Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000035F **Certification No: MES/200117/C5**

Calibrated for: AJ HOSPITAL&RESEARCH CENTRE,MANGALURU.

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 100-1000µl**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: PW14440/ AJH/B/HRCLAB/MP/04**	**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. K P

(Lab In Charge)

Approved Signatory

MEDICAL ENGINEERING & SERVICES THRISSUR-21

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000035F **Certification No: MES/200117/C5**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	100	99.98	± 0.819	2
2		99.91		
3		99.86		
4		99.83		
5		100.00		
	Repeatability =	0.033 µl		
	Average volume =	**99.914 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.97	± 0.821	2
2		500.02		
3		499.95		
4		499.91		
5		499.86		
	Repeatability =	0.027 µl		
	Average volume =	**499.942 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	1000	999.99	± 0.829	2
2		999.94		
3		1000.12		
4		999.96		
5		999.90		
	Repeatability =	0.038 µl		
	Average volume =	**999.982 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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	999.98	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_E, in the determination of volume = ± 1.645 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
- 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000036F **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 :

PRABIN. K P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000036F **Certification No: MES/200117/C6**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	500.03	± 0.151	2.87000
2		500.09		
3		499.90		
4		499.95		
5		500.13		
	Repeatability =	0.043 µl		
	Average volume =	**500.02 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	2500	2508.81	± 6.533	2.87000
2		2507.86		
3		2498.40		
4		2500.28		
5		2498.83		
	Repeatability =	2.271 µl		
	Average volume =	**2502.838 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5000	5004.31	± 2.557	2.87000
2		5002.13		
3		5000.04		
4		5000.18		
5		5000.09		
	Repeatability =	0.838 µl		
	Average volume =	**5001.349 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000037F **Certification No: MES/200117/C7**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 5-50µl**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: OW14281/ AJH/B/HRCLAB/MP/11**	**MODEL NO**	**: FINNPIPETTE F3**
NO OF CHANNELS	**: 1**	**Resolution of DUC: 0.1µl**	
Date of Calibration	**: 17/01/2020**	**Next calibration due : 09/08/2021**	
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 : **10/08/2020**

Calibrated by :

PRABIN. K P

(Lab In Charge)

Approved Signatory

MEDICAL ENGINEERING SERVICES THRISSUR-21

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000037F **Certification No: MES/200117/C7**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5*	4.99*	± 0.095*	2*
2		4.95*		
3		4.90*		
4		4.94*		
5		4.85*		
	Repeatability =	0.024* µl		
	Average volume =	**4.928* µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	25	24.83	± 0.134	2.21000
2		25.10		
3		24.94		
4		24.99		
5		24.92		
	Repeatability =	0.045 µl		
	Average volume =	**24.958 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	50	49.97	± 0.135	2.21000
2		49.94		
3		49.83		
4		50.11		
5		49.96		
	Repeatability =	0.045 µl		
	Average volume =	**49.966 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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	4.975E+01	3.483E-03	∞
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	∞
Repeatability	49.97	µl	-	-	Type A	4.486E-02	1.000E+00	4.486E-02	4
Va	49.97	µl						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_E, in the determination of volume = ± 0.187 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000038F **Certification No: MES/200117/C8**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 100-1000µl**	**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 :

PRABIN. K P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000038F **Certification No: MES/200117/C8**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	100	99.94	± 0.817	2
2		99.98		
3		99.90		
4		99.97		
5		99.89		
	Repeatability =	0.018 µl		
	Average volume =	**99.934 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.86	± 0.825	2
2		499.93		
3		500.11		
4		499.96		
5		499.82		
	Repeatability =	0.05 µl		
	Average volume =	**499.936 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	1000	1000.07	± 0.828	2
2		999.94		
3		999.96		
4		999.89		
5		999.95		
	Repeatability =	0.03 µl		
	Average volume =	**999.962 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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	∞
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	-	-	*Type A*	*2.970E-02*	*1.000E+00*	*2.970E-02*	*4*
Va	999.96	µl						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_E, 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000039F **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 :

PRABIN. K.P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000039F **Certification No: MES/200117/C9**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5	4.96	± 0.414	2
2		4.83		
3		4.98		
4		4.86		
5		4.99		
	Repeatability =	0.033 µl		
	Average volume =	**4.926 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	25	24.89	± 0.413	2
2		24.96		
3		25.08		
4		24.95		
5		24.92		
	Repeatability =	0.033 µl		
	Average volume =	**24.962 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	50	50.10	± 0.415	2
2		49.98		
3		49.87		
4		49.95		
5		49.99		
	Repeatability =	0.037 µl		
	Average volume =	**49.982 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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						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_E, in the determination of volume = ± 0.820 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000040F **Certification No: MES/200117/C10**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 0.5-5ML**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: PW13799/ AJH/B/HRCLAB/MP/07**	**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 :

PRABIN. K P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000040F **Certification No: MES/200117/C10**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.89	± 0.164	2.87000
2		499.96		
3		500.13		
4		499.97		
5		499.85		
	Repeatability =	0.048 µl		
	Average volume =	**499.96 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	2500	2497.76	± 0.516	2.87000
2		2497.87		
3		2498.22		
4		2497.66		
5		2497.78		
	Repeatability =	0.097 µl		
	Average volume =	**2497.858 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5000	4995.52	± 1.01	2.87000
2		4995.56		
3		4996.47		
4		4995.61		
5		4995.66		
	Repeatability =	0.179 µl		
	Average volume =	**4995.764 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	0.0	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						4.949E-01	

Combined Standard uncertainty = 0.495 µl

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_E, 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:

- 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: 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. K.P

(Lab In Charge)

Approved Signatory

MEDICAL ENGINEERING SERVICES THRISSUR-21

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000041F **Certification No: MES/200117/C11**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	100	99.98	± 0.818	2
2		99.93		
3		99.89		
4		99.94		
5		99.86		
	Repeatability =	0.021 µl		
	Average volume =	**99.918 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.88	± 0.821	2
2		499.93		
3		499.96		
4		499.82		
5		499.99		
	Repeatability =	0.03 µl		
	Average volume =	**499.916 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	1000	999.94	± 0.828	2
2		1000.07		
3		999.90		
4		999.93		
5		999.95		
	Repeatability =	0.029 µl		
	Average volume =	**999.958 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	-	-	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_E, 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000042F **Certification No: MES/200117/C12**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 100-1000µl**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: PW14441/ AJH/B/HRCLAB/MP/01**	**MODEL NO**	**: FINNPIPETTE F3**
NO OF CHANNELS	**: 1**	**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.P

(Lab In Charge)

Approved Signatory

MEDICAL ENGINEERING & SERVICES THRISSUR-21

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000042F **Certification No: MES/200117/C12**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	100	99.98	± 0.819	2
2		99.91		
3		99.86		
4		99.83		
5		100.00		
	Repeatability =	0.033 µl		
	Average volume =	**99.914 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.97	± 0.821	2
2		500.02		
3		499.95		
4		499.91		
5		499.86		
	Repeatability =	0.027 µl		
	Average volume =	**499.942 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	1000	999.99	± 0.829	2
2		999.94		
3		1000.12		
4		999.96		
5		999.90		
	Repeatability =	0.038 µl		
	Average volume =	**999.982 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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	999.98	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_E in the determination of volume = ± 1.645 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
- 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: 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**	**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 P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000043F **Certification No: MES/200117/C13**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	100	100.00	± 0.818	2
2		99.99		
3		99.92		
4		99.86		
5		99.91		
	Repeatability =	0.026 µl		
	Average volume =	**99.934 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.96	± 0.821	2
2		499.89		
3		500.02		
4		499.96		
5		499.87		
	Repeatability =	0.027 µl		
	Average volume =	**499.94 µl**		

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	1000	1001.05	± 0.933	2
2		999.99		
3		1000.07		
4		999.94		
5		999.90		
	Repeatability =	0.218 µl		
	Average volume =	**1000.191 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

Uncertainty Budget

Source of uncertainty	Estimates	Unit	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	∞
Resolution of micropipette	1	µl	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 µl

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_E in the determination of volume = ± 1.700 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.
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000044F **Certification No: MES/200117/C14**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 0.5-5ML**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: PW13792/AJH/B/HRCLAB/MP/06**	**MODEL NO**	**: FINNPIPETTE F3**
NO OF CHANNELS	**: 1**	**Resolution of DUC:0.001 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 P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

MEDICAL ENGINEERING & SERVICES

CALIBRATION REPORT

ULR: CC254320000000044F **Certification No: MES/200117/C14**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	500	499.97	± 0.167	2.87000
2		500.11		
3		499.88		
4		500.15		
5		500.07		
	Repeatability =	0.049 µl		
	Average volume =	**500.036 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	2500	2497.76	± 2.054	2.87000
2		2497.92		
3		2501.38		
4		2497.70		
5		2498.28		
	Repeatability =	0.699 µl		
	Average volume =	**2498.607 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5000	4995.52	± 0.997	2.87000
2		4995.66		
3		4996.47		
4		4995.65		
5		4995.73		
	Repeatability =	0.17 µl		
	Average volume =	**4995.806 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	µl	1.00E-03	1.22	Type B, Rtglr	8.164E-04	1.000E+00	8.164E-04	∞
Repeatability	4995.81	µl	-	-	Type A	1.702E-01	1.000E+00	1.702E-01	4
Va	4995.81	µl						4.918E-01	

Combined Standard uncertainty = 0.492 µl

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_E in the determination of volume = ± 0.984 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
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.

MEDICAL ENGINEERING & SERVICES THRISSUR

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000045F **Certification No: MES/200117/C15**

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

DEVICE UNDER CALIBRATION

EQUIPMENT	**: MICRO PIPETTE**		
RANGE	**: 5-50µl**	**MAKE**	**: THERMO SCIENTIFIC**
SL.NO/ID	**: PW10158/AJH/B/HRCLAB/MP/09**	**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 :

PRABIN. K P

(Lab In Charge)

Approved Signatory

THRISSUR-21

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000045F **Certification No: MES/200117/C15**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5	5.06	± 0.414	2
2		5.14		
3		5.01		
4		5.21		
5		5.07		
	Repeatability =	0.035 µl		
	Average volume =	**5.101 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	25	24.92	± 0.413	2
2		24.87		
3		25.02		
4		24.94		
5		25.02		
	Repeatability =	0.029 µl		
	Average volume =	**24.956 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	50	49.98	± 0.416	2
2		50.06		
3		49.90		
4		50.03		
5		50.13		
	Repeatability =	0.039 µl		
	Average volume =	**50.024 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	µl	5.00E-01	1.22	Type B, Rtglr	4.082E-01	1.000E+00	4.082E-01	∞
Repeatability	50.02	µl	-	-	Type A	3.877E-02	1.000E+00	3.877E-02	4
Va	50.02	µl						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_E in the determination of volume = ± 0.820 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.
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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 :

PRABIN. K P

(Lab In Charge)

Approved Signatory

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000046F **Certification No: MES/200117/C16**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	5	4.96	± 0.103	2
2		4.98		
3		4.83		
4		5.01		
5		4.95		
	Repeatability =	0.031 µl		
	Average volume =	**4.948 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	25	24.88	± 0.113	2.13000
2		24.96		
3		25.08		
4		24.92		
5		24.97		
	Repeatability =	0.034 µl		
	Average volume =	**24.964 µl**		
Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	50	50.11	± 0.126	2.17000
2		49.97		
3		49.93		
4		49.88		
5		50.04		
	Repeatability =	0.041 µl		
	Average volume =	**49.99 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	µl						9.145E-02	

Combined Standard uncertainty = 0.091 µl

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_E in the determination of volume = ± 0.183 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.
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: CC254320000000047F **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**
NO OF CHANNELS	**: 1**	**Resolution of DUC:0µl**	
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

BINOJ THOMAS

(Quality /Technical Manager)

MEDICAL ENGINEERING & SERVICES THRISSUR-21

CALIBRATION REPORT

ULR: CC254320000000047F **Certification No: MES/200117/C17**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	250	249.85	± 0.238	2.87000
2		250.28		
3		249.94		
4		249.83		
5		249.99		
Repeatability =		0.081 µl		
Average volume =		**249.978 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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	∞
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	∞
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_E in the determination of volume = ± 0.243 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
- The recalibration interval should be determined based on the user requirement.
- Calibration certificate issued for scientific or industrial purpose only.

MEDICAL ENGINEERING & SERVICES THRISSUR-21

Cert No. CC-2543

Medical Engineering & Services

Things Beyond Thoughts

(An ISO/IEC 17025:2005 NABL Accredited Calibration Laboratory)

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: 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:0µl**	
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

BINOJ THOMAS

(Quality /Technical Manager)

CALIBRATION REPORT

ULR: CC254320000000048F **Certification No: MES/200117/C18**

Sl.no.	Volume µl	Actual volume µl	Expanded uncertainty µl	Coverage factor (k)
1	145	144.83	± 0.129	2.87000
2		144.97		
3		145.04		
4		144.98		
5		144.82		
	Repeatability =	0.044 µl		
	Average volume =	**144.927 µl**		

The reported expanded uncertainty is the uncertainty in measurement multiplied by the coverage factor k corresponds to a normal distribution at a confidence level of 95.45%.

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_E 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.
- 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.

MEDICAL ENGINEERING & SERVICES THRISSUR-21