STANDARD OPERATING PROCEDURE	
Department: Quality Assurance	**SOP No.:**
Title: Performance Verification of Calculator and Excel Sheet	**Effective Date:**
Supersedes: Nil	**Review Date:**
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1.0   OBJECTIVE:

To lay down a Procedure for Performance verification of Calculator and Excel sheet validation.

2.0   SCOPE:

This SOP is applicable for Performance verification of Calculator and Excel sheet validation in Quality Assurance Department at ……………..

3.0   RESPONSIBILITY:

QA (Officer/Executive): Preparation, Distribution (to Respective Department), Revision, Retrieval and Destruction of this SOP.

QA Manager: Review, Approval, Training and effective implementation of this SOP in all the applicable areas.

4.0   ACCOUNTABILITY:

Head QA: Authorization of this SOP & ensure Training and effective Implementation of SOP.

5.0   DEFINITION:

5.1   NA

6.0   PROCEDURE:

6.1   Performance verification of Calculator:

➢ Before using any new calculator Identification No. shall be allocate and subsequent Performance verification shall be check.

➢ Identification No. for calculator shall be provide by as per Instrument list.

➢ Verify for addition in calculator by using numeric key $2 + 2 = 4$,

➢ Verify for substraction in calculator by using numeric Key $5-2 = 3$,

➢ Verify for Multiplication in calculator by using numeric Key $4 \times 6 = 24$,

➢ Verify for Division in calculator by using numeric Key $8/2 = 4$,

➢ Verify for percentage in calculator by using this formula $(5/20) \times 100 = 25\%$,

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- Verify for Under root in calculator by using this formula $\sqrt{64} = 8$
- Verify for log in scientific calculator by using standard log table : Log 10 = 1
- Verify for Antilog in scientific calculator by using standard log table : Antilog 1 = 10
- Note down Performance check of calculator in **Annexure-I.**
- If the results are found satisfactory after Performance verification, allocate the Identification No. to the calculator and maintain it.
- Maintain calculator issuance Record as per **Annexure-II**.
- If the results are found unsatisfactory after Performance verification the calculator will be rejected and record shall be maintained as per **Annexure-II**.
- If any unsatisfactory results are given by the calculator during use, it shall be rejected and record shall be maintained as per **Annexure-II**.
- Re-performance Verification of calculators shall be done at an interval of two year and after each maintenance.

6.2   Performance validation of Excel sheet:

- Before using of Excel sheet it shall be validate for its calculation and allocate Identification No. and subsequent Performance check.
- Verify for addition in Excel sheet by using Formula bar 2 + 2 = 4 ,
- Verify for Substraction in Excel sheet by Formula bar 5-2 = 3,
- Verify for Multiplication in Excel sheet by using Formula bar 4 * 6 = 24,
- Verify for Division in Excel sheet by using Formula bar 8 / 2 = 4,
- Verify for percentage in Excel sheet by using this formula bar (5 / 20) X 100 = 25%,
- Verify for Square root in Excel sheet by using this formula $\sqrt{64} = 8$
- Verify the RSD in Excel sheet by using formula bar STDEV *100/Average for 9%, 2%, 5%, 4%, 12%, 7% = 55.677
- Following formula shall be use for Manual RSD Calculation :
- Formula for STDEV =

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}$$

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Where:

S　　=　　Standard Deviation

x_i　　=　　Individual Value

$\overline{x}$　　=　　Mean Value

N　　=　　Number of Value

Note: Calculate STDEV individual by above formula then add total value divide by (N-1) then take sqrt.

➢ For RSD = S x 100/Mean

➢ Record the data of Excel sheet validation in **Annexure-III**.

➢ If the results of Excel sheet found satisfactory after Performance check, allocate the Identification No. to the computer and maintain it

➢ If the Excel sheet is found unsatisfactory after validation, the Excel sheet will be rejected for calculation.

➢ If Excel sheet given any unsatisfactory results during use, it shall be rejected for calculation.

➢ Re-performance Verification of Excel sheet shall be done at an interval of two year and after each maintenance.

➢ Computer ID shall be generated by IT department.

7.0 ABBREVIATIONS:

SOP　　　　　　Standard Operating Procedure
QA　　　　　　Quality Assurance
Pvt.　　　　　Private
Ltd.　　　　　Limited

8.0 ANNEXURES:

ANNEXURE No.	ANNEXURE TITLE	FORMAT No.
Annexure-I	Calculator Performance Verification Record.	
Annexure-II	Calculator Issuance/Rejection Record	
Annexure-III	Excel sheet validation Record	

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9.0   DISTRIBUTION:

- Controlled Copy No. 01   Head Quality Assurance

- Master Copy   Quality Assurance Department

10.0   REFERENCES:

10.1   NA

11.0   REVISION HISTORY:

Revision No.	Change Control No.	Details of Changes	Reason of Changes	Effective Date	Done By
00	Not Applicable	Not Applicable	New SOP		

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ANNEXURE-I

CALCULATOR PERFORMANCE VERIFICATION RECORD

Calculator ID No.:

Make: **Model :**

Key functions	Results				
Digits Display					
Key Performance (1 to 9, 0, 00 and Decimal)					
Sign Key					
Auto Replay					
Performance of Memory Keys					
Verified For Function	**Puzzle**	**Actual Result**	**Result Given By Calculator**	**Done by**	**Checked by**
Addition	2 + 2 =				
Substraction	5 – 2 =				
Multiplication	4 X 6 =				
Division	8 / 2 =				
%	(5 / 20) X 100 =				
√ (Square Root)	√64 =				
Actual result for Log and Antilog taken from Standard log table.					
Log	Log 10				
Antilog	Antilog 1				
Limit : All result given by calculator shall be match with actual result.					
Remark : Performance verification of the calculator was found satisfactory / unsatisfactory.					
Approved by: Sign./Date					

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ANNEXURE-II

CALCULATOR ISSUANCE/REJECTION RECORD

Calculator ID. No.	Issued to	Issued On	Issued By	Received By	Retrieved By/Date	Rejected By	Remarks

Approved by: Sign/Date

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ANNEXURE-III

EXCEL SHEET VALIDATION RECORD

Computer ID No.:

Make: **Model:**

Key functions	Results
Digits Display	
Key Performance (1 to 9, 0 and Decimal)	
Sign Key	

Verified for function	Puzzle	Result given by calculator	Result Given By Excel sheet	Done by	Checked by
Addition	2 + 2 =				
Substraction	5 – 2 =				
Multiplication	4 X 6 =				
Division	8 / 2 =				
%	(5 / 20) X 100 =				
√ (Square Root)	√64 =				
%RSD	9%, 2%, 5%, 4%, 12%, 7% =				

➤ Formula for STDEV =

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}$$

Where:

S   =   Standard Deviation

x_i =   Individual Value

$\overline{x}$ =   Mean Value

N   =   Number of Value

Note : Calculate STDEV individuel by above formula then add total value divide by (N-1) then take sqrt.

For RSD =   S x 100/Mean

Limit : All result given by excel sheet shall match with calculator result.

Remark : Excel sheet validation of the computer is found satisfactory / unsatisfactory.