 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	1 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

## 1.0 PURPOSE:

To describe the Operation and Calibration of Analytical balance.

## 2.0 SCOPE:

This procedure is applicable to the following Analytical balance in Quality control Laboratory at Discovery.

Make : Citizen.

Model : CY204

ID No. : DIPL/QC/INS/AB/001

## 3.0 RESPONSIBILITY:

3.1 Analyst-QC is responsible to follow this SOP.

3.2 Head-QC/Designee is responsible for ensuring implementation of this SOP.

3.3 Head-QA/Designee is responsible for monitoring overall compliance of this SOP.

## 4.0 DEFINITIONS:

Nil.

## 5.0 PROCEDURE:

### 5.1 OPERATING PROCEDURE

5.1.1 Ensure that the balance and its surroundings are clean.

5.1.2 Clean the weighing pan with a small camel hair brush or its equivalent.


5.1.3 Adjust the bubble level available on the front side of the instrument to the specified center by rotating the adjustable screws provided at the bottom (front side) of the instrument.

5.1.4 Switch on the instrument and wait for “0.0000” display

5.1.5 Keep the sample bottle /weighing paper on weighing pan and close all the doors of the balance.

5.1.6 Balance will display the weight.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	2 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

5.1.7 Press TARE button.

5.1.8 Transfer required quantities to sample bottle/weighing paper and note down the value. In-case of weighing paper, subtract the quantity of sample left over on it after transferring the sample to respective glassware/equipment.

5.1.9 Enter the details of usage in Equipment usage log book.

5.1.10 To convert grams to milligrams press the function key once. Similarly to convert milligrams to grams press the function key thrice.

## 5.2 CALIBRTION PROCEDURE :

5.2.1 The analytical balance shall be calibrated daily and monthly. Daily performance check shall cover Accuracy check while monthly calibration shall be done in full length covering Accuracy, Uncertainty and Eccentricity.

5.2.2 Calibration (daily/monthly) shall be performed in “A” shift between 06:00 hrs and 07:00 hrs.

### **Schedule:**

- a) Internal Calibration and Daily performance check : Daily.
- b) Monthly performance check : Once in a month.
- c) Measurement Uncertainty : Every one month
- d) Measurement Eccentricity : Every one month


## 5.2.3 DAILY PERFORMANCE CHECK:

### 5.2.3.1 Internal calibration:

5.2.3.1.1 Press “CAL” Key. Push C will be displayed. Again press “CAL”.

5.2.3.1.2 The balance performs the calibration automatically. After calibration END will be appeared. During this calibration do not load the pan.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	3 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

5.2.3.1.3 After this process the balance records the results of the calibration in the memory and returns to weighing mode.

5.2.3.1.4 Internal calibration should be performed prior to performance check

#### 5.2.4 Daily performance check:

5.2.4.1 Once the internal calibration is completed, proceed for Performance check.

5.2.4.2 Use the calibrated mass weights of 200 gm, 50 gm, 10 gm, 1 gm, 200 mg, 100 mg for accuracy check of the analytical balance.

5.2.4.3 The observed weights shall be recorded as per format no.QC 047/F02

#### 5.2.5 MONTHLY PERFORMANCE CHECK:

5.2.5.1 Monthly performance checks to be conducted by the calibrated mass weights. Prior to monthly calibration check, internal calibration to be carried out as mentioned in 6.2.3.1

5.2.5.2 Use the calibrated mass weights of 200 gm, 100 gm, 50 gm, 10 gm, 5 gm, 2 gm, 1gm, 500 mg, 200 mg, 100 mg for the performance analytical balances.

5.2.5.3 The observed weights shall be recorded as per format no. QC 046/F03


#### 5.2.6 MEASUREMENT OF UNCERTAINTY:

5.2.6.1 Use the 100 mg, 1 gm and 200 gm standard weights for the uncertainty check of the analytical balance.

5.2.6.2 Tare the balance and keep the 100 mg weight at randomly selected places preferably at the center of the pan for 10 times.

5.2.6.3 The same exercise shall be repeated for 1 gm as well as 200 gm certified weights.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	4 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

5.2.6.4 Record the readings as per format number QC047/F04

5.2.6.5 The uncertainty shall be calculated by using the below formula

$$\text{Standard deviation} = \sqrt{\frac{\sum(X_i - \bar{X})^2}{n - 1}}$$

Where

$n$  = total number readings (10 readings).

$X_i$  = Individual reading

$\bar{X}$  = Mean of 10 readings

5.2.6.6 Calculate the Measurement Uncertainty (manual or through computer) as follows.

$$\text{Measurement Uncertainty} = \frac{2 \times \text{Standard deviation}}{\text{Calibrated mass weight}}$$

#### 5.2.7 MEASUREMENT OF ECCENTRICITY:


5.2.7.1 Use 100 mg and 5 gm standard weights for the eccentricity check of the analytical balance.

5.2.7.2 Place 100 mg certified weight at the center point A of the balance pan and record the displayed weight.

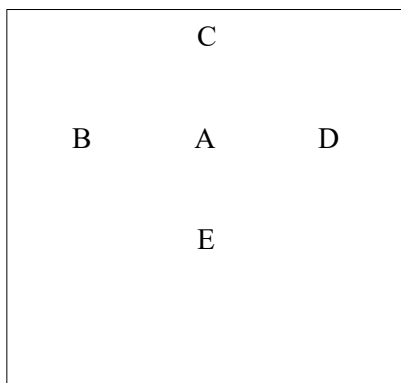
5.2.7.3 Further place the same weight at the points B, C, D and E and record the displayed weights accordingly.

5.2.7.4 Repeat the weighing as above by placing 5 gm certified weight.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	5 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

5.2.7.5 Record the readings as per format number QC 047/F05.



#### 5.2.8 EXTERNAL PERFORMANCE CHECK:

Standard weights calibration can be done once in a year by the external (Govt.) certified laboratory like ETDC (Electronics testing & development centre).

#### 5.2.9 ACCEPTANCE CRITERIA :

5.2.9.1 Measurement Uncertainty and Eccentricity (Once in a month):  $\pm 0.1\%$

5.2.9.2 Daily and Monthly Performance Check:  $\pm 0.1\%$  (for milligrams & grams).

#### 5.2.10 IN CASE PERFORMANCE CHECK FAILS :

If performance check is failed, call the service engineer and hold “**Under Maintenance**” status. Failure information shall be captured in Instrument history card.


#### 5.3 PRECAUTIONS:

The following precautions shall be taken while handling the analytical balance.

5.3.1 Analytical balance shall be connected with uninterrupted power supply (UPS).


5.3.2 Analytical balance shall be placed on non-vibrating surface.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	6 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

- 5.3.3 The spirit level of the analytical balance shall be at centre.
- 5.3.4 Analytical balance shall be placed in such a way that the air flow velocity does not disturb the balance. (Close the doors observe fluctuations and confirm).
- 5.3.5 When an analytical balance is moved, it must be allowed to attain the temperature of its new environment and shall be recalibrated.
- 5.3.6 An analytical balance shall always be in switched ON condition. If switched off, allow it to stabilize for about 1 hour before proceeding to calibration.
- 5.3.7 Do not allow the material to remain on the balance for an extended period of time as it may catch moisture from atmosphere and may cause analytical errors.
- 5.3.8 Corrosive chemicals like NaOH shall be weighed in glass apparatus and not on butter paper
- 5.3.9 Always use correct size of butter paper so that it does not go beyond balance pan.
- 5.3.10 Tare the balance to zero after the completion of weighing. Clean the pan and leave the area around the pan clean.
- 5.3.11 Do not overload balance beyond the maximum capacity.
- 5.3.12 Ensure that the top/ side doors are firmly closed during weighing operation.
- 5.3.13 The proper receiver for the material must be selected. The receiver's weight plus the weight to be measured must not exceed the maximum load for the balance; the size and shape of the receiver should permit it to fit into the space. It is important that the receiver be clean and dry. Common receivers are weighing bottles, weighing funnels, flasks, and weighing paper.
- 5.3.14 The balance should be tested using weights traceable to standardization by the National Institute of Standards and Technology.
- 5.3.15 All standard weights can be cleaned by wiping with a lint-free cloth moistened with a small amount of an appropriate solvent such as diethyl ether.

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Checked by</b>
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	7 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

5.3.16 The calibrated and certified weights shall be carefully handled with the stainless steel forceps. The operator should avoid touching weights by naked hands as to ensure accuracy of the weight. If required suitable non fiber releasing hand gloves shall be used.


## 6.0 FORMATS / ANNEXURE(S):

- 6.1 Analytical balance Daily performance check record : QC010-FM0
- 6.2 Analytical balance uncertainty test record : QC010-FM0
- 6.3 Analytical balance eccentricity test record : QC010-FM0
- 6.4 Analytical balance monthly calibration record : QC010-FM0
- 6.5 Analytical balance Usage Log book : QC010-FM0

## 7.0 CHANGE HISTORY:

Revision No.	Effective Date	Details of Revision	Ref CCF No.
00	01.06.2007	New SOP introduced "Operation and calibration of analytical balance".	--
01	01.08.2009	In the SOP Formats change with more clear and clarity	--
02	01.12.2010	In this SOP incorporate Eccentricity test for analytical balance.	--
03	01.01.2012	In this SOP introduce the outside calibration values in place of normal standard weights values for weighing balance.	--
04		1. Formats removed from SOP 2. Periodical calibration frequency change month to 4 months	--

	Prepared by	Reviewed by	Checked by
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			

 Discovery Labs	<b>STANDARD OPERATING PROCEDURE</b>			
	SOP No.:	SOP-QC-010-05	Effective Date:	01.01.2017
	Supersedes:	QC-010-04	Next Review Date:	31.12.2019
	Department:	Quality Control	Page:	8 of 8
<b>TITLE: OPERATION AND CALIBRATION OF ANALYTICAL BALANCE</b>				

Revision No.	Effective Date	Details of Revision	Ref CCF No.
05	01.01.2017		

	Prepared by	Reviewed by	Checked by
<b>Sign &amp; Date</b>			
<b>Name</b>	A.Navya	S.Prasad	Ch.Mahendar Reddy
<b>Department</b>			