



## CERTIFICATE OF CALIBRATION

FT-Q-25		Page 1 of 2	
ULR No.	: CC29372000000801P	Date of Issue	: 21-Nov-20
Certificate No	: TVCS 20/11/189 - 01	Recom. Due Date	: 17-May-21
Date of Calibration	: 18-Nov-20		
<b>Customer Details:</b>		SRF No.	: 189
M/s. KALPANA MICROBIOLOGY LAB,		Calibrated at	: Lab
# 40/25, Pookadai Corner,		Date of Receipt	: 17-Nov-20
South Car St,		Cond. On Receipt	: Satisfactory
Thirucengode - 637211.			
<b>Details of Test Instrument:</b>			
Description	: Micropipette	Model No.	: --
Range	: 5-50 µl	Serial No	: YE174AB0061013
Least Count	: 0.5 µl	Identification No.	: --
Make	: D - Lab	Accuracy	: As per Manual
Working range	: --	Location	: Lab
<b>Details of Standard Used</b>			
Name	Certificate No.	Valid upto	Traceability
Electronic SemiMicro Balance	TVCSPL 20/05/364-01	12-May-21	TVCSPL, Chennai.
Work Instruction : WI-M-03 (Reference Standard ISO 8655-6)			
Environmental Details : Temperature : 25±2°C Relative Humidity : 50±10 % RH			
<b>MECHANICAL CALIBRATION</b>			
(Volume)			
<b>Calibration Results</b>			
1. Lower Volume :	5 µl	No. of Measurements :	10
<input type="text" value="4.99"/>	<input type="text" value="4.93"/>	<input type="text" value="4.98"/>	<input type="text" value="4.97"/>
<input type="text" value="5.00"/>	<input type="text" value="4.94"/>	<input type="text" value="4.96"/>	<input type="text" value="4.98"/>
<input type="text" value="5.00"/>	<input type="text" value="4.97"/>		
Mean Value :	4.98 µl		
<b>Error Limits(±)</b>			
Systematic Error :	-0.02 µl	0.13 µl	
Systematic Error :	-0.46 %	2.50 %	
Random Error :	0.02 µl	0.08 µl	
Random Error :	0.47 %	1.50 %	
Measurement Uncertainty :	±	0.14 µl	

Calibrated by :

*S. Mani*  
Ms. S. Manikala  
(Calibration Engineer)

Authorised by:

*M. G. John*  
(The Head)



...redefining the true value



ULR No. : CC29372000000801P  
Certificate No : TVCS 20/11/189 - 01

MECHANICAL CALIBRATION (Volume)				
Calibration Results				
2. Middle Volume :	25	$\mu\text{l}$	No. of Measurements :	10
25.01	24.93		24.88	24.91
24.88	24.89		24.82	24.87
24.83	24.96			
Mean Value :	24.90	$\mu\text{l}$		
Error Limits( $\pm$ )				
Systematic Error :	-0.10	$\mu\text{l}$	0.20	$\mu\text{l}$
Systematic Error :	-0.41	%	1.00	%
Random Error :	0.06	$\mu\text{l}$	0.10	$\mu\text{l}$
Random Error :	0.23	%	0.50	%
Measurement Uncertainty :	$\pm$		0.14 $\mu\text{l}$	
3. Nominal Volume :	50	$\mu\text{l}$	No. of Measurements :	10
50.08	50.12		50.14	49.99
50.11	50.04		50.23	50.24
50.21	50.23			
Mean Value :	50.14	$\mu\text{l}$		
Error Limits( $\pm$ )				
Systematic Error :	0.14	$\mu\text{l}$	0.50	$\mu\text{l}$
Systematic Error :	0.28	%	1.00	%
Random Error :	0.09	$\mu\text{l}$	0.20	$\mu\text{l}$
Random Error :	0.18	%	0.40	%
Measurement Uncertainty :	$\pm$		0.14 $\mu\text{l}$	

Remarks

- The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor  $k=2$
- The Above Results are within the maximum permissible Error

Calibrated by :

*S. Manikala*  
Ms. S. Manikala  
(Calibration Engineer)



...redefining the true value



CERTIFICATE No.:  
CC-2937

## CERTIFICATE OF CALIBRATION

FT-Q-25		Page 1 of 2	
ULR No.	: CC29372000000802F	Date of Issue	: 21-Nov-20
Certificate No	: TVCS 20/11/189 - 02	Recom. Due Date	: 17-May-21
Date of Calibration	: 18-Nov-20	SRF No.	: 189
<b>Customer Details:</b>		Calibrated at	: Lab
M/s. KALPANA MICROBIOLOGY LAB, # 40/25, Pookadai Corner, South Car St, Thirucengode - 637211.		Date of Receipt	: 17-Nov-20
		Cond. On Receipt	: Satisfactory
<b>Details of Test Instrument:</b>			
Description	: Micropipette	Model	: --
Range	: 100 - 1000 $\mu$ l	Serial No	: YE199AL0547646
Least Count	: 5 $\mu$ l	Identification No.	: --
Make	: D - Lab	Accuracy	: As per Manual
Working range	: --	Location	: Lab
<b>Details of Standard Used</b>			
Name	Certificate No.	Valid upto	Traceability
Electronic SemiMicro Balance	TVCSPL 20/05/364 - 01	12-May-21	TVCSPL, Chennai.
Work Instruction	: WI-M-03 (Reference Standard ISO 8655-6)		
Environmental Details	: Temperature : 25 $\pm$ 2 $^{\circ}$ C Relative Humidity : 50 $\pm$ 10 % RH		
<b>MECHANICAL CALIBRATION</b>			
(Volume)			
<b>Calibration Results</b>			
1. Lower Volume :	100 $\mu$ l	No. of Measurements :	10
100.15	100.22	100.19	100.17
100.24	100.19	100.21	100.25
100.24	100.22		
Mean Value :	100.21 $\mu$ l		
<b>Error Limits(<math>\pm</math>)</b>			
Systematic Error :	0.21 $\mu$ l	0.80 $\mu$ l	
Systematic Error :	0.21 %	0.80 %	
Random Error :	0.03 $\mu$ l	0.30 $\mu$ l	
Random Error :	0.03 %	0.30 %	
Measurement Uncertainty :	$\pm$	0.14 $\mu$ l	

Calibrated by :  
*S. Mani*  
Ms. S. Manikala  
(Calibration Engineer)

Authorised by:  
*[Signature]*  
Mr. G. John  
(The Head)

*...redefining the true value*

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GSTIN : 33AAMFT6449G1ZV





ULR No. : CC29372000000802F  
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MECHANICAL CALIBRATION (Volume) Calibration Results				
2. Middle Volume :	500	$\mu\text{l}$	No. of Measurements :	10
	499.63	499.59	499.56	499.60
	499.18	499.31	499.71	499.77
	499.56	499.26		
Mean Value :	499.51	$\mu\text{l}$		
Error Limits( $\pm$ )				
Systematic Error :	-0.49	$\mu\text{l}$	4.00	$\mu\text{l}$
Systematic Error :	-0.10	%	0.80	%
Random Error :	0.20	$\mu\text{l}$	1.50	$\mu\text{l}$
Random Error :	0.04	%	0.30	%
Measurement Uncertainty :		$\pm$	1.1 $\mu\text{l}$	
3. Nominal Volume :	1000	$\mu\text{l}$	No. of Measurements :	10
	1000.51	999.50	999.73	999.64
	999.48	998.75	998.32	998.25
	998.47	999.06		
Mean Value :	999.17	$\mu\text{l}$		
Error Limits( $\pm$ )				
Systematic Error :	-0.83	$\mu\text{l}$	8.00	$\mu\text{l}$
Systematic Error :	-0.08	%	0.80	%
Random Error :	0.73	$\mu\text{l}$	3.00	$\mu\text{l}$
Random Error :	0.07	%	0.30	%
Measurement Uncertainty :		$\pm$	1.1 $\mu\text{l}$	

Remarks

- The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor  $k=2$
- The Above Results are within the maximum permissible Error

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