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Title	Analytical Method Validation Report For test of Dissolution of Gliclazide in Gliclazide and Metformin Hydrochloride Sustained Release Tablets
Report No.	ST/AMVDGR/23/022

ANALYTICAL METHOD VALIDATION REPORT FOR THE TEST OF DISSOLUTION OF GLICLAZIDE IN GLICLAZIDE AND METFORMIN HCL SUSTAINED RELEASE TABLETS (GLIDE-M 60/500 AND 60/850)

Site Address: GENERIC HEALTHCARE PRIVATE LIMITED
Plot No.A-67 to 72, PIPDIC Electronic Park,
Thirubuvanai, Puducherry-605 107

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1.0 INDEX

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2.0 REPORT APPROVAL SHEET

PREPARED BY		
Name	:	S. SANTHI
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Signature	:	
Date	:	17/10/23
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Date	:	19/10/23

Effective Date	:	21/10/2023

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3.0 OBJECTIVE

To validate the method for test of Dissolution of Gliclazide in Gliclazide and Metformin Hydrochloride Sustained Release tablets by HPLC.

4.0 GENERAL INFORMATION

REFERENCE : In-House

TYPE OF VALIDATION : Validation of non-pharmacopoeial method

TEST TO BE VALIDATED : Dissolution of Gliclazide in Gliclazide and Metformin Hydrochloride Sustained Release tablets

COMPOSITION : This Validation Report is applicable for both strength

Each Uncoated bilayered Sustained Release tablet contains:

Content	Strength
Gliclazide BP	60mg
Metformin Hydrochloride BP	500mg and 850mg

BATCH NO : G17230801, G1722093

SPECIFICATION LIMIT :

Time intervel	Limit
2nd Hour	NMT 25.0%
5th Hour	Between 30 – 60%
12th Hour	NLT 70%

VALIDATION STUDY : QC-Laboratory, Generic Healthcare Private Limited, Puducherry-605107

VALIDATION TEAM : 1. C.K.Saravanan

2. S.Bhavyasri

3. E.Meena

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5.0 DETAILS OF STANDARD,SAMPLES AND PLACEBO TO BE USED

Mention the name and Batch No., Potency of the reference/working std., test samples/placebo to be used during Validation.

NAME OF THE MATERIAL	ID NO/BATCH NO	POTENCY/PURITY
Sample	B.No: G17230801 G1722093	Not applicable
Plain Placebo	B.No: NA	Not applicable
Working standard Gliclazide BP	WS. No: ST/WS/22/040	100.0% (As is basis)
Metformin Hydrochloride BP	WS. No: WS/MEF/22/01	100.2% (As is basis)

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6.0 DETAILS OF INSTRUMENTS/EQUIPMENTS, COLUMN, SOLVENTS AND CHEMICALS TO BE USED :

INSTRUMENTS/EQUIPMENTS :

High performance liquid chromatograph with PDA detector

Make : Shimadzu, Model : LC-2050C 3D Prominence i

High performance liquid chromatograph with UV detector

Make : Shimadzu, Model : LC-2050C Prominence i

Analytical Balance:

Make : Sartorius, Model : Quintix-125D-1OIN

Dissolution:

Make : Electro lab, Model No : EDT-14LX

Make : Electro lab, Model No : EDT-08LX

pH:

Make: Eutech instruments, Model No: PH 700

COLUMN :

Kromasil 100-C18 ,250 mm X 4.6 mm, 5µm (or) equivalent

SOLVENTS AND CHEMICALS WITH GRADE :

Gliclazide (Working standard)

Potassium Di-hydrogen orthophosphate (AR grade)

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Dipotassium hydrogen orthophosphate (AR Grade)

Disodium hydrogen orthophosphate (AR grade)

Orthophosphoric acid (AR grade)

Methanol (HPLC grade)

Acetonitrile (HPLC grade)

Purified Water (Milli-Q water (or) equivalent)

Sodium hydroxide (AR grade)

Sodium Chloride (AR grade)

7.0 DESCRIPTION OF ANALYTICAL METHOD

Dissolution parameters:

Apparatus	:	USP Apparatus II (Paddle) with sinker
Volume	:	900 mL
Dissolution medium	:	Phosphate buffer pH 7.4
Speed	:	100 rpm
Temperature	:	37.0±0.5°C
Time	:	2nd, 5th and 12 Hours

Chromatographic Conditions:

Column	:	Kromasil 100-C18 ,250 mm X 4.6 mm, 5µm (or) equivalent
Wave length	:	228 nm
Column Temperature	:	Ambient

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Flow Rate	:	1.0 mL/min
Injection Volume	:	20 µL
Run time	:	12 Minutes

Buffer Preparation:

Weigh accurately about 2.96gm of Potassium dihydrogen orthophosphate and 0.54gm of Dipotassium hydrogen orthophosphate in 1000 ml glass beaker. Add about 500 ml of water, shake and sonicate to dissolve completely and finally make the solution 1000 ml with water.

Preparation of Mobile phase:

Mix 550 ml of buffer solution and 450 ml Acetonitrile, adjust the pH 6.85±0.05 using Orthophosphoric acid. Filter through 0.20micron membrane filter, sonicate and degas.

Preparation of Phosphate buffer (pH = 7.4): (Dissolution medium)

Weigh accurately about 23.8gm of disodium hydrogen orthophosphate, 1.9 gm of Potassium dihydrogen orthophosphate and 80gm of Sodium Chloride in 500ml with water, shake and sonicate to dissolve completely and finally make the solution to 10 liters of water. Adjust pH to 7.4 using 0.5 M Sodium Hydroxide solution.

Preparation of Standard solution:

Weigh accurately and transfer about 66 mg of Gliclazide working standard into 100ml volumetric flask. Add about 5 ml of Methanol, sonicate to dissolve and dilute up to mark with dissolution medium and mix. Further dilute 5 ml of this solution to 50 ml with dissolution medium and mix well. (**Concentration:**0.066mg/ml of Gliclazide)

Preparation of Sample solution:

Place the stated volume of dissolution medium of each vessels of the dissolution apparatus. Warm the dissolution medium at 37°C ± 0.5°C. Transfer 1 tablet in to each vessel. Immediately operate the apparatus at specified speed. At the end of specified time interval, withdraw 10 ml of aliquot from each specimen. Filter sufficient quantity of this solution through 0.45micron, PVDF syringe filter and inject. **(Concentration**:0.066mg/ml of Gliclazide).

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(After withdrawing aliquot at each interval, then add same volume of dissolution medium to maintain 900 ml volume in dissolution vessel)

(Aliquot withdrawal position: - from the mid-way zone between the top surface of dissolution medium and top of rotating paddle and 1 cm away from vessel wall.)

Procedure:

Equilibrate the chromatographic system with mobile phase till a stable baseline is obtained. Separately inject equal volumes (20 µl) of solutions as per Sequence of injections into the chromatograph and record the peak area responses for the major peaks and check for the System suitability requirements.

Injection sequence:

S. No	Sample Name	No. of injections
1	Dissolution medium- (Blank)	1
2	Standard solution	5
3	Sample solution	6
4	Standard solution (Bracketing standard)	1 Each after every 6 sample injection

System suitability:

1) The tailing factor for the peak of Gliclazide obtained with standard solution should not more than 2.0.

2) The column efficiency for the peak of Gliclazide obtained in the chromatogram of Standard solution should not less than 2000.

3) The % RSD for the retention time of Gliclazide peak obtained with the replicate injections of standard solution should not more than 1.00

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4) The % RSD for the peak area response of Gliclazide peak obtained with the replicate injections of standard solution should not more than 2.00

5) The % RSD for the retention time of Gliclazide peak obtained with the replicate injections of standard solution and bracketing standard solution should not more than 1.00

6) The % RSD for the peak area response of Gliclazide peak obtained with the replicate injections of standard solution and bracketing standard solution should not more than 2.00

Calculations:

Calculate % drug release of Gliclazide as follows:

$$= \frac{AT}{AS} \times \frac{WS}{100} \times \frac{5}{50} \times \frac{900}{1} \times \frac{P}{100} \times \frac{100}{LC} + D$$

Where,

AT	=	Peak area response of Gliclazide peak obtained with sample solution.
AS	=	Average peak area response of Gliclazide peak obtained with replicate injections of standard solution
WS	=	Weight of Gliclazide working standard in mg.
P	=	Potency of Gliclazide working standard in % on as such basis.
LC	=	Label claim of Gliclazide in mg/tablet.
D	=	Sum of correction factor for all previous time points.

Calculation for correction factor:

Calculate the correction factor (CFn) at each time point by using the following formula.

$$CFn = \frac{Dn}{900} X10$$

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Where,

Dn = % Labeled amount of Gliclazide Dissolved at respective time point.

Calculation for corrected results:

For 2nd Hour = D2
For 5th Hour = D5+CF1
For 12th Hour = D12+CF2+CF1

8. VALIDATED PARAMETERS :

Following parameters shall be selected for validation	
Sr. No.	**VALIDATION PARAMETER**
1	**System suitability**
2	**Specificity (Selectivity)** i) Interference from blank and Placebo
3	**Linearity and Range**
4	**Accuracy (Recovery)**
5	**Precision** i) System precision ii) Method precision iii) Intermediate Precision
6	**Stability of analytical solution**
7	**Filter paper study**
8	**Robustness**

Note: More than one parameter may be performed at once with relevant sequence having common system suitability with bracketing preparation.

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9.0 VALIDATION RESULTS :

9.1 SYSTEM SUITABILITY TEST:

Study Design:

Five replicate of standard preparation are injected into HPLC and following system suitability parameters are evaluated.

1) Theoretical plate for Gliclazide peaks.

2) Tailing Factor for Gliclazide peaks.

3) % RSD of area of five replicate standard injections

Results are tabulated in Table 1.

Table 1: System suitability

System Suitability Parameter	Limit	Gliclazide
Theoretical Plates	NLT 2000	14026
Tailing Factor	NMT 2.0	0.927
% RSD	NMT 2.0	0.016

Result and Conclusion:

The results are well within the acceptance criteria and the study concludes the suitability of analytical system for the analysis.

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9.2 SPECIFICITY (SELECTIVITY)

9.2.1 Interference from Blank and Placebo

Study Summary:

Blank, standard, placebo, placebo spiked with analyte and sample are analyzed as per the method to examine the interference of placebo and blank with Gliclazide peaks.

Peak purity of the analyte peak and the representative chromatograms of blank, standard, placebo, placebo spiked with analyte.

Results are tabulated in Table 2.

Acceptance criteria:

1) There should not be any interference due to blank and placebo peak with analyte.

2) Peak purity of analyte should be pass. (Peak purity value should not less than 0.995) by lab solution software.

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Table 2: Specificity

Sr.No	Sample ID	Compound Name	Retention time	Peak Purity index
1	Blank	Blank peaks	Not applicable	Not applicable
2	Standard preparation	Gliclazide	9.213	1.000
3	Blank	Blank peaks	Not applicable	Not applicable
4	Gliclazide Working standard	Gliclazide	9.215	1.000
5	Metformin Hydrochloride working standard	Metformin	2.033	1.000
6	Blank	Blank peaks	Not applicable	Not applicable
7	Plain placebo for Glide-M 60/500	Placebo peaks	Not applicable	Not applicable
8	Plain placebo for Glide-M 60/850	Placebo peaks	Not applicable	Not applicable
9	Plain placebo with Gliclazide WS	Gliclazide	9.22	1.000
10.	Plain placebo with Metformin HCL WS	Metformin	2.04	0.995
11.	Plain placebo + Gliclazide WS+ Metformin HCL WS	Gliclazide	9.218	0.987
		Metformin	2.037	0.995
12.	Blank	Blank peaks	Not applicable	Not applicable
13.	Test preparation for Glide-M 60/500 B.No: G1722093	Gliclazide	9.215	0.994
		Metformin	2.053	0.999
14.	Test preparation for Glide-M 60/850 B.No: G17230801	Gliclazide	9.219	0.999
		Metformin	2.064	0.991

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Results and Conclusion:

From the Blank and Placebo peaks are not interfere with Principal peak in sample preparation and Peak purity passes within specified limits. Hence method is selective and specific.

9.3 LINEARITY AND RANGE:

Study Summary:

Analytical solutions for Gliclazide Working standard are prepared over the range of 10% to 150% concentration with respect to target concentration (i.e. 10%, 25%, 50%, 75%, 100%, 125% and 150%). Replicate injections of these solutions are injected and checked for Linearity and Range.

The results are tabulated in Table 3 for Linearity and Table 4 for Range.

Acceptance criteria:

1) The squared correlation coefficient should not be less than 0.995.

2) % RSD for peak areas of linearity levels 10%, 25%, 50%, 75%, 100%, 125%& 150% should not be more than 2.0 for Gliclazide peaks.

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Table 3: Linearity Table for Gliclazide

Linearity Levels (%)	Conc. In ppm (X- axis)	Avg. Area (Y- axis)
10%	6.602	286859
25%	16.505	714963
50%	33.010	1434481
75%	49.515	2155408
100%	66.020	2871915
125%	82.525	3600702
150%	99.030	4278481
Slope		43367
CC		1.000
Sqaured R		0.9999
Intercept		3628.8

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Fig. : Liner Graph for Gliclazide

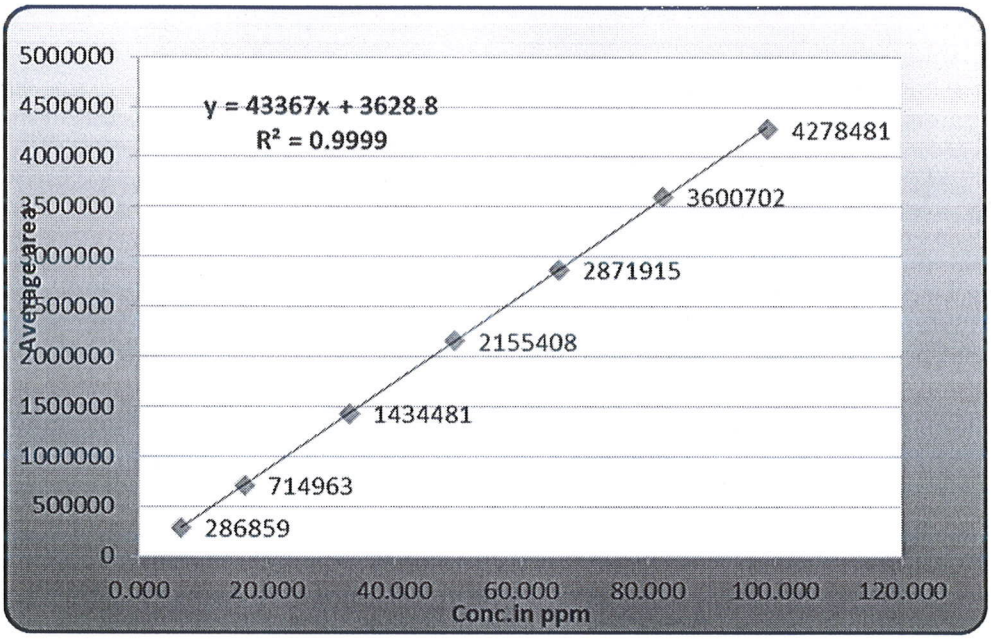

Table:4 Range for Gliclazide

Linearity Levels (%)	Gliclazide
10%	0.034
25%	0.028
50%	0.111
75%	0.038
100%	0.098
125%	0.022
150%	0.039

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Result and Conclusion:

Squared correlation coefficient and Range, %RSD of areas at 10%, 25%, 50%, 75%, 100%, 125 & 150% levels within limits.

9.4 ACCURACY STUDY (RECOVERY STUDY)

Study Design:

Known quantity of Gliclazide working standard are spiked with placebo at three different levels (at level of 5%, 50%, 100% and 150% of targeted concentration).

Prepared the recovery samples in triplicate for each level and inject only one injection for each sample. The samples are analyzed as per the proposed method. The results are tabulated in Table 5 for Gliclazide respectively to demonstrate the accuracy of the method.

The mean % recovery at each level for Gliclazide should be 95.0 to 105.0.

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Table 5: Accuracy for Gliclazide

Recovery level	Sample No.	% Recovery	Mean	% RSD
5%	1	101.21	101.11	0.083
	2	101.04		
	3	101.09		
50%	1	98.05	98.05	0.031
	2	98.08		
	3	98.02		
100%	1	100.99	101.01	0.028
	2	101.00		
	3	101.05		
150%	1	98.38	98.38	0.011
	2	98.39		
	3	98.37		

Result and Conclusion:

All the results are well within the acceptance criteria and results indicate that the method is accurate and precise.

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9.5 PRECISION:

9.5.1 SYSTEM PRECISION

Study design:

Five replicate injections of standard preparation are injected into the HPLC system. The area response for Gliclazide Peaks along with % RSD are tabulated in Table 6.

Acceptance criteria:

% RSD of area of analyte peak in five replicate standard injections should not be more than 2.0 at final time point.

Table 6: System precision

Injection No.	Gliclazide
1	2862162
2	2861345
3	2861167
4	2861959
5	2861262
Mean	2861579
% RSD	0.016

Results and Conclusion:

The results are well within the acceptance criteria and the % RSD observed for the replicate injections indicates the precision of HPLC system used.

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9.5.2 Method Precision:

Study Design:

Six Dissolution preparations of sample are analyzed as per the method. The Dissolution of Gliclazide is calculated. The results are tabulated in Table 7.

Acceptance criteria:

% RSD for Dissolution of Six sample preparations should not be more than 5.0.

Table 7: Method precision

No. of Preparation	Gliclazide (60/500mg)	Gliclazide (60/850mg)
1	92.48	95.01
2	89.71	96.03
3	89.36	90.45
4	87.46	94.93
5	93.56	95.98
6	91.33	91.48
Mean	90.6	94.0
% RSD	2.4	2.56

Results and Conclusion:

The results are well within the acceptance criteria and the % RSD observed for drug release indicates the precision of the analytical method.

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9.5.3 Intermediate Precision (Ruggedness):

Study summary:

Six Dissolution preparations of sample were analyzed as per the method by different analyst using different instrument and different column on different day.

The Dissolution of Gliclazide is calculated. The results are tabulated in Table 8 and cumulative results are tabulated in Table 9.

Acceptance criteria:

1) % RSD for Dissolution of Six sample preparations should not be more than 5.0.

2) Cumulative % RSD for Dissolution of twelve sample preparations of (method and intermediate precision) should not be more than 10.0%.

Table 8: Intermediate precision

No. of Preparation	Gliclazide (60/500mg)	Gliclazide (60/850mg)
1	92.29	93.34
2	94.40	94.27
3	100.81	92.58
4	92.49	90.47
5	96.50	93.06
6	99.12	89.07
Mean	95.9	92.1
% RSD	3.66	2.13

The Cumulative results of Method Precision and Intermediate Precision are tabulated in Table 9.

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Table 9: Cumulative % RSD

Parameter	Gliclazide (60/500mg)	Gliclazide (60/850mg)
Method Precision	92.48	95.01
	89.71	96.03
	89.36	90.45
	87.46	94.93
	93.56	95.98
	91.33	91.48
Intermediate Precision	92.29	93.34
	94.40	94.27
	100.81	92.58
	92.49	90.47
	96.50	93.06
	99.12	89.07
Mean	93.29	93.06
% RSD	4.22	2.48

Result and Conclusion:

The results are well within the acceptance criteria and the % RSD observed for drug release indicates the precision of the method.

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9.6 STABILITY OF ANALYTICAL SOLUTION:

Study design:

Sample solution:

Sample preparation are prepared as per the proposed method and injected into the system initially and at various time intervals and data tabulated in Table 10.

Table 10: Stability of sample solution for Gliclazide

Time in hours	Area of Sample solution	Absolute % Difference
Initial	2688105	Not applicable
2	2688365	-0.01
4	2688197	0.00
6	2685970	0.08
8	2686414	0.06
10	2685793	0.09
12	2684553	0.13
16	2681176	0.26
20	2683508	0.17
24	2682781	0.20
32	2663487	0.92
38	2659870	1.06
42	2660384	1.04
48	2659946	1.06
Mean	2678468	0.39
% RSD	0.438	Not applicable

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The sample solution shall be considered stable for the final period till which the area difference between initial and next periodic interval should be not more than ±2%.

Standard solution:

Standard preparation are prepared as per the proposed method and injected into the system initially and at various time intervals and data tabulated in Table 11.

Table 11: Stability of standard solution for Gliclazide

Time in hours	Area of Standard solution	Absolute % Difference
Initial	2825425	Not applicable
2	2823197	0.08
4	2823905	0.05
6	2822418	0.11
8	2821704	0.13
10	2820429	0.18
12	2819832	0.20
16	2817179	0.29
20	2817317	0.29
24	2816734	0.31
32	2790525	1.25
38	2776752	1.75
42	2777427	1.73
48	2775155	1.81
Mean	2809143	0.63
% RSD	0.698	Not applicable

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Results and conclusions:

The Standard solution and Sample solution was stable upto 48 hours at room temperature.

9.7 FILTER PAPER STUDY:

Study design:

The filter paper study of analytical method is performed by filtering sample solution through 0.45µ Nylon, PVDF filter and Whatman membrane against that of unfiltered sample (Centrifuged). The results are tabulated in Table 12.

Table 12: Filter paper study for Sample solution of Gliclazide.

Filter study	Area of sample solution	Dissolution in %	% difference from unfiltered sample
Unfiltered sample (Centrifuged)	2629956	92.7	Not applicable
Filter set-1 (0.45µ Nylon membrane)	2625549	92.6	0.17
Filter set-2 (0.45µ Nylon membrane)	2631670	92.8	-0.07
Filter set-3 (0.45µ Nylon membrane)	2627585	92.7	0.09
Filter set-1 (0.45µ PVDF membrane)	2643289	93.2	-0.50
Filter set-2 (0.45µ PVDF membrane)	2639776	93.1	-0.37
Filter set-3 (0.45µ PVDF membrane)	2647840	93.4	-0.68
Filter set-1 (Whatman membrane)	2625970	92.6	0.15
Filter set-2 (Whatman membrane)	2625494	92.6	0.17
Filter set-3 (Whatman membrane)	2639033	93.1	-0.34

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Acceptance criteria:

The % difference on filter solution should not differ ±2.0 against that of unfiltered (Centrifuged).

Results and conclusions:

The results are well within the acceptance criteria and the study proved the compatibility of filter paper.

9.8 ROBUSTNESS:

Study Design:

Standard preparation are injected varying different chromatographic conditions as per protocol. System suitability parameters and mean dissolution difference with respect to dissolution value in method precision are calculated.

The results are tabulated in table 13 Gliclazide peaks respectively.

The sample Preparations are injected variation difference dissolution condition as per protocol. The results are tabulated in table 14A &14B

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Table 13: Robustness of analytical method for Gliclazide

Parameter	Theoretical Plates (NLT 2000)	Tailing Factor (NMT 2.0)	% RSD (NMT 2.0)
As such (system suitability)	14026	0.927	0.016
Low wavelength (225nm)	12709	0.870	0.038
High wavelength (231nm)	12646	0.870	0.049
Low flow rate (0.9ml/minute)	13440	0.860	0.034
High flow rate (1.1ml/minute)	11952	0.880	0.024
Low Oven Temperature 20°C	12323	0.890	0.025
High Oven Temperature 30°C	12737	0.850	0.019

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Table 14A: Robustness of analytical method for Dissolution medium volume

Chromatographic variation's	Gliclazide Dissolution in %	Mean value of Method precision
Low volume Dissolution Medium (at final interval)	89.53	90.6
	87.29	
	86.48	% Difference
	90.06	
	84.35	2.7
	89.52	
Average	87.9	Not applicable
% RSD	2.54	
Chromatographic variation's	**Gliclazide Dissolution in %**	**Mean value of Method precision**
High volume Dissolution Medium (at final interval)	90.95	90.6
	90.17	
	94.77	% Difference
	93.24	
	90.93	-1.5
	92.7	
Average	92.1	Not applicable
% RSD	1.89	

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Table 14B: Robustness of analytical method for pH Dissolution medium

Chromatographic variation's	Gliclazide Dissolution in %	Mean value of Method precision
Low pH Dissolution Medium (at final interval)	94.9	90.6
	90.24	
	90.17	% Difference
	93.42	
	93.39	-1.2
	88.58	
Average	91.8	Not applicable
% RSD	2.68	
Chromatographic variation's	**Gliclazide Dissolution in %**	**Mean value of Method precision**
High pH Dissolution Medium (at final interval)	94.00	90.6
	91.70	
	87.87	% Difference
	86.85	
	91.29	-0.3
	93.55	
Average	90.9	Not applicable
% RSD	3.23	

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Acceptance criteria:

1) Theoretical plates for Gliclazide peaks should be NLT 2000.

2) Tailing Factor for Gliclazide peaks should be NMT 2.0.

3) % RSD of area of five replicates standard injections should be NMT 2.0.

4) % Dissolution result shall meet the specification.

5) Relative standard deviation of % dissolution results should not be more than 5.0%.

6) The difference in average % dissolution with actual dissolution medium volume and dissolution medium pH with changed dissolution medium volume and pH shall NMT 5.0.

Result and Conclusion:

Each chromatographic variation System suitability parameters are within limits.

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10.0 SUMMARY:

S.No	Validation parameter	Acceptance criteria	Results
1	System suitability	1) % RSD of area of analyte in five replicate standard injections should not be more than 2.0.	0.016
		2) Theoretical plate should be not less than 2000.	14026
		3) Tailing factor should not be more than 2.0.	0.927
2	**Specificity** Interference from blank, placebo and placebo spiked with analyte.	There should not be any interference due to blank, impurity and placebo with analyte.	Blank and Placebo peaks are not interfere with Gliclazide peak in test preparation and Peak purity passes within specified limits.
3	Linearity and Range	1) R^2 Should be NLT 0.995	Squared correlation coefficient for 0.9999

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S.No	Validation parameter	Acceptance criteria	Results
		2) To conclude the range, %RSD for peak area of linearity level-10%, 25%, 50%, 75%, 100%, 125% and 150% should be not more than 2.0.	Level / %RSD: 10% – 0.034; 25% – 0.028; 50% – 0.111; 75% – 0.038; 100% – 0.098; 125% – 0.022; 150% – 0.039
4	Accuracy (Recovery)	The mean % recovery at each level should be 95.0 to 105.0.	**Level %Recovery** 5% : 101.11 50% : 98.05 100% : 101.01 150% : 98.38

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S.No	Validation parameter	Acceptance criteria	Results
5	**Precision** 1) System Precision	%RSD of area of analyte peaks in five replicate standard injections should not be more than 2.0.	0.016
	2) Method Precision	%RSD of dissolution of six sample preparations should not be more than 5.0.	**For 60/500mg:** 2.4 **For 60/850mg:** 2.56
	3)Intermediate Precision	% RSD for dissolution of six sample preparations should not be more than 5.0.	**For 60/500mg:** 3.66 **For 60/850mg:** 2.13
		Cumulative %RSD for dissolution of twelve preparations (of method and intermediate precision) should not be more than 5.0%.	**For 60/500mg:** 4.22 **For 60/850mg:** 2.48

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S.No	Validation parameter	Acceptance criteria	Results
6	Stability for analytical solution	The standard and sample solution shall be considered stable for the final period till which the area difference between initial and next periodic interval should not be more than ±2%.	The Standard and Sample solution was stable upto 48hours at room temperature.
7	Filter paper study (0.45µ Nylon and PVDF)	The % difference on filter solution should not differ ±2.0 against that of unfiltered (Centrifuged).	The % difference on filtered sample 0.45µ Nylon, PVDF and Whatman membrane filter within limit against that of unfiltered (Centrifuged).
8	Robustness (i) Flow rate change (ii) Wavelength change (iii) Column oven Temperature Change (iv) Dissolution medium volume change (v) Dissolution medium pH change	System suitability parameters should comply.	Each chromatographic variation System suitability parameters are within limits.

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11.0 CONCLUSION:

Validation studies have been conducted for Dissolution of Gliclazide and Metformin Hydrochloride in Gliclazide and Metformin Hydrochloride tablets for the parameters of system suitability, specificity, System Precision, method precision, Intermediate precision, Linearity and range, accuracy, Filter paper study, solution stability and Robustness by using the proposed method. The data is complied and found satisfactory with the analytical method for all the parameters analysed. Hence it is concluded that the method can be used for regular analysis.

12.0 ABBREVIATION:

mg	:	Milligram
No	:	Number
ml	:	Milliliter
%	:	Percentage
ID	:	Identification
API	:	Active pharmaceutical ingredient
HPLC	:	High performance liquid chromatography
B.NO	:	Batch number
WS.NO	:	Working standard number
mm	:	Millimeter
µm	:	Micrometer
min	:	Minutes
°C	:	Degree centigrade
nm	:	Nanometer
RSD	:	Relative standard deviation
µl	:	Micro litre
Hcl	:	Hydrochloric acid

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13.0 REVISION HISTORY:

Report No.	Effective date	Reason for Review
ST/AMVDGR/23/022	21/10/2023	New Report prepared.