rectification of this problem, Check the weight during weighing and signed by the section head. If print facility available attach the print out with a template. In case the weight prints taken are not considered in the calculation ( e.g due to  unclear  visibility, misprinting, not as per defined statistics mode or weighing mode, etc.),  Attach such weight prints in the template and write justification against the weight print on the respective template. Take fresh standard/ sample weights for the batch to continue the analysis. If the calibration status label is not provided by the certified agency then affix the label on the weight box as per Annexure-3. (Note: The  above mentioned general notes and precaution are applicable to all the analytical balance available in the Quality control department ) Remove powder if any, from inside the balance using soft nylon brush & wipe with clean cotton balls. Remove weighing pan & wipe it with a soft nylon brush, if required, wipe with clean cotton soaked in 70 % IPA solution & dry the pan with cotton balls completely before mounting. Wipe the carefully inner side of the balance with clean moist cotton with 70% IPA solution in water, without disturbing the balance & finally mop with clean dry cotton. In case of dirty spots or stains on the body, use cotton balls soaked in 70 % IPA solution in water. Ensure that balance is on firm, vibration-free position and in a room without temperature fluctuations. Check that balance is exactly in a horizontal position, compensate it if any minor unevenness in its location by turning two leveling feet at the rear of the balance housing until the air bubble is in the center of the leveling control (internal circle). Press “ON / OFF” key, the display will show normal weight(0.0000g). Allow the balance to warm up for initialization 30 minutes. Press the “O/T” key of the menu bar, the display shows “0.0000 g”. If we are working with butter paper/container, place it on the weighing pan, close the glass draft shield, then press the “O/T” key to tare the scale. Press the “Print” key from the menu bar, to take a printout of the printer is attached. Before executing the tests, the analyst should place the weights in the vicinity of the balance for an appropriate time to reach sufficient thermal equilibrium. If possible, Carry out all tests with a single test weight in order to minimize handling errors, but multiple test weights are permitted. Take appropriate size butter paper/receiver of with respect to the quantity of sample. Add slowly the desired quantity of the sample to the center of the butter paper /receiver. The weight taken should be ± 10% of the specified weight or as specified in the individual monograph. Addition weighing is used for solid samples or liquid samples for which volatility is not an issue. Place the empty butter paper / or receiver on the balance in the center of the pan, and press the appropriate tare (Zero) key on the balance (On stabilization of indicator). Add the desired amount of material to the butter paper / or receiver, and allow the balance to display stabilize reading (On stabilization of indicator). Record the weight and transfer the weighed material to the final flask or beaker as per requirements, Then reweigh the original weighing butter paper / or receiver by placing it in the same position on the pan  Note- Do not change the set tare of the balance between these two weighings. The difference between the two weights represents the transferred material weight. Dispense weighing is used for weighing of emulsions or viscous liquids such as ointments. Tare the balance (On stabilization of indicator), place the sample container on the balance in the center of the pan in a suitable container (bottle, tube, transfer pipette or syringe) and record the weight (On stabilization of indicator). Transfer the desired amount of material to the final flask or beaker as per requirements, then reweigh the sample container by placing back on the pan of balance [ Note- Do not change the set tare of the balance between these two weighings]. The difference between the two weights represents the transferred material weight. Weighing of liquid and/ or volatile material (which has a low boiling point) shall be done as per procedure defined below. Place the empty receiver (In case of material is highly volatile, add some amount of diluent) on the balance in the center of the pan and press the appropriate tare (Zero) key on the balance (On stabilization of indicator). Add the desired amount of material to the receiver. On stabilization of indicator displayed weight will be transferred material, which should be printed and keep with the raw data. Hygroscopic samples – Good Weighing Practices: Hygroscopic material readily absorbs the moisture from the atmosphere and steadily gain weight. Therefore hygroscopic samples shall either weigh promptly or placed in a vessel with gas-tight closure. For a gas-tight vessel, the analyst shall tare the vessel and enclosure, add the desired amount of sample in the vessel and replace the enclosure and record the weight. The difference between the two weights represents the transferred material weight. Place the empty receiver on the balance in the center of the pan and press the appropriate tare (Zero) key on the balance (On stabilization of indicator). Add the material to the receiver, slowly so maximum require the volume to the vessel. On stabilization of indicator displayed weight will be transferred material, which should be printed and keep with the raw data. Place the empty receiver on the balance in the center of the pan and press the appropriate tare (Zero) key on the balance (On stabilization of indicator). Transferred the approximate required quantity of semi-solid material to the receiver (by touching the inner surface of the receiver ) with the help of a capillary tube or spatula. On stabilization of indicator displayed weight will be transferred material, which should be printed and keep with the raw data. Place the clean and dry glass coverslip on the balance in the center of the pan and press the appropriate tare (Zero) key on the balance (On stabilization of indicator). Transfer approximate required quantity of semi-solid material to the glass coverslip with the help of a capillary tube or spatula. On stabilization of indicator record the displayed weight (Display weight shall be printed and keep with the raw data ) and transfer the glass coverslip directly into the receiver. Equilibrate the sample that is warm or cool in the laboratory to room temperature. As if warm samples weighed then apparent weight is smaller than the true weight because of heat convention. Perform the weighing of the sterile or bio-hazardous samples within the confines of the clean bench, biosafety cabinet, isolator or similar containment device. Airflow within the hood potentially can cause balance instability, so after a balance has been installed under the hood, perform a rigorous qualification study with suitable weight artifacts in order to determine the acceptability of the balanced performance in this environment. Many chemicals, such as salts are corrosive, and material of this nature should not be spilled on the balance pan or inside the balance housing. Take extra care to weigh such type of material. In the event of a spill re-qualification of balance may require, depending on the nature of the spill. The calibration shall consist of the following parameters: Internal adjustments Linearity Sensitivity Repeatability(Uncertainty) Accuracy Internal Adjustment: Calibration Frequency:  Perform on every working day, after a power failure, after any maintenance and relocation of balance. Linearity: Calibration Frequency:  Perform on every working day, after a power failure, after any maintenance and relocation of balance. Sensitivity: Calibration Frequency: Monthly and after any maintenance and relocation of balance. Repeatability (Uncertainty): Calibration Frequency: Monthly and after any maintenance and relocation of balance. Accuracy: Calibration Frequency: Monthly and after any maintenance and relocation of balance. Eccentricity: Calibration Frequency: Monthly and after any maintenance and relocation of balance. If necessary, turn on the power, and allow the balance to equilibrate for at least 30 minutes before proceeding with the calibration. Note : Perform internal calibration, If facility available in balance. Press the key ‘ cal’ given in the front panel of the balance until the display of ‘Cal-int’ is displayed. Release the key. The instrument performs calibration automatically. Wait till the message ‘cal done’ is displayed and Take the print out . if the printer is attached. Sign the printout with the date and paste in the calibration template and complete the entry in Annexure-1. Carry out the Linearity using 200 mg, 100 g, and 200 g weights. Put the external weight of 200 mg on the pan and note the measurement in the Template (Annexure-1). Put the weight 100 g and 200 g on the pan and record the weight in Annexure-1. Deviation NMT ± 0.05% of the actual mass value. Carry out the Sensitivity by using 200 g weights. Put the external weight of 200 g on the pan and note the measurement in the template (Annexure-2). Put the weight 200 g on the pan and record the weight in Annexure-2. Deviation NMT +05% of the actual mass value. Carry out the measurement uncertainty by using 200 mg and 200 g weight. Put the weight of 200 mg on the pan and note the 10 measurements in the Template of measurement uncertainty test (Annexure -2) Calculate the measurement of uncertainty as follows. Standard deviation x 2 Repeatability = ———————————————— Actual weight of the standard weight Note: In case the calculated standard deviation of 10 replicate measurements is smaller than0.41d value then replace the standard deviation value with 0.41d value. Where “ d” is the scale interval (readability ) of the balance. Repeatability should not be more than 0.001 or 0.10% and the measurements should be within ± 10% or 0.0010. of the actual weight Carry out the same procedure for 200 g weight. Carry out full-scale calibration by using 10 g, 100g, and 200 g. Deviation NMT 0.10% of the actual mass value. Take the 100 g weight and weigh 5 times on different places of the pan as shown in figure-1 (when the balance pan is circular) and figure-2 (When the balance pan is square) and record the observation in the Template for Corner test (Annexure-2). Figure-1 Every four readings (other than central reading) should lie in the range of ± 0.05% of central reading and actual mass value of weight. Figure-2 8.0 ANNEXURES FOR BALANCE CALIBRATION: EDITABLE FORMATS DAILY CALIBRATION TEMPLATE (ANNEXURE 1) MONTHLY CALIBRATION TEMPLATE (ANNEXURE 2) WEIGHT BOX STATUS LABEL (ANNEXURE 3) CALIBRATION STATUS LABEL (ANNEXURE 4) Also Visit: Calibration of UV Spectrophotometer February 12, 2022 October 11, 2023 September 13, 2021 1.0 Objective: 1.1 To lay down the procedure for the Operation and Calibration of Analytical Balance (ISHIDA).2.0 Scope: 2.1 This SOP is applicable for the operation and calibration of Analytical Balance in Analytical Development labs.3.0 References: 3.1 In-house4.0 Responsibility:4.1 Executive/Officer Analytical Development Shall be responsible for the operation and calibration of the analytical balance.5.0 Accountability:5.1 AD Manager: For effective implementation of the SOP. 6.0 Procedure:6.1 Operating Instructions:6.1.1 Check the Spirit level of the balance given on the front side of the balance. It should be in the middle position.6.1.2 Balance warm-up time is 5 minutes for the stabilizing purpose after Power supply is “ON”.6.1.3 For Switching On, press the “On/Off” key, and for switching off press the “On/Off” key again from the front panel.6.1.4 After switching ‘On’ the system will initialize and a normal weight display appears.6.1.5 The weight of any container/butter can be tarred by the “zero/Tare” key and the display set to zero. The tarring range encompasses the entire weighing range of the balance. If you wish to tare a container, place this on the weighing pan. Close shield doors. Then press the → zero/Tare ← key to start the tarring process. After completion of the process, the normal weight is displayed on the screen.6.1.6 If a container/butter paper is tarred on the balance when it is unstable, the tarring operation will be shown in the blinked display.6.1.7 After completion of tarring, the zero display appears and balance is ready for operation.6.1.8 Before Operating the Balance check for proper cleaning, Spirit level, and Daily verification as per the procedure. The above steps shall be performed at the beginning of the day or after any power failure, which leads to the shutdown of the balance for a longer time. Keep the balance always in condition for all the working shifts.6.1.9 Place the material and record the weight.6.1.10 After recording the weight, remove the material from pan and tare the weighing balance with the help of → zero/Tare ← key.6.1.11 Care should be taken not to weigh above the given operating range.6.1.12 To change the weighing mg to gram Press and hold the →Function ← key till “1 Set 1” icon displays repeatedly press the “Function” key till displays Then change 1 to 2 by using “zero/Tare” key.6.1.13 For any change then press → zero/Tare ← key and For setting save press → Function ← key and quit from this icon press → Print ← key. 6.2 Cleaning:6.2.1 Disconnect the balance from power supply.6.2.2 Clean the external surface of the instrument using a clean lint-free cloth or soft brush.6.2.3 Only AD analysts shall clean the internal area of the instrument with 70% IPA.6.3 Handling of Weights:6.3.1 Ensure that the weights used are calibrated and certified.6.3.2 Always use forceps to place the weight on the balance pan.6.3.3 Do not drop the weight with force on the pan of the balance, to avoid any variation in the results.6.3.4 Weights used for calibration should be always cleaned with a soft brush and wipewith a clean dry mop before & after each use. 6.4 Daily verification of balance:6.4.1 Weighing Note:6.4.1.1 During operation all the sliding doors of balance shall be properly closed.6.4.1.2 Balance pan and surrounding shall be cleaned on pre and post weighting.6.4.2 For Solid:6.4.2.1 Take the Square pan size butter paper and keep it in the middle of the balance pan and tare the paper.6.4.2.2 Take the required amount of sample to be weighed and close all the sliding doors of balance and take print as gross weight.6.4.2.3 Carefully transfer the material to glassware/pots without strucking the paper and put the butter paper on pan and take weight.6.4.2.4 Subtract the tare weight from the gross weight and get the net weight of the material.6.4.3 For Liquid:6.4.3.1 Put the container with having dry and clean bottom pan and tare the container. (Ensure that container weight is not more than 50% of the maximum weighing capacity of balance).6.4.3.2 Take the required amount of sample in a container to be weighed and close all the sliding doors of balance and take print as net weight and remove the container. Related: Daily Verification of Balance 6.5 Verification:6.5.1 Check the spirit level, if not leveled adjusts the level with the help of spirit level indicator and use leveling screw situated at the base of the instrument.6.5.2 Perform internal calibration by pressing the relative key.6.5.3 Minimum weight for verification range shall be 2000 × standard deviation of uncertainty measurement. Note: In the pharma industry, the general chapters (GC) and of the USP are widely recognized as standards for managing balances, and how a minimum weight is calculated is also stipulated in these chapters.According to the general chapters “Balances”, a balance used for samples that necessitate accurate weighing must becalibrated over the operating range and meet requirements defined for repeatability and accuracy 6.5.4 In case of working range, maximum range shall be about 80% of the balance capacity.6.5.5 Place the standard weight one by one in the center of the platform of the balance and record the observation in “Balance Verification Record” refer to Annexure-II.6.5.6 If balance is moved from one place to another place, calibration shall be performed & verify the balance prior to use6.5.7 If observations are out of tolerance limit, affix the “Under maintenance” label along with sign, and date and discontinue the use of the balance.6.5.8 Inform engineering department or service engineer of corrective action.6.5.9 Acceptance Criteria: Should be not more than 0.1% of reported standard value of respective standard weight or least of the balance whichever is higher. 6.6 Calibration (Monthly): Frequency ± 3 days6.6.1 Following parameters shall be performed while performing calibration• Accuracy• Linearity Test• Uncertainty Measurement• Eccentricity Test 6.6.2 Accuracy:6.6.2.1 Check the accuracy of the balance using standard weight mentioned against the capacity of the balance.6.6.2.2 Place the standard weights one by one in the center of the platform of the balance and record the observation in the balance calibration record as per Annexure III.6.6.2.3 Acceptance Criteria: Should be not more than 0.1% of repeated standard value of respective standard weight or least of the balance whichever is higher.6.6.3 Linearity test:6.6.3.1 Linearity refers to the ability to deliver identical sensitivity throughout the weighing capacity of a balance.6.6.3.2 Put the following weight in the center of the weighing pan of balance as 100 mg, 500 mg, 1g, 5g, 50g, and 200g, and record the observation of each weight.6.6.3.3 Plot a graph of actual weight against observed weight.6.6.3.4 Acceptance Criteria: The correlation coefficient should not be less than 0.999. 6.6.4 Uncertainty measurement:6.6.4.1 Perform uncertainty measurement on 5.0g.6.6.4.2 Weigh selected standard weight 10 times and record the observation in annexure-II6.6.4.3 Calculate mean and standard deviation from the above data.6.6.4.4 Calculate uncertainty for all the selected weights by using the following formula: 6.6.4.5 Acceptance criteria: Uncertainty is satisfaction if 2 × standard deviation divided by the actual mass value, does not exceed 0.10%6.6.4.6 If the standard deviation obtained is less than 0.41d, where’d’ is the scale interval, replace this standard deviation with 0.41d. In this case, uncertainty is satisfaction if 2 × 0.41d, divided by the actual mass value, does not exceed 0.10% 6.6.5 Eccentricity test: 6.6.5.1 Eccentricity usually is expressed as the largest magnitude of any of the deviations between off centers reading for the least load.6.6.5.2 Place standard selected weight (50.0g) centrally on the pan and note down the result =R(1)Place standard at points 2, 3, 4, 5 and note down the result = R (2) .....R (5) 6.6.5.3 Calculation:Subtract value R (1) from following R (2)..... R (5)The maximum deviation of calculated difference is maximum differential centricity error.Example of centricity error differential calculation.Formula E= R (i) – R (1) with E= eccentricity differential errorR (i) = following point indicationR (1) = central location indication. R (1) = 50.0003 gR (2) = 50.0001 g R (3) = 50.0004 g R (4) = 50.0007 g R (5) = 50.0003 g E (2) = 50.0001-50.0003 = -0.0002E (3) = 50.0004-50.0003 = 0.0001E (4) = 50.0007 –50.0003 = 0.0004E (5) = 50.0002-50.0003 = -0.0001 In this case, maximum differential eccentricity error is equal to approx. 0.0008 g. 6.6.5.4 Acceptance criteria: NMT 0.05 %6.6.5.5 Place the weight (30% of balance capacity or possible integer up to 30% of balance capacity as mentioned in the balance calibration record).6.6.5.6 If all the parameters fall within acceptance limit, affix the calibration status label.6.6.5.7 If any observation is out of limit, affix the “under maintenance” tag and discontinue use of balance.6.6.5.8 Inform service engineer or maintenance department of corrective action.6.6.5.9 After corrective action if balance is in working condition, recalibrate the balance prior to starting the activity.6.6.5.10 No repairs shall be done by another person except a qualified maintenance person or service engineer. 7.0 AbbreviationsSOP: Standard Operating ProcedureNo. : NumberDept. : DepartmentAD: Analytical Development% : PercentSD: Standard Deviationg: GramLCD: Liquid Crystal Displaymg: MilligramMin. : MinimumMax. : MaximumIHS: In-house specification 8.0 Annexures:8.1 Annexure I: Analytical Balance Logbook.8.2 Annexure II: Daily Verification Record of Analytical Balance.8.3 Annexure III: Calibration Record of Analytical Balance. Annexure Will be provided shortly Annexure I: Analytical Balance Logbook. Annexure II: Daily Verification Record of Analytical Balance. Annexure III: Calibration Record of Analytical Balance. Panks Pamyal is a Author and Editor at Pharmaguddu.com. He Worked in Top Pharmaceuticals MNCs in India had a more then 10 years experience in Quality control department. He Delivering most valuable insights and knowledge through this website. Analytical Balance SOP covers below points: General instruction for operation of analytical balance Calibration parameters for calibration of analytical balances Daily calibration of Analytical balance: Monthly calibration of Analytical balance: Accuracy check Repeatability (Measurement of Uncertainty) Eccentricity check Off-Center Load Test Calibration format for Daily calibration of Analytical balance: Calibration format for Monthly calibration of Analytical balance: To define procedure for calibration of Analytical Balances. This procedure is applicable for following balances used in Quality Control Department. MakeModel No.CapacityLeast countOperational rangeShimadzuAUW120D42 gm0.01 mg1 mg to 10 gmCitizenCV220220 gm0.1 mg50 mg to 200 gm Quality Control Chemist and above 5.1 OPERATION : General instruction for operation of analytical balances. The initial step to assemble the proper equipment, such as container for weighing, receiving vessels, forceps, spatula of proper size and so forth. Use containers of size such that the loading capacity of the balance is not exceeded. Ensure that the containers selected to receive the weighing material are clean and dry. The balance and the surrounding work area have to be kept neat and tidy. Balance door should be closed to stabilize the scale. Ensure that balance should be kept on vibration free platform. Ensure that air currents are not present on the location where the balance is installed. 5.2 CLEANING Clean the balance platform and display board with dry lint free clean cloth. Wipe the balance with wet lint free clean cloth. Wipe the balance platform with dry free clean cloth. In case of sensitive balance, clean the balance and the pan as per the procedure given below, Remove the dust from pan with smooth nylon brush. Remove the pan from the balance and clean it with wet lint free cloth. Fix the weighing pan properly on the balance. 5.3 CALIBRATION General instruction for calibration of analytical balances. If necessary, turn on the power, and allow the balance to equilibrate for at least 1 hour before proceeding with the calibration. Check the spirit level of the balance; adjust the level with help of mounting screws, if required. Before starting the calibration, standard weight should be kept on balance platform at room temperature for at least 15 minutes to reach thermal equilibrium. Required standard weight shall be kept one by one at the center of the weighing pan. Balance shall be verified daily for minimum, middle and maximum operational range of balance. Do not use any solvents or compressed air for cleaning of the weighing balance. Ensure the cleanliness of the instrument area. Ensure the balance is clean and free from dust. Balance shall be calibrated for the entire operational range of balances. Ensure all the standard weights should be clean. Ensure the balances are calibrated and verified before use. (All the standard weights should be calibrated once in year ± 30 days) Ensure the stamping by the “Weight and Measure controlling authority” once in year ± 30 days. In case of power failure, once the power is resumed, re-verify the balance and then start the further activity as per procedure. If it is required to use the balance for weight which is out of operational range, the balance shall be verified for the same weight before using for that particular weight. The weight displayed should be within limit of tolerance. Use the balance only after rectification/ recalibration. If weight displayed is not within tolerance limit then stop weighing on the balance and label as “Out of Order” and inform to Engineering and QA departments. Out of Order label Daily calibration of Analytical balances: Analytical balances shall be verified daily by using standard weights mentioned as follows; MakeModelStandard weights usedShimadzuAUW120D1 mg, 500 mg, 5 gm & 10 gmCitizenCV22050 mg, 1 gm, 100 gm & 200 gm Acceptance criteria: Observed weights should be within ± 0.10% of actual weight or graduation value (least count) of analytical balance. Place the weight on center of weighing pan. Note down the actual weight observed in daily balance calibration. Write remark after calibration. Make the entry in balance log book. Frequency: Daily once (Once in 24 hrs),  As and when required. Monthly calibration of Analytical balances: Accuracy check Calibrate the balance by using the following all different weights from standard calibrated weight box and note  down the observed weight in calibration protocol. MakeModelStandard weights usedShimadzuAUW120D1 mg, 5 mg, 20 mg, 50 mg, 100 mg, 200 mg, 500 mg, 1 gm, 5 gm & 10 gmCitizenCV22050 mg, 200 mg, 500 mg, 1 gm, 5 gm, 10 gm, 20 gm, 50 gm, 100 gm & 200 gm. Acceptance criteria: Observed weights should be within ± 0.10% of actual weight or graduation value (least count) of analytical balance. Repeatability (Measurement of Uncertainty) Place the standard weight on the center of the pan and record the observed weight in calibration protocol. Repeat the same procedure for another 9 times. Determine the standard deviation (σ) of ten replicate weighing. Calculate the Repeatability (Measurement of uncertainty) by the formula; Repeatability  (Measurement of Uncertainty) = 2 x σ  / Standard weight Where σ is standard deviation. Repeat above steps for other defined standard weights. Standard weights for Repeatability for analytical balances are as follows; MakeModelStandard weights usedShimadzuAUW120D1 mg, 500 mg, 5 gm & 10 gmCitizenCV22050 mg, 1 gm, 100 gm & 200 gm Acceptance criteria: The Repeatability (Measurement of Uncertainty) should be less than or equal to 0.10%. Eccentricity check Place the standard weight on the center of the pan and record the observed weight in calibration protocol. Repeat the same by keeping the weight on four different corner positions. (i.e., front, rear, left and right) and check the deviation from the center. Repeat above steps for other defined standard weights. Standard weights for Eccentricity check for analytical balances are as follows; MakeModelStandard weights usedShimadzuAUW120D1 mg, 500 mg, 5 gm & 10 gmCitizenCV22050 mg, 1 gm, 100 gm & 200 gm Acceptance criteria: Observed weight of corners should not exceed ± 0.10% from center position. Off-Center Load Test Place the standard weight on the center of the pan (Location A) and record the observed weight in calibration protocol. (Figure-1) Without lifting move the standard weight between the center (Location A) and rear edge of the platform (Location B) & record the reading. Without lifting move the standard weight halfway between the center (Location A) and front edge of the platform (Location C) & record the reading. Without lifting move the standard weight halfway between the center (Location A) and left edge of the platform (Location D) & record the reading. Without lifting move the  standard weight halfway between the center (Location A) and right edge of the platform (Location E) & record the reading. Standard weights for Off-Center Load Test for analytical balances are as follows; MakeModelStandard weights usedShimadzuAUW120D1 gmCitizenCV22050 gm Acceptance criteria: Observed weight of corners should not exceed ± 0.05% from center location. Take entry of monthly calibration in respective balance log book. AbbreviationExpanded formgmGrammgMilligram%PercentagehrsHoursQAQuality Assurance Annex. No. Title01Daily Calibration Record – Analytical Balance02Monthly Calibration Record – Analytical balance  USP 42 NF 37, Chapter No. and END OF THE SOP ANNEXURES : Annex. No. 01 Daily Calibration Record – Analytical Balance Annex. No. 02 Monthly Calibration Record – Analytical balance