



Abhcon Crown, X1/411/21, Ambadi Lane Kokkalai, Thrissur-21. Ph: 0487 2420367 Email: medengserv@gmail.com Visit us @www.mescalibration.com

# **CERTIFICATE OF CALIBRATION**

ULR: CC25432000000035F

Certification No: MES/200117/C5

Calibrated for: AJ HOSPITAL&RESEARCH CENTRE, MANGALURU.

## **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 100-1000µl

: THERMO SCIENTIFIC

SL.NO/ID

: PW14440/ AJH/B/HRCLAB/MP/04

MODEL NO

: FINNPIPETTE F3

NO OF CHANNELS : 1

Date of Calibration: 17/01/2020

Resolution of DUC: 1µl

Calibrated at

: Permanent Facility

Condition of item: Good

Next calibration due: 16/01/2021

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

(Lab In Charge )

Approved Signatory

BINO! THOMAS

(Quality / Technical Manager)

ULR: CC25432000000035F

Certification No: MES/200117/C5

Sl.no.	Volume µl	Actual volume μl	Expanded uncertainty µl	Coverage factor
1		99.98		
2		99.91	1	
3	100	99.86	± 0.819	M00000215712
4		99.83		
5	MANGALUR	100.00	TAL & RUST	ROH Wind
	Repeatability = Average volume =	0.033 µl <b>99.914 µl</b>	130W30	
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor
	μΙ	μΙ	μl	4911
1	APPRICATE .	499.97		
2	MODEL NO	500.02	H/a/Hrv /osss)	AFE :
3	500	499.95	± 0.821	2 2 2
4		499.91		
9 5 AC	as disc fruit	499.86	71/2020	ANI: DOMESTAN
item: Go	Repeatability =  Average  volume =	0.027 µl <b>499.942 µl</b>	varion Facility	9199. is
Sl.no.	Volume µl	Actual volume μl	Expanded uncertainty µl	Coverage facto (k)
1		999.99		<u> </u>
2	Laurealian Laur	999.94	hidro Steroeno	class by the
3	1000	1000.12	± 0.829	2
4		999.96		roral ke
5		999.90		
	Repeatability = Average volume =	0.038 μl <b>999.982 μl</b>		0505\x0\72::

#### ULR: CC254320000000035F

## Certification No: MES/200117/C5

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	995.51	mg	6.07E-05	2.00	Type B, Normal	3.036E-05	1.005E+00	3.050E-05	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	9.955E+02	6.969E-02	œ
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	3.500E+02	6.062E-02	∞
Resolution of micropipette	1.0	μl	1.00E+00	1.22	Type B, Rtglr	8.164E-01	1.000E+00	8.164E-01	œ
Repeatability	999.98	μl			Type A	3.764E-02	1.000E+00	3.764E-02	4
Va	999.98	μl						8.224E-01	

Combined Standard uncertainty

= 0.822

μl

Effective Degree of freedom

= 911849

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

± 1.645

ul

#### **Environmental Factors:**

Temperature: 26.5 ° C + 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

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- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.
- Calibration is carried out as per MES work procedure: MES/WP/VOLUME.







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# **CERTIFICATE OF CALIBRATION**

ULR: CC25432000000036F

Certification No: MES/200117/C6

Calibrated for: AJ HOSPITAL&RESEARCH CENTRE, MANGALURU.

### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

**RANGE** 

: 0.5-5ML

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW13815/ AJH/B/HRCLAB/MP/08

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

Resolution of DUC: 0.001µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

Approved Signator

(Lab In Charge )

(Quality /Technical Manager)

ULR: CC25432000000036F

Certification No: MES/200117/C6

	Repeatability = Average volume =	0.838 μl <b>5001.349 μl</b>		02 17/01/2020	
5		5000.09			
4		5000.18		.roiist	
3	5000	5000.04	± 2.557	2.87000	
2	ad under vali	5002.13	ment's which	related unstr	Alflorh
1		5004.31			
Sl.no.	Volume μl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)	a kon
09 :ms/	Repeatability =  Average  volume =	2.271 μl <b>2502.838 μl</b>	anent Facility		
5	Plext calibrate	2498.83	1/2020	Olimation: 17/4	
4		2500.28	and the second second		
3	2500	2498.40	± 6.533	2.87000	
2	MODELNO	2507.86	3815/ A3H/8/H	W9:	
1	SOUL BASE	2508.81			
	μl	μl	uncertainty µl	(k)	
Sl.no.	Average volume =	500.02 μl  Actual volume	Expanded	Coverage factor	
	Repeatability =	0.043 μl			
5	MANGALURI	499.95 500.13	TALSKESE	EOMA not b	
4	500	499.90	± 0.151	2.87000	
2	500	500.09	-		
1	-	500.03	-	100	
Sl.no.	Volume µl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)	





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# **CERTIFICATE OF CALIBRATION**

ULR: CC25432000000037F

Certification No: MES/200117/C7

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

**RANGE** 

SL.NO/ID

: 5-50µl

: OW14281/ AJH/B/HRCLAB/MP/11

NO OF CHANNELS : 1

Date of Calibration: 17/01/2020

Calibrated at

: Permanent Facility

MAKE

: THERMO SCIENTIFIC

**MODEL NO** 

: FINNPIPETTE F3

Resolution of DUC: 0.1µl

Next calibration due: 09/08/2021

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue: 10/08/2020

Calibrated by:

(Lab In Charge )

Approved Signator

(Quality Technical Manager)

ULR: CC25432000000037F

Certification No: MES/200117/C7

Sl.no.	Volume μl	Actual volume μΙ	Expanded uncertainty µl	Coverage factor (k)	
1		4.99*			
2		4.95*	7		
3	Certiff then	4.90*	± 0.095*	2*	DULIU
4		4.94*		1/2	
5	MANGALLORE	4.85*	TALERESE	BOH M not b	Calibrate
	Repeatability =  Average  volume =	0.024* µl <b>4.928* µl</b>			
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μΙ	μl	зтгрич оя	WY: TW	EQUIPME
1	MAKE	24.83	lat	re-e :	RANGE
2		25.10	olojina kancai	5473	BROM IS
3	25	24.94	± 0.134	2.21000	Minaire
4	nelfulare?	24.99	-	L: ZITMMAN	10 90 OF
5	Total Control of the	24.92			The otest
titem noor	Repeatability = Average volume =	0.045 μl <b>24.958 μl</b>		me9 : Pem	
Sl.no.	Volume μl	Actual volume	Expanded uncertainty µl	Coverage factor (k)	
1	se Te	49.97	3	1 11 18	
2	officially to	49.94	NILW DS-IOR	ra Elbisoli ar	
3	50	49.83	± 0.135	2.21000	
4	EV TONNIN DI	50.11	130 SAL 622 131	0.087(2.000)(1)	
5	-	49.96		proid.	
	Repeatability = Average volume =	0.045 μl <b>49.966 μl</b>	1	16/08/2020	

### ULR: CC25432000000037F

## Certification No: MES/200117/C7

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	49.75	mg	3.03E-06	2.00	Type B, Normal	1.517E-06	1.005E+00	1.524E-06	00
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	00
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.975E+01	3.483E-03	œ
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.749E+01	3.029E-03	∞
Resolution of micropipette	0.1	μl	1.00E-01	1.22	Type B, Rtglr	8.164E-02	1.000E+00	8.164E-02	<b>∞</b>
Repeatability	49.97	μl	-	-	Type A	4.486E-02	1.000E+00	4.486E-02	4
Va	49.97	μl					12/31	9.335E-02	

Combined Standard uncertainty

= 0.093

μl

Effective Degree of freedom

= 75

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

± 0.187

ul

### **Environmental Factors:**

Temperature: 27.5 ° C + 1 ° C

Air pressure: 1006 mbar

Double distilled water,

Relative humidity: 75 %

#### Note:

- The results in this certificate are only related to DUC submitted calibration.
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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000038F

Certification No: MES/200117/C8

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 100-1000µl

100-1000μι

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW10143/ AJH/B/HRCLAB/MP/05

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

Resolution of DUC: 1µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by :

Approved Signator

PRABBA K P

BINOJ THOMAS

(Lab In Charge )

(Quality / Technical Manager)

ULR: CC25432000000038F

Certification No: MES/200117/C8

Sl.no.	Volume μl	Actual volume μΙ	Expanded uncertainty	Coverage factor (k)	
1		99.94			
2		99.98			
3	100	99.90	± 0.817	2	- 夏、川
4		99.97			
5	MANGALURI	99.89	PETALLERISE	IOH (Mas) be	readil
	Repeatability = Average volume =	0.018 μl <b>99.934 μl</b>			
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μl	μΙ	377 µ14 090	M: TWE	
1	PARKE	499.86	1,000.4	01:	2000
2	- Martine C	499.93	The second of	50.	
3	500	500.11	± 0.825	2	
4	noduless R	499.96		I : 219MMAH	
5		499.82			
item: du item: G	Repeatability = Average volume =	0.05 μl <b>499.936 μl</b>	manent Faculty	rsi: Jab	
Sl.no.	Volume μl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)	
1	editerral base were	1000.07	Har barbailt	rathra 7 mil	
2		999.94			
3	1000	999.96	± 0.828	2	
4		999.89			
5		999.95		- mother	
	Repeatability =  Average  volume =	0.03 μl <b>999.962 μl</b>		neatirains	

#### ULR: CC254320000000038F

## Certification No: MES/200117/C8

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	995.59	mg	6.07E-05	2.00	Type B, Normal	3.037E-05	1.005E+00	3.050E-05	- 00
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	9.956E+02	6.969E-02	os.
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	3.500E+02	6.062E-02	œ
Resolution of micropipette	1.0	μl	1.00E+00	1.22	Type B, Rtglr	8.164E-01	1.000E+00	8.164E-01	∞ ,
Repeatability	999.96	μJ	-	-	Туре А	2.970E-02	1.000E+00	2.970E-02	4
Va	999.96	μl					- 232	8.221E-01	

Combined Standard uncertainty

= 0.822

μl

Effective Degree of freedom

= 2349351

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

± 1.644

μl

#### **Environmental Factors:**

Temperature: 27.5 ° C ± 1 ° C

Air pressure: 1006 mbar

Double distilled water,

Relative humidity: 75 %

#### Note:

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- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
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# **CERTIFICATE OF CALIBRATION**

ULR: CC25432000000039F

Certification No: MES/200117/C9

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 5-50µl

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: OW13463/ AJH/B/HRCLAB/MP/12

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

Resolution of DUC: 0.1µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by :

(Lab In Charge )

pproved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

ULR: CC25432000000039F

Certification No: MES/200117/C9

Sl.no.	Volume µl	Actual volume μΙ	Expanded uncertainty µl	Coverage factor (k)
1		4.96		
2		4.83		
3.	noing5 and	4.98	± 0.414	ULR: ( C2543/2 000004
4		4.86		
5	MANGALURU	4.99	PITALSERES	Calibrated for Managia
	Repeatability = Average volume =	0.033 μl <b>4.926 μl</b>		
Sl.no.	Volume μl	Actual volume µl	Expanded uncertainty	Coverage factor (k)
1	μι	24.89		
2	SHAM	24.96	lagi	RANGE : 5-5
3	OH 13/25 M	25.08	± 0.413	NO : 2 II/ON.JE
4	1	24.95	1 20.425	NO OF CHANGES 1.1
5	Resolution	24.92	1	T : CHEMINA A AN
tion du Rem: G	Repeatability = Average volume =	0.033 μl <b>24.962 μl</b>	nament Facility	Date of Institute Calibrated at Perm
Sl.no.	Volume μl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)
1	MUSTU YOU DON'T	50.10	1 12 200 20 20 20 20 20 20 20 20 20 20 20 2	lified that the above
2		49.98	les la la la	a a a a
3	357750 46 37	49.87	± 0.415	calibration Results
4		49.95	4 4 4 4	a start to
5	ley tobrus bus	49.99	DHIW S MAING	nt of the related instr
	Repeatability = Average volume =	0.037 µl <b>49.982 µl</b>		of calibration

### ULR: CC25432000000039F

Certification No: MES/200117/C9

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	49.88	mg	3.04E-06	2.00	Type B, Normal	1.521E-06	1.005E+00	1.528E-06	
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	00
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.988E+01	3.492E-03	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.749E+01	3.030E-03	∞
Resolution of micropipette	0.5	μl	5.00E-01	1.22	Type B, Rtglr	4.082E-01	1.000E+00	4.082E-01	∞
Repeatability	49.98	μl	-	-	Type A	3.723E-02	1.000E+00	3.723E-02	4
Va	49.98	μl					1.386	4.099E-01	

Combined Standard uncertainty

= 0.410

μl

Effective Degree of freedom

= 58758

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

± 0.820

μl

### **Environmental Factors:**

Temperature:  $27.5 \,^{\circ}$  C  $\pm \, 1 \,^{\circ}$  C

Air pressure: 1006 mbar

Double distilled water,

Relative humidity: 75 %

### Note:

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- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements
- The recalibration interval should be determined based on the user requirement RING
- Calibration certificate issued for scientific or industrial purpose only
- Calibration is carried out as per MES work procedure: MES/WP/VOLUME.

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## **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000040F

Certification No: MES/200117/C10

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 0.5-5ML

: THERMO SCIENTIFIC

SL.NO/ID

: PW13799/ AJH/B/HRCLAB/MP/07

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

MAKE

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Resolution of DUC: 0.001µl

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

Approved Signator

PRABIN, KP

(Lab In Charge )

(Quality Technical Manager)

ULR: CC254320000000040F

Certification No: MES/200117/C10

Sl.no.	Volume µl	Actual volume μl	Expanded uncertainty µl	Coverage facto (k)
1		499.89		
2		499.96	1	
3	500	500.13	± 0.164	2.87000
4		499.97		
5	MANGALUKU	499.85	TALSEES	for Marian
	Repeatability = Average volume =	0.048 µl <b>499.96 µl</b>		
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage facto (k)
	μΙ	μΙ	ROPIN TEE	IM: T
1	EXAM	2497.76	5 Mil.	2.0
2	200	2497.87		
143	2500	2498.22	± 0.516	2.87000
4	Recolution of	2497.66		WINELS : I
5		2497.78		
n due ; see: Go	Repeatability = Average volume =	0.097 μl <b>2497.858 μl</b>	navent Facility	at Pern
Sl.no.	Volume µl	Actual volume	Expanded uncertainty µl	Coverage facto (k)
1	- Danillan or	4995.52	Tree 1 1 1 11	on Results a
2	A THANKSHIP OF ST	4995.56	ridiw kantaari	E CHACAL IN
3	5000	4996.47	± 1.01	2.87000
4	and totalism with	4995.61	2011111 6 20 20110	1313 12 FOODSS\$123
5		4995.66		posto
	Repeatability = Average volume =	0.179 μl <b>4995.764 μl</b>		0000110121

#### ULR: CC254320000000040F

### Certification No: MES/200117/C10

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	4973.14	mg	3.03E-04	2.00	Type B, Normal	1.517E-04	1.005E+00	1.524E-04	- 00
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.973E+03	3.481E-01	oo.
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.749E+03	3.029E-01	∞
Resolution of micropipette	0.0	μl	1.00E-03	1.22	Type B, Rtglr	8.164E-04	1.000E+00	8.164E-04	∞
Repeatability	4995.76	μl	-	-	Type A	1.789E-01	1.000E+00	1.789E-01	4
Va	4995.76	μl					24.	4.949E-01	

Combined Standard uncertainty

= 0.495

μΙ

Effective Degree of freedom

= 234

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

± 0.990

μl

## **Environmental Factors:**

Temperature: 27.5 ° C ± 1 ° C

Air pressure: 1006 mbar

Double distilled water,

Relative humidity: 75 %

#### . Note:

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- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.
- Calibration is carried out as per MES work procedure: MES/WP/VOLUME.





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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000041F

Certification No: MES/200117/C11

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 100-1000µl

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW14444/ AJH/B/HRCLAB/MP/03

MODEL NO

: FINNPIPETTE F3

NO OF CHANNELS : 1

Resolution of DUC: 1µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by :

PRABIN.

(Lab In Charge )

**Approved Signatory** 

BINO THOMAS

(Quality / Technical Manager)

ULR: CC254320000000041F

Certification No: MES/200117/C11

Sl.no.	Volume μl	Actual volume μΙ	Expanded uncertainty µl	Coverage factor (k)	
1		99.98			
2		99.93			
3	100	99.89	± 0.818	02543.21000000	
4		99.94			
5	MANGALURU.	99.86	LLVISKRRE	ScOH M nol I	
	Repeatability = Average volume =	0.021 μl <b>99.918 μl</b>			
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μΙ	μΙ	3T µ1919 09	DINE: _ TV	
1	SHARE	499.88	12/000	100	
2	283043	499.93	ajveus		
3	500	499.96	± 0.821	2	
4	to neimieras	499.82		ALMELS : 2	
5		499.99			
in que : em: Goc	Repeatability = Average volume =	0.03 µl <b>499.916 µl</b>	anent Facility	at Penn	
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μl	μΙ	μΙ		
1	e authoniic a	999.94	direction	on Results an	
2		1000.07	-		
3	1000	999.90	± 0.828	relate\$ instra	
4		999.93	-		
5		999.95		maile	
	Repeatability = Average volume =	0.029 µl <b>999.958</b> µl		e 17/01/2020	

### ULR: CC254320000000041F

## Certification No: MES/200117/C11

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance .	995.46	mg	6.07E-05	2.00	Type B, Normal	3.036E-05	1.005E+00	3.050E-05	
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	9.955E+02	6.968E-02	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	3.500E+02	6.062E-02	∞
Resolution of micropipette	1.0	μl	1.00E+00	1.22	Type B, Rtglr	8.164E-01	1.000E+00	8.164E-01	∞
Repeatability	999.96	μl	- 1		Type A	2.935E-02	1.000E+00	2.935E-02	4
Va	999.96	μl						8.221E-01	

Combined Standard uncertainty

= 0.822

μl

Effective Degree of freedom

= 2460523

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub>, in the determination of volume

= ± 1.644

μl

### **Environmental Factors:**

Temperature: 27.5 ° C ± 1 ° C

Air pressure: 1006 mbar

Double distilled water,

Relative humidity: 75 %

#### . Note:

- The results in this certificate are only related to DUC submitted calibration.
- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements
- The recalibration interval should be determined based on the user requirement,
- Calibration certificate issued for scientific or industrial purpose only.
- Calibration is carried out as per MES work procedure: MES/WP/VOLUME.

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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000042F

Certification No: MES/200117/C12

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 100-1000ul

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW14441/ AJH/B/HRCLAB/MP/01

MODEL NO

: FINNPIPETTE F3

NO OF CHANNELS : 1

Date of Calibration: 17/01/2020

Resolution of DUC: 1 µl

Calibrated at

: Permanent Facility

Condition of item: Good

Next calibration due: 16/01/2021

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

(Lab In Charge )

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

### ULR: CC254320000000042F

(Quality /Technica) Manager)

Certification No: MES/200117/C12

Sl.no.	Volume μl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)	
1		99.98			
2	1 [	99.91	1		
3	100	99.86	± 0.819	2	
4	Certification 1	99.83	12F	34320000000	
5		100.00			
	Repeatability = Average volume =	0.033 µl <b>99.914 µl</b>	23,430 23,430		
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor	
	μΙ	μΙ	STI ME OR	M f TP	
1	DIANG	499.97	4:0001-	01:	
2		500.02			
3	500	499.95	± 0.821	2	
4	o notisk9	499.91		I : EJBMAA	
5		499.86	neora e	49.30	
euu itaen Ge	Repeatability = Average volume =	0.027 μl <b>499.942 μl</b>	ranoni Facility	nte9: ts	
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
1	μ	μl 999.99	μΙ	13 67	
2	are authentic	999.94	THW RONDED	ETHESE TEE	
3	1000	1000.12	± 0.829	3 3 3	
4	1000	999.96	10.029	dani b <b>2</b> slov	
5	1 -	999.90		april o	
	Repeatability =	0.038 μl		110123	
	Average volume =	999.982 μl			

#### ULR: CC254320000000042F

Certification No: MES/200117/C12

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	995.51	mg	6.07E-05	2.00	Type B, Normal	3.036E-05	1.005E+00	3.050E-05	- 00
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	9.955E+02	6.969E-02	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	3.500E+02	6.062E-02	∞
Resolution of micropipette	1.0	μΙ	1.00E+00	1.22	Type B, Rtglr	8.164E-01	1.000E+00	8.164E-01	∞
Repeatability	999.98	μl	-	-	Type A	3.764E-02	1.000E+00	3.764E-02	4
Va	999.98	μl					48	8.224E-01	

Combined Standard uncertainty

= 0.822

μl

Effective Degree of freedom

= 911849

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

- 2

Expanded uncertainty U<sub>B</sub> in the determination of volume

± 1.645

μΙ

#### **Environmental Factors:**

Temperature: 26.5 ° C + 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000043F

Certification No: MES/200117/C13

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

**RANGE** 

: 100-1000µl

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW17580/AJH/B/HRCLAB/MP/02

MODEL NO

: FINNPIPETTE F3

NO OF CHANNELS : 1

1 1204

Resolution of DUC: 1 µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

PRABIN. K

(Lab In Charge )

**Approved Signatory** 

BINO THOMAS

(Quality / Technical Manager)

ULR: CC254320000000043F

Certification No: MES/200117/C13

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor
	μΙ	μΙ	μΙ	
1		100.00		
2		99.99		
3	100	99.92	± 0.818	2
4	DITTACTION	99.86	DOWN D TANKS	- A
5	PERO LUNGE FIRM	99.91	A COLUMN DE L'IN	dun fan moi i
****	Repeatability = Average volume =	0.026 µl <b>99.934 µl</b>	1301/20	
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)
HERE	plans	μΙ	μ1,000.1	184
1	OW JEGOW	499.96	S del contra con sera	Live .
2	CW JAKESIN	499.89	fatura lapar r	
1300	500	500.02	± 0.821	2 2
4	fandlise beekt	499.96	050571	Tr : myleufile
5		499.87	5-2-1-32	SELA E FRANKS BAND
Alims).	Repeatability = Average volume =	0.027 μl <b>499.94</b> μl	tomour subsets	
Sl.no.	Volume μl	Actual volume	Expanded uncertainty	Coverage factor (k)
1		1001.05	F:	
2	lav valuer har.	999.99	uncont's whi	dere beisbir
3	1000	1000.07	± 0.933	2
4		999.94		.neitsv
5		999.90		
	Repeatability = Average volume =	0.218 µl <b>1000.191 µl</b>		re: 17/01/2020

#### ULR: CC254320000000043F

## Certification No: MES/200117/C13

## **Uncertainty Budget**

Source of uncertainty	Estimates	Ünit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	996.57	mg	6.08E-05	2.00	Type B, Normal	3.040E-05	1.005E+00	3.053E-05	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	9.966E+02	6.976E-02	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	3.501E+02	6.063E-02	8
Resolution of micropipette	1	μΙ	1.00E+00	1.22	Type B, Rtglr	8.164E-01	1.000E+00	8.164E-01	∞
Repeatability	1000.19	μl	-		Type A	2.178E-01	1.000E+00	2.178E-01	4
Va	1000.19	μl						8.500E-01	

Combined Standard uncertainty

= 0.850

ul

Effective Degree of freedom

= 927

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>B</sub> in the determination of volume

= ±

1.700

μΙ

## **Environmental Factors:**

Temperature: 26.5 ° C ± 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000044F

Certification No: MES/200117/C14

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

## **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 0.5-5ML

SL.NO/ID

: PW13792/AJH/B/HRCLAB/MP/06

NO OF CHANNELS : 1

Date of Calibration: 17/01/2020

Calibrated at

: Permanent Facility

MAKE

: THERMO SCIENTIFIC

**MODEL NO** 

: FINNPIPETTE F3

Resolution of DUC:0.001 µl

Next calibration due: 16/01/2021

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

(Lab In Charge )

Approved Signatory

BINOTTHOMAS

(Quality / Technical Manager)

### ULR: CC254320000000044F

Certification No: MES/200117/C14

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	TA PHIST		A A MILITA	Q W A	
1	and the second second	499.97	and the second residence for the second		
2		500.11	1.		
3	500	499.88	± 0.167	2.87000	
4	Certification I	500.15	445	543.2020/00/00	
5		500.07			
	Repeatability = Average volume =	0.049 µl <b>500.036 µl</b>	ADIV30	con Lagran	
SI.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μΙ	μΙ	911 <b>µ</b> 19 08	DAA : TV	
1	MAKE	2497.76	386	0.0	
2		2497.92			
3	2500	2501.38	± 2.054	2.87000	
4	Resolution o	2497.70		ANNELS : 2	
5		2498.28	acast s	S. S	
ana nan Dimini	Repeatability = Average volume =	0.699 µl <b>2498.607 µl</b>	anent Facility	mag: 1s	
Sl.no.	Volume μl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)	
1	- sitemations en	4995.52	Him barrasi	on Rossills al	
2		4995.66			
3	5000	4996.47	± 0.997	2.87000	
4		4995.65			
5		4995.73			
	Repeatability = Average volume =	0.17 μl <b>4995.806 μl</b>		17/01/2020	

#### ULR: CC254320000000044F

## Certification No: MES/200117/C14

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	4973.14	mg	3.03E-04	2.00	Type B, Normal	1.517E-04	1.005E+00	1.524E-04	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.973E+03	3.481E-01	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.749E+03	3.029E-01	∞
Resolution of micropipette	0.001	μΙ	1.00E-03	1.22	Type B, Rtglr	8.164E-04	1.000E+00	8.164E-04	∞
Repeatability	4995.81	μl		-	Туре А	1.702E-01	1.000E+00	1.702E-01	4
Va	4995.81	μl						4.918E-01	

Combined Standard uncertainty

= 0.492

μΙ

Effective Degree of freedom

= 279

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>B</sub> in the determination of volume

± 0.984

μΙ

## **Environmental Factors:**

Temperature: 26.5 ° C + 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

- The results in this certificate are only related to DUC submitted calibration.
- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
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- Calibration certificate issued for scientific or industrial purpose only.

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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000045F

Certification No: MES/200117/C15

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 5-50µl

SL.NO/ID

MAKE

: THERMO SCIENTIFIC

: PW10158/AJH/B/HRCLAB/MP/09

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

Date of Calibration: 17/01/2020

Resolution of DUC:0.1 µl

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

(Lab In Charge )

Approved Signator

BINO! THOMAS

(Quality (Technical Manager)

ULR: CC254320000000045F

Certification No: MES/200117/C15

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor
Principle Services	μΙ	μΙ	μΙ	The second secon
1		5.06		
2		5.14		
3	Certification N	5.01	± 0.414	2000000
4	TOTAL TRACTOR AND	5.21	DEFER PARTS	- S
5	BAGLEUYERE	5.07	E SUNDALIN I A I	K CALL TEST
	Repeatability =	0.035 μl	104V40	
	Average volume =	5.101 µl		
Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)
93117	зикм	μΙ	μl lis	04-8 :
1	CM ERON	24.92	о ек на гоз гоз	NAME OF THE PARTY
2	EST JEIQGM	24.87	- infumitions	
1.0300	25	25.02	± 0.413	2
4	de difer trad	24.94	1/2020	ibration : 17.0
5		25.02		
eu men Lua k	Repeatability = Average volume =	0.029 μl <b>24.956 μl</b>	loop paragraph (v)	sundo adt is
Sl.no.	Volume µl	Actual volume μl	Expanded uncertainty µl	Coverage factor (k)
1		49.98		
502	hw rabnu bin	50.06	endrit s which	dani katalm
3	50	49.90	± 0.416	2
4		50.03	]	noils
5		50.13		
	Repeatability =  Average	0.039 μΙ		0505/10/71
	volume =	50.024 μl		

#### ULR: CC254320000000045F

## Certification No: MES/200117/C15

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	49.76	mg	3.04E-06	2.00	Type B, Normal	1.518E-06	1.005E+00	1.525E-06	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.976E+01	3.483E-03	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.751E+01	3.033E-03	∞
Resolution of micropipette	0.5	μΙ	5.00E-01	1.22	Type B, Rtglr	4.082E-01	1.000E+00	4.082E-01	<b>o</b> o
Repeatability	50.02	μl	-	-	Type A	3.877E-02	1.000E+00	3.877E-02	4
Va	50.02	μΙ						4.101E-01	

Combined Standard uncertainty

= 0.410

μl

Effective Degree of freedom

= 50035

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>B</sub> in the determination of volume

± 0.820

μΙ

#### **Environmental Factors:**

Temperature: 26.5  $^{\circ}$  C  $\pm$  1  $^{\circ}$  C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

- The results in this certificate are only related to DUC submitted calibration.
- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.





Abhcon Crown, X1/411/21, Ambadi Lane Kokkalai, Thrissur-21, Ph: 0487 2420367 Email: medengserv@gmail.com Visit us @www.mescalibration.com

# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000046F

Certification No: MES/200117/C16

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

RANGE

: 5-50µl

MAKE

: THERMO SCIENTIFIC

SL.NO/ID

: PW10161/AJH/B/HRCLAB/MP/10

**MODEL NO** 

: FINNPIPETTE F3

NO OF CHANNELS : 1

Resolution of DUC:0.1 µl

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by

(Lab In Charge )

(Quality / Technical Manager)

ULR: CC254320000000046F

Certification No: MES/200117/C16

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
	μl	μΙ	μΙ	The same of the sa	
1		4.96			
2		4.98			
3	Certification N	4.83	± 0.103	000000000000000000000000000000000000000	
4	101111101411	5.01	PERALLERS	OH M nell	
5	DEGLESS CONTROL	4.95	DC1/436,474,4331	CATA THE DESIGN	
	Repeatability = Average volume =	0.031 μl <b>4.948 μl</b>	331/30		
.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
f7 :	зим	μΙ	μι 140	3-3	
	ON THOOM	24.88	10161/AIM/8/I	1.50	
1 1	Chail Transcollas	24.96	MANAGEMENT OF THE PARTY OF THE		
3110	o nota 25	25.08	± 0.113	2.13000	
4	Next calibrat	24.92	91/2020	Tt : noite di	
5		24.97			
	Repeatability = Average volume =	0.034 μl <b>24.964 μl</b>	inchesses and	simple edition	
.no.	Volume µl	Actual volume	Expanded uncertainty µl	Coverage factor (k)	
1		50.11			
2	and under val	49.97	birtw's brone.	steni luetoist	
3	50	49.93	± 0.126	2.17000	
4		49.88		Jmila	
5		50.04			
	Repeatability = Average volume =	0.041 μl <b>49.99 μl</b>		c : 17/01/2020	

#### ULR: CC254320000000046F

Certification No: MES/200117/C16

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	49.89	mg	3.04E-06	2.00	Type B, Normal	1.522E-06	1.005E+00	1.528E-06	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	4.989E+01	3.492E-03	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	1.750E+01	3.030E-03	∞
Resolution of micropipette	0.1	μl	1.00E-01	1.22	Type B, Rtglr	8.164E-02	1.000E+00	8.164E-02	∞
Repeatability	49.99	μl		-	Type A	4.075E-02	1.000E+00	4.075E-02	4
Va	49.99	μΙ						9.145E-02	

μl

Combined Standard uncertainty

= 0.091

Effective Degree of freedom

= 101

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2

Expanded uncertainty U<sub>E</sub> in the determination of volume

± 0.183

μΙ

#### **Environmental Factors:**

Temperature: 26.5  $^{\circ}$  C  $\pm$  1  $^{\circ}$  C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

- The results in this certificate are only related to DUC submitted calibration.
- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
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THRISSUR-2





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## **CERTIFICATE OF CALIBRATION**

ULR: CC25432000000047F

Certification No: MES/200117/C17

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

#### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

**RANGE** 

: 250µl

MAKE

: BIOMERIUX

SL.NO/ID

: 175852237/AJH/B/HRCLAB/MP/13

MODEL NO

: NA

Next calibration due: 16/01/2021

NO OF CHANNELS : 1

Resolution of DUC:0µl

Date of Calibration: 17/01/2020

•

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue : 17/01/2020

Calibrated by:

PRABIN. K

(Lab In Charge )

Approved Signatory

BINOJ THOMASIRISSUR-21

(Quality /Technical Manager)

ULR: CC254320000000047F

Certification No: MES/200117/C17

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)
	μΙ	μΙ	μΙ	
1		249.85		
2		250.28		
233	250	249.94	± 0.238	2.87000
4		249.83		1007 1/4 . 1 . 1
5	MANGALURY	249.99	PITALBARES	OH to mold
	Repeatability =	0.081 μΙ	) BOHVBO	
	Average volume =	249.978 μΙ		

#### ULR: CC254320000000047F

Certification No: MES/200117/C17

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	248.73	mg	1.52E-05	2.00	Type B, Normal	7.586E-06	1.005E+00	7.620E-06	- x
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	µl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	2.487E+02	1.741E-02	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	8.749E+01	1.515E-02	∞
Resolution of micropipette	0.0	μl	0.00E+00	1.22	Type B, Rtglr	0.000E+00	1.000E+00	0.000E+00	<b>∞</b>
Repeatability	249.98	μl	-	-	Type A	8.132E-02	1.000E+00	8.132E-02	4
Va	249.98	μl						8.463E-02	

Combined Standard uncertainty

= 0.085

μl

Effective Degree of freedom

= 5

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2.87

Expanded uncertainty U<sub>5</sub> in the determination of volume

= ±

μΙ

0.243

## **Environmental Factors:**

Temperature: 26.5 ° C ± 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

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# **CERTIFICATE OF CALIBRATION**

ULR: CC254320000000048F

Certification No: MES/200117/C18

Calibrated for: A.J HOSPITAL&RESERCH CENTRE, MANGALURU.

### **DEVICE UNDER CALIBRATION**

**EQUIPMENT** 

: MICRO PIPETTE

**RANGE** 

: 145µl

MAKE

: BIOMERIUX

SL.NO/ID

: 17586245/AJH/B/HRCLAB/MP/14

MODEL NO

: NA

NO OF CHANNELS : 1

Resolution of DUC:0นไ

Date of Calibration: 17/01/2020

Next calibration due: 16/01/2021

Calibrated at

: Permanent Facility

Condition of item: Good

Certified that the above instrument has been calibrated by trained technical person. The calibration Results attached with the certificate are authentic quantitative analysis report of the related instrument's which are calibrated and under valid traceability on the date of calibration.

Date of issue: 17/01/2020

Calibrated by:

PRABIN, K P

(Lab In Charge )

Approved Signatory

BINOS THOMAS

(Quality / Technical Manager)

ULR: CC254320000000048F

Certification No: MES/200117/C18

Sl.no.	Volume	Actual volume	Expanded uncertainty	Coverage factor (k)	
Crisery - Garriera	μl	μΙ	μΙ	A CONTRACTOR OF THE CONTRACTOR	
1		144.83			
2		144.97			
25 <b>3</b> 4 to	145	145.04	± 0.129	2.87000	
4		144.98		Jan 1984	
5	, MANGALLIPI	144.82	PARALARES	OH Want	
	Repeatability =	0.044 μl	DEVICE U		
	Average volume =	144.927 μΙ			

ULR: CC254320000000048F

Certification No: MES/200117/C18

#### **Uncertainty Budget**

Source of uncertainty	Estimates	Unit	Exp. Uncertainty	k	Probability Distribution	Standard uncertainty	Sensitivity Coefficient	Uncertainty contribution	Degree of Freedom
Balance	144.18	mg	8.79E-06	2.00	Type B, Normal	4.397E-06	1.005E+00	4.417E-06	∞
Readability of balance	0.01	mg	5.00E-03	1.22	Type B, Rtglr	4.082E-03	1.005E+00	4.100E-03	∞
Temperature measurement	1.0045	μl/mg	1.40E-04	2.00	Type B, Normal	7.000E-05	1.442E+02	1.009E-02	∞
Thermal Exp. Coeff	0.0003	per °C	0.0003	1.73	Type B, Rtglr	1.732E-04	5.072E+01	8.786E-03	∞
Resolution of micropipette	0.0	μl	0.00E+00	1.22	Type B, Rtglr	0.000E+00	1.000E+00	0.000E+00	∞
Repeatability	144.93	μl	-	-	Type A	4.395E-02	1.000E+00	4.395E-02	4
Va	144.93	μl						4.612E-02	

Combined Standard uncertainty

= 0.046

μl

Effective Degree of freedom

= 5

For the calculated DOF and at a confidence of 95.45 %, the coverage factor, k, determined

from student's distribution table

= 2.87

Expanded uncertainty U<sub>B</sub> in the determination of volume

0.132 = ±

μl

#### **Environmental Factors:**

Temperature: 26.5 ° C + 1 ° C

Air pressure: 1003 mbar

Double distilled water,

Relative humidity: 55 %

#### Note:

- The results in this certificate are only related to DUC submitted calibration.
- Results Presented in this certificate & report shall not be reproduced except in full without the written approval of this centre.
- Next calibration due date mentioned as per customer requirement.
- All results reported are valid at the time of calibration and under stated condition of measurements THRISSUR-2
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.
- Calibration is carried out as per MES work procedure: MES/WP/VOLUME.