



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 subtraction 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 : $\text{Log } 10 = 1$
- Verify for Antilog in scientific calculator by using standard log table : $\text{Antilog } 1 = 10$
- 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 Subtraction 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 $(5 / 20) * 100 = 25\%$,
- Verify for Square root in Excel sheet by using this formula $\sqrt{64} = 8$
- Verify the RSD in Excel sheet by using formula bar $\text{STDEV} * 100 / \text{Average}$ for 9%, 2%, 5%, 4%, 12%, 7% = 55.677
- Following formula shall be use for Manual RSD Calculation :
- Formula for STDEV =

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



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Where:

S = Standard Deviation

x_i = Individual Value

\bar{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 = $S \times 100/\text{Mean}$
- 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	$4 \times 6 =$				
Division	$8 / 2 =$				
%	$(5 / 20) \times 100 =$				
$\sqrt{\quad}$ (Square Root)	$\sqrt{64} =$				
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 =

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

Where:

- S = Standard Deviation
- x_i = Individual Value
- \bar{x} = Mean Value
- N = Number of Value

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

For RSD = S x 100/Mean

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

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