



ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือวิเคราะห์

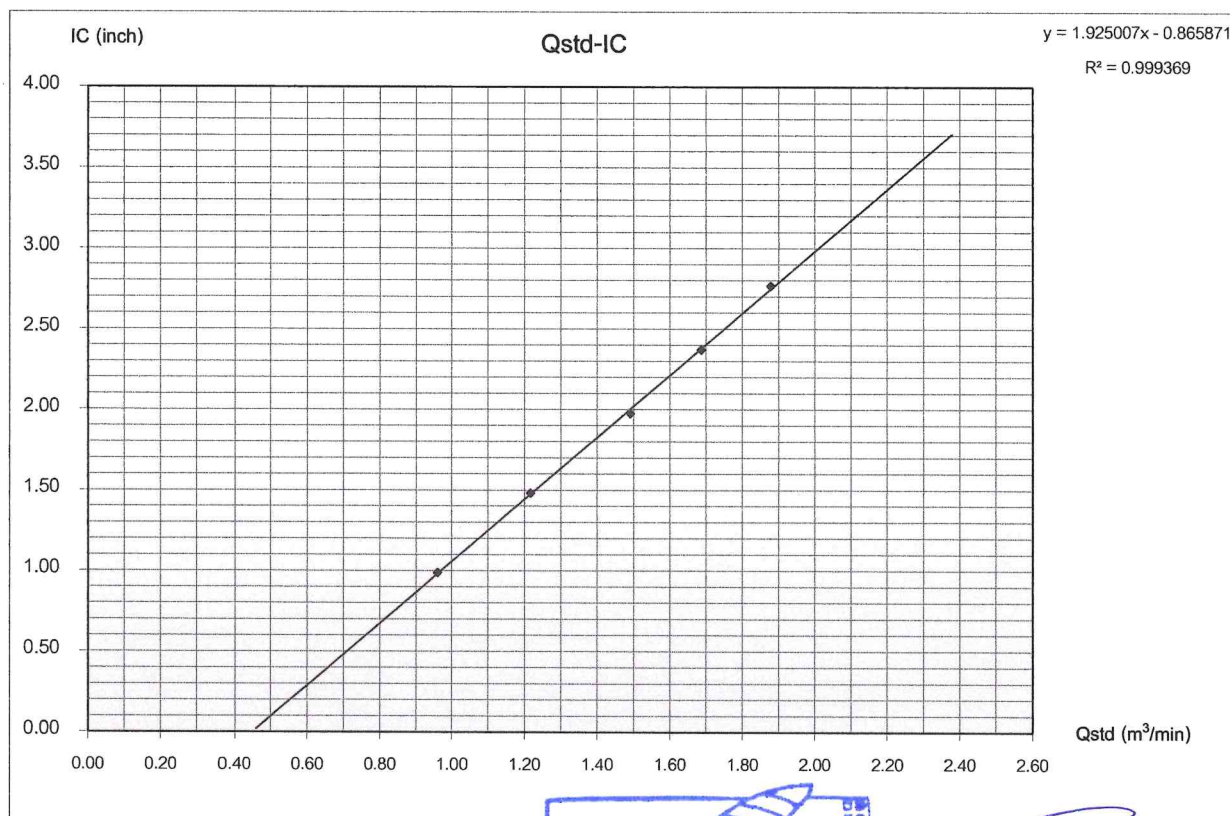
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-01275	Date	June 15, 2026
Sampler Location	บ้านพักอาศัยด้านทิศเหนือ	Start Time	8:45 AM
Sampler Number	PM-10 No.39	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A
Motor Serial Number	2025-39	Calibrator Serial Number	2919
Recorder Serial Number	-	Calibrated By	Mr. Nuttapon Juisup

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop	
	Pressure Drop Across Orifice (inH ₂ O)			[ΔH ₂ O(Pa/P _{std})(T _{std} /Ta)] ^{1/2}	Qstd = (1/m)[(A-b)] (m ³ /min)	sample Flow Rate indication (inch/min)	IC = I[(Pa/P _{std})(T _{std} /Ta)] ^{1/2}	(°K = °C+273)	Pressure (mmHg)	Meter	Meter	
	Positive	Negative	ΔH ₂ O									
5	1.5	1.5	3.0	1.71262	0.95982	1.0	0.99	304.0	758.0			
7	2.4	2.4	4.8	2.16631	1.21606	1.5	1.48	304.0	758.0			
10	3.6	3.6	7.2	2.65317	1.49103	2.0	1.98	304.0	758.0			
13	4.6	4.6	9.2	2.99911	1.68641	2.4	2.37	304.0	758.0			
18	5.7	5.7	11.4	3.33850	1.87809	2.8	2.77	304.0	758.0			
Linear Regression Y ON X : Y= mX + b							Average	304.0	758.0			
1	Slope (m)			1.77059	Linear Equation			r ²	0.999369	Pstd(mmHg)	760.0	
2	Intercept (b)			0.01317	Set Point Flow Rate (X) (m ³ /min)			1.133	r	0.9996845	T _{NTP}	298.0
3	Correlation Coefficient (r)			0.99974	Final Set Flow Rate = (I)			0	(Pa/Pstd)*(Tstd/Ta)			0.977683518
Result									C=(Pa/Pstd)*(Tstd/Ta)^0.5			0.988778801

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

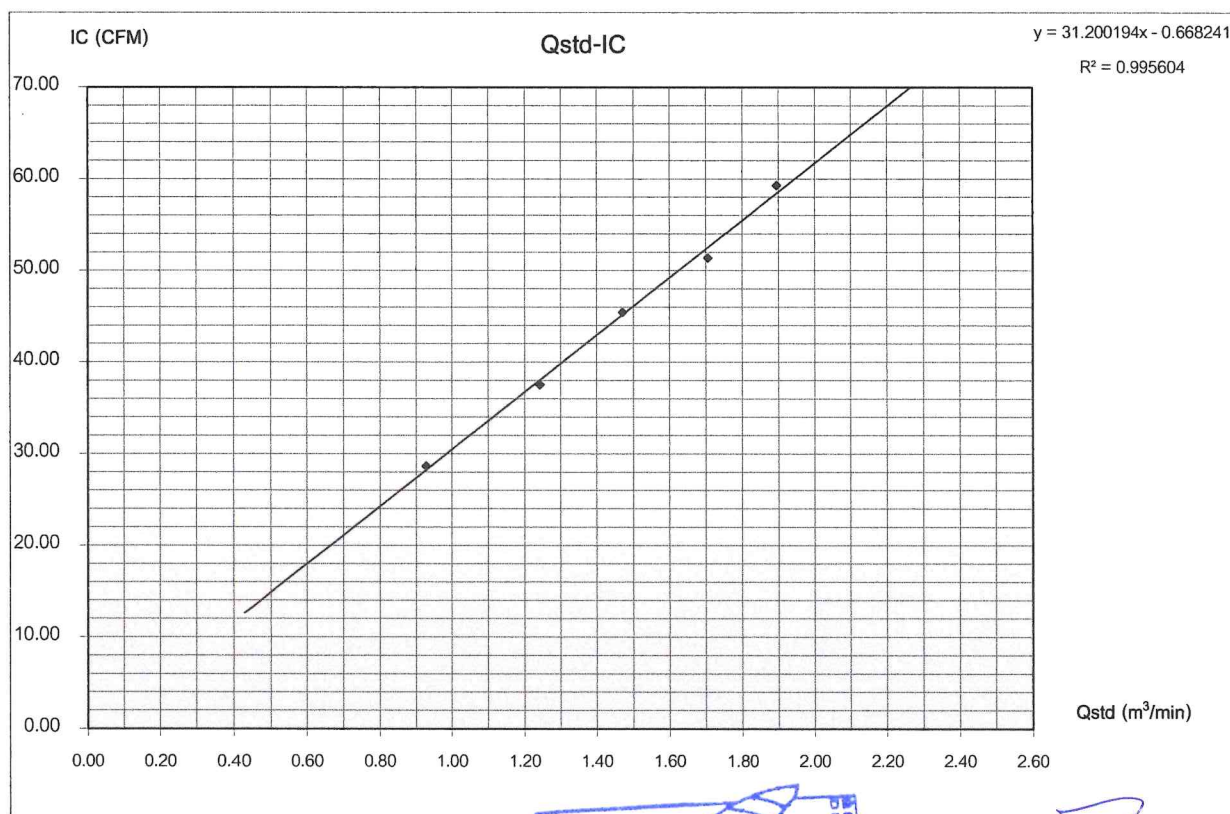
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-01275	Date	June 15, 2026
Sampler Location	บ้านพักอาศัยด้านทิศเหนือ	Start Time	8:56 AM
Sampler Number	TSP No.A1	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A
Motor Serial Number	3680	Calibrator Serial Number	2919
Recorder Serial Number	0954	Calibrated By	Mr. Nuttapon Juisup

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Pressure Drop Across Orifice (inH ₂ O)			$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$	Sample Flow Rate Indication	$IC = I[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(*K = °C+273)	(mmHg)		
	Positive	Negative	ΔH ₂ O		(m ³ /min)	(ft ³ /min)					
5	1.4	1.4	2.8	1.65454	0.92702	29.0	28.67	304.0	758.0		
7	2.5	2.5	5.0	2.21098	1.24128	38.0	37.57	304.0	758.0		
10	3.5	3.5	7.0	2.61606	1.47007	46.0	45.48	304.0	758.0		
13	4.7	4.7	9.4	3.03154	1.70472	52.0	51.42	304.0	758.0		
18	5.8	5.8	11.6	3.36766	1.89456	60.0	59.33	304.0	758.0		
Linear Regression Y ON X : Y= mX + b							Average	304.0	758.0		
1	Slope (m)			1.77059	Linear Equation			r ²	0.995604	Pstd(mmHg)	760.0
2	Intercept (b)			0.01317	Set Point Flow Rate (X) (m ³ /min)		1.133	r	0.9977996	T _{NTP}	298.0
3	Correlation Coefficient (r)			0.99974	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.977683518	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.988778801	

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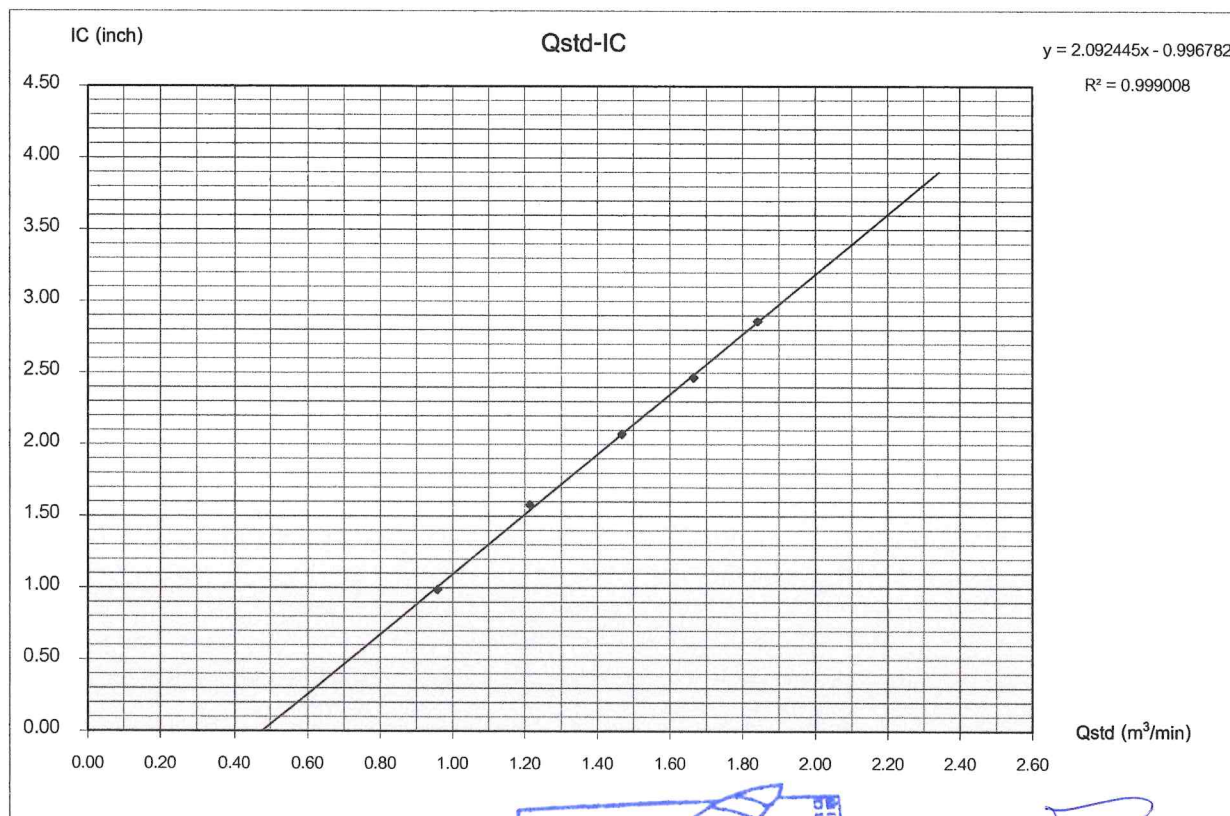
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-01275			Date	June 15, 2026
Sampler Location	บ้านพักอาศัยด้านทิศตะวันออก			Start Time	9:40 AM
Sampler Number	PM-10 No.35	Transfer Standard Type	Orifice	Stop Time	9:50 AM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A	Calibrated By	Mr. Nuttapon Juisp
Motor Serial Number	2024-35	Calibrator Serial Number	2919		
Recorder Serial Number	-				

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Pressure Drop Across Orifice (inH ₂ O)			$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ (m ³ /min)	sample Flow Rate Indication (inch/min)	$IC = I[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(°K = °C+273)	(mmHg)		
	Positive	Negative	ΔH ₂ O								
5	1.5	1.5	3.0	1.70981	0.95823	1.0	0.99	305.0	758.0		
7	2.4	2.4	4.8	2.16275	1.21405	1.6	1.58	305.0	758.0		
10	3.5	3.5	7.0	2.61177	1.46765	2.1	2.07	305.0	758.0		
13	4.5	4.5	9.0	2.96147	1.66515	2.5	2.47	305.0	758.0		
18	5.5	5.5	11.0	3.27403	1.84168	2.9	2.86	305.0	758.0		
Linear Regression Y ON X : Y= mX + b							Average	305.0	758.0		
1	Slope (m)			1.77059	Linear Equation			r ²	0.999008	Pstd(mmHg)	760.0
2	Intercept (b)			0.01317	Set Point Flow Rate (X) (m ³ /min)		1.133	r	0.9995039	T _{NTP}	298.15
3	Correlation Coefficient (r)			0.99974	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.974477998	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.987156522	

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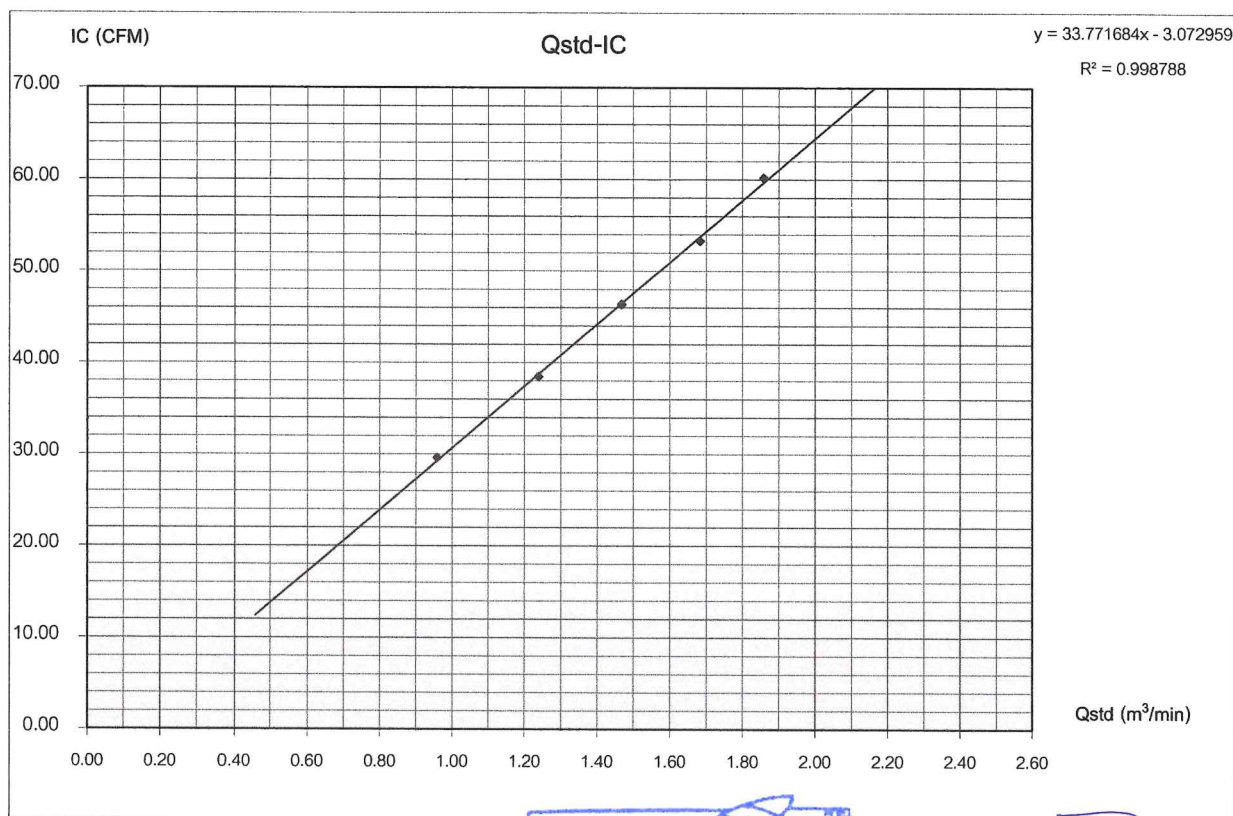
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-01275	Date	June 15, 2026
Sampler Location	บ้านพักอาศัยด้านทิศตะวันออก	Start Time	9:51 AM
Sampler Number	TSP No.A10	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A
Motor Serial Number	2012-04	Calibrator Serial Number	2919
Recorder Serial Number	1504	Calibrated By	Mr. Nuttapon Juisp

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (inH ₂ O)			$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$	Sample Flow Rate Indicator	$IC = I[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$		Pressure	Meter	Meter
	Positive	Negative	ΔH_2O		(m ³ /min)	(ft ³ /min)		(°K = °C+273)	(mmHg)		
5	1.5	1.5	3.0	1.70981	0.95823	30.0	29.61	305.0	758.0		
7	2.5	2.5	5.0	2.20735	1.23924	39.0	38.50	305.0	758.0		
10	3.5	3.5	7.0	2.61177	1.46765	47.0	46.40	305.0	758.0		
13	4.6	4.6	9.2	2.99419	1.68363	54.0	53.31	305.0	758.0		
18	5.6	5.6	11.2	3.30366	1.85841	61.0	60.22	305.0	758.0		
Linear Regression Y ON X : Y= mX + b							Average	305.0	758.0		
1	Slope (m)			1.77059	Linear Equation			r ²	0.998788	Pstd(mmHg)	760.0
2	Intercept (b)			0.01317	Set Point Flow Rate (X) (m ³ /min)			1.133	r	0.9993938	T _{NTP}
3	Correlation Coefficient (r)			0.99974	Final Set Flow Rate = (I)			0	(Pa/Pstd)*(Tstd/Ta)		0.974477998
Result									C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.987156522

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist



JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.
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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.



NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : COF-013-069

Page 1 of 2 Pages

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 2919
ID NUMBER : -
CONDITION AS-RECEIVED : Used item
CUSTOMER : Environment Research & Technology Co., Ltd.
25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

RECEIVED DATE : 04 Jan 2026
MEASUREMENT DATE : 29 Jan 2026
ISSUE DATE : 30 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are 23.9 °C and 63.8 %RH.

NOTED: The certificate is valid only to the item calibrated on date and place of calibration.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:

The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/W2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:

This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0063-23.

Uncertainty of Measurement:

The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

Calibrated by:

- ☐ Mr. Sorawit Thachalad
☒ Miss Jittraporn Lertsomphol



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	Y	Standard Flow [Q_s] m^3/min
1	0.696	761.303	23.97	23.42	53.502	1.358	1.169	0.652
2	1.001	761.260	23.59	23.04	58.300	2.755	1.665	0.932
3	1.111	761.216	23.70	23.27	39.578	3.557	1.892	1.062
4	1.165	761.175	23.82	23.34	28.812	4.010	2.008	1.129
5	1.416	761.184	23.58	23.16	27.005	5.983	2.454	1.377

Slope (m): 1.77059
 Intercept (b): 0.01317
 Correlation coefficient (r): 0.99974
 Uncertainty ($k=2$): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	Y	Standard Flow [Q_a] m^3/min
1	0.696	761.303	23.97	23.42	53.502	1.358	0.728	0.649
2	1.001	761.260	23.59	23.04	58.300	2.755	1.036	0.926
3	1.111	761.216	23.70	23.27	39.578	3.557	1.178	1.055
4	1.165	761.175	23.82	23.34	28.812	4.010	1.251	1.123
5	1.416	761.184	23.58	23.16	27.005	5.983	1.527	1.368

Slope (m): 1.10898
 Intercept (b): 0.00822
 Correlation coefficient (r): 0.99973
 Uncertainty ($k=2$): 0.015 m^3/min

End of Certificate of Calibration



Mettler-Toledo (Thailand) Limited

846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District

Bangna District, Bangkok 10260

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MT-TH.ServiceSupport@mt.com



NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong
City: Laksi **Contact:** Ramita Taengthai
Zip / Postal: 10210
State / Province: Bangkok
Order Number: 
0 3 3 3 7 8 4 4 8 2

Weighing Device

Manufacturer: Mettler Toledo **Terminal Model:** N/A
Model: AB204-S **Terminal Serial No.:** N/A
Serial No.: 1123103723 **Terminal Asset No.:** N/A
Instrument Type: Weighing Instrument **Building:** N/A
Asset Number: ERTC-L-IN-0048 **Floor:** 4
Room: 406

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

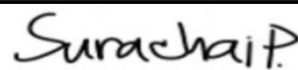
Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 25.0 °C	End: 24.9 °C	Start: 39.7 %	End: 40.8 %

As Found Calibration Date: 26-Jan-2026 **Calibrator:** 
As Left Calibration Date: N/A
Issue Date: 27-Jan-2026 **Surachai Pidkanpai**

Approved Signatory:

Technical Manager / Head of Calibration Center

Measurement Results

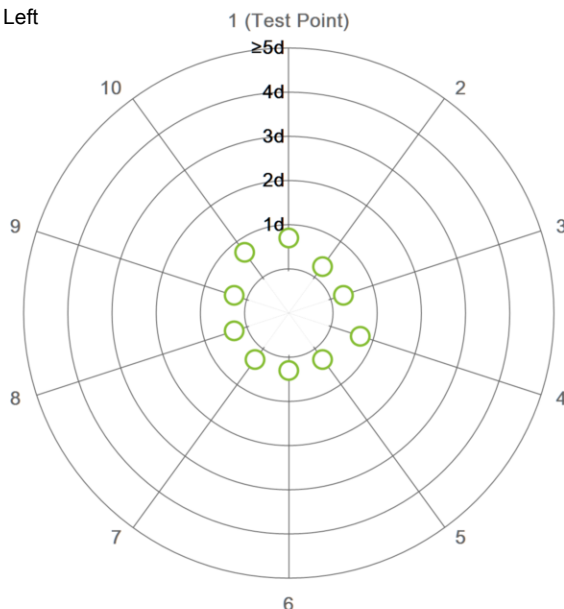
Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
6	99.9999 g	N/A
7	99.9999 g	N/A
8	99.9999 g	N/A
9	99.9999 g	N/A
10	100.0000 g	N/A

Standard Deviation	0.00005 g	N/A
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○ As Found
◆ As Left



The "d" in the graph represents the readability of the range/interval in which the test was performed.

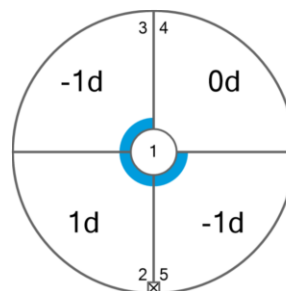
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A

Maximum Deviation	0.0001 g	N/A
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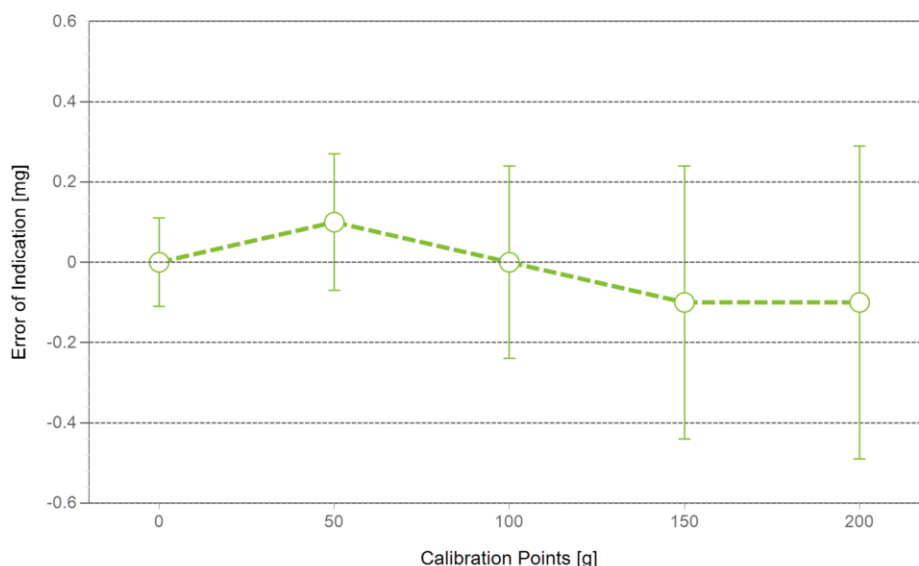
As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.11 mg	2
2	0.0500 g	0.0499 g	-0.0001 g	0.13 mg	2
3	0.1000 g	0.0999 g	-0.0001 g	0.13 mg	2
4	0.5000 g	0.4999 g	-0.0001 g	0.13 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.13 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.13 mg	2
7	10.0000 g	9.9999 g	-0.0001 g	0.14 mg	2
8	50.0000 g	50.0001 g	0.0001 g	0.17 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.24 mg	2
10	150.0001 g	150.0000 g	-0.0001 g	0.34 mg	2
11	200.0001 g	200.0000 g	-0.0001 g	0.39 mg	2



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS105	Date of Issue:	14-Apr-2025
Certificate Number:	C515828262	Calibration Due Date:	02-Oct-2026

Thermo Hygrometer

Equipment No.:	IN305	Date of Issue:	17-Oct-2025
Certificate Number:	SG-H-00885/68	Calibration Due Date:	14-Oct-2026

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

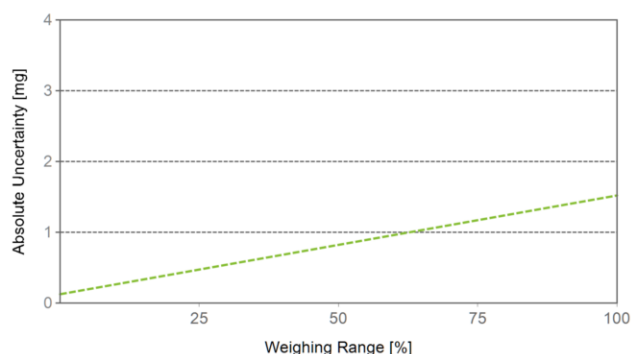
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.13 \text{ mg} + 0.00634 \text{ mg/g} \cdot R$	N/A

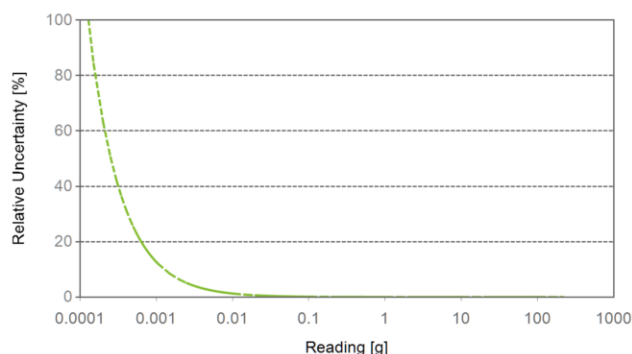
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.13 mg	0.59%	N/A	N/A
0.2200 g	0.13 mg	0.060%	N/A	N/A
2.2000 g	0.14 mg	0.0065%	N/A	N/A
22.0000 g	0.27 mg	0.0012%	N/A	N/A
220.0000 g	1.5 mg	0.00069%	N/A	N/A



As Found



As Left



Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
► www.mt.com/ACC-Cert-Info



GWP™ Certificate



Process Requirements

Weighing Tolerance	1%
Smallest Net Weight	0.0500 g
Safety Factor	As found = 1; As left = 2

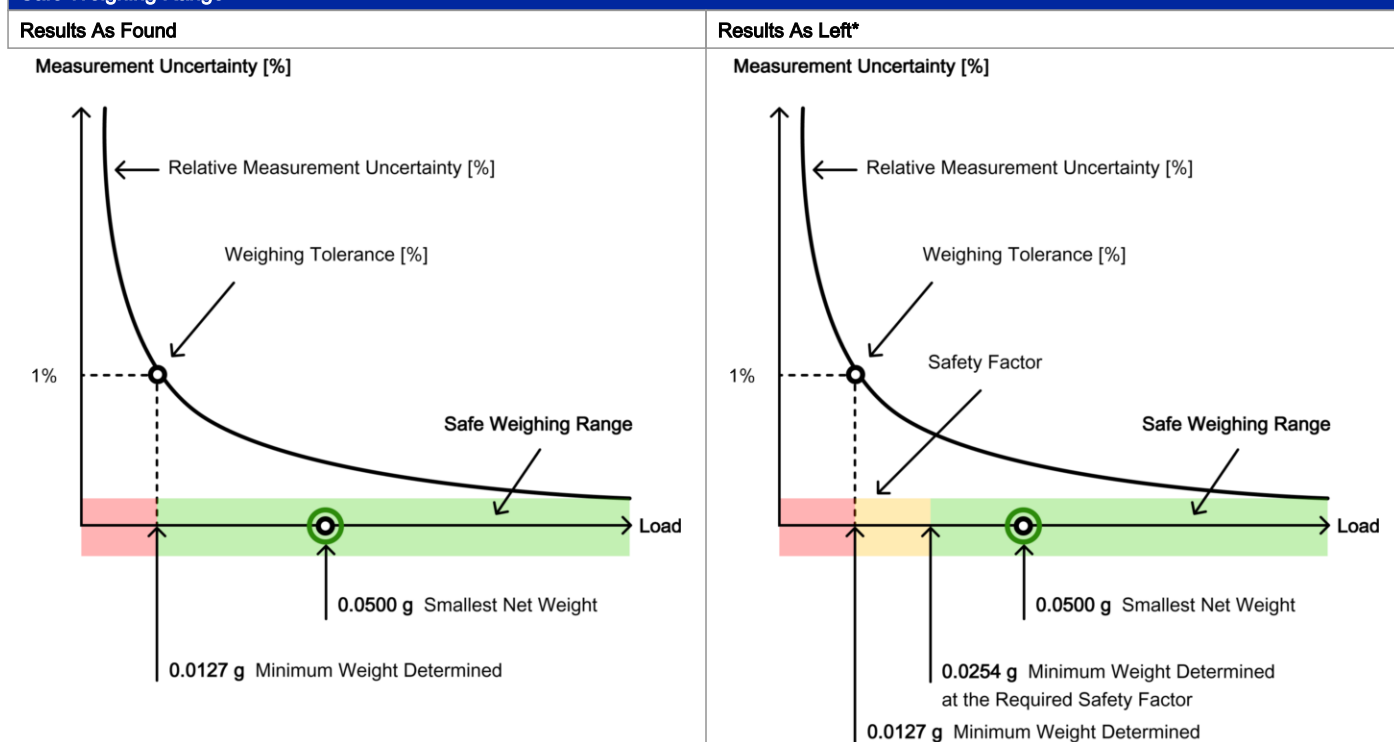
Results As Found

Minimum Weight Determined	0.0127 g	The instrument meets the process requirements.
Measurement Uncertainty at the Smallest Net Weight	0.25%	

Results As Left*

Minimum Weight Determined at the Safety Factor	0.0254 g	The instrument meets the process requirements.
Minimum Weight Determined	0.0127 g	
Measurement Uncertainty at the Smallest Net Weight	0.25%	

Safe Weighing Range



* No adjustments/modifications made. As Left results correspond to As Found.



Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:

► www.mt.com/GWP-Cert-Info



Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1273 g	0.2563 g	0.3869 g	0.6532 g	1.3506 g
0.2%	0.0635 g	0.1273 g	0.1916 g	0.3214 g	0.6532 g
0.5%	0.0254 g	0.0508 g	0.0762 g	0.1273 g	0.2563 g
1%	0.0127 g	0.0254 g	0.0381 g	0.0635 g	0.1273 g
2%	0.0064 g	0.0127 g	0.0190 g	0.0317 g	0.0635 g
5%	0.0026 g	0.0051 g	0.0076 g	0.0127 g	0.0254 g

Result:



Pass

The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1273 g	0.2563 g	0.3869 g	0.6532 g	1.3506 g
0.2%	0.0635 g	0.1273 g	0.1916 g	0.3214 g	0.6532 g
0.5%	0.0254 g	0.0508 g	0.0762 g	0.1273 g	0.2563 g
1%	0.0127 g	0.0254 g	0.0381 g	0.0635 g	0.1273 g
2%	0.0064 g	0.0127 g	0.0190 g	0.0317 g	0.0635 g
5%	0.0026 g	0.0051 g	0.0076 g	0.0127 g	0.0254 g

Result:



Pass

The instrument meets the process requirements.

No adjustments or modifications were made and thus As Left results correspond to As Found.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors.

At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 12 January, 2026

Certification No. 022/26

Page : 1 of 6

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro2

Serial No. : AS160105025 ID No. : No.24

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1016.9 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

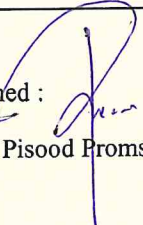
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

Calibrated by : 

Mr. Watcharapol Subwat

Mechanical Engineer

Signed : 

Mr. Pisood Promsut





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 022/26

12 January, 2026

Page : 2 of +6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacumm inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.1	-0.09
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.08

Vane Angel Bench Stand Model 18112	
Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Watchapol

Mr. Watchapol Subwat
Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 12 January, 2026

Certification No. 021/26

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III Product No. 7425

Serial No. : WC40801A97 ID No. : No.16

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1016.2 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

Calibrated by :

Wacharapol

Mr. Wacharapol Subwat

Mechanical Engineer

Signed :

Mr. Pisood Promsut





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 021/26

12 January, 2026

Page : 2 of 2

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	6.7	0.34
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.8	0.21
13.01	-	-	-	12.9	0.11
15.01	-	-	-	14.8	0.21
17.02	-	-	-	16.9	0.12
20.02	-	-	-	19.8	0.22

Vane Angel Bench Stand Model 18112	
Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

hstomarpol

Mr. Watcharapol Subwat

Mechanical Engineer





THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0122

MTC No. EEL. BP. 37/1268

CALIBRATION CERTIFICATE

Submitted by : Environment Research & Technology Co.,Ltd.

Address : 25/114 Moo6, Soi Chinaket1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok, 10210.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Ambient Environment

Description : Precision Acoustic Calibrator

Temperature : $(23 \pm 3) ^\circ\text{C}$

Manufacturer : Larson Davis

Relative Humidity : $(50 \pm 15) \%$

Model : CAL200

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Serial No. : 23396

Standards used :

1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone B&K 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 22 Dec. 2025

Date of Calibration : 7 Jan. 2026

1 / 3

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office

35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
Fax. (66) 0 2577 9009

Office/Laboratory

668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan,
Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office

196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0122

MTC No. EEL. BP. 37/1268

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa , Corrected to Reference Conditions : 101.325 kPa , 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	93.74	-0.26	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	1000.1	0.1	± 1.5	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	1.35	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Date of Calibration : 7 Jan. 2026

2 / 3

The results relate only to the items tested/calibrated or value assigned.

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FM.BL.MTC.002 Rev.5

Head Office

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Changwat Samutprakan 10280, Thailand
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(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office

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Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0122

MTC No. EEL. BP. 37/1268

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	113.72	-0.28	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.1	0.1	± 1.5	$\pm 1.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	0.29	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Calibrated by :


.....
(Mr. Weerachai Deechaiyae)

Approved by :


.....
(Mr. Prawate Kluaypa)

Director
TISTR

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 7 Jan. 2026

Date of Issue : 8 Jan. 2026

Ref : 2011268122205065002

End of Certificate

3 / 3

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Head Office

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Office

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Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827



Certificate of Calibration

Cert.No.: 26CH16

Page.: 1 of 2

Equipment :	pH Meter
Manufacturer :	Eutech
Model :	pHTestr 30
Serial No. :	5003714
ID No. :	-
Condition As-Received:	Used Item
Received Date :	06 January 2026
Calibration Date :	08 January 2026
Reference :	2601-0066DN-1
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with reference material (RM)
Calibrated by :	Warakorn Lerngagtrakul
Approved by :	 Approved Signatory
() Chakrit Waewwanjua	
() Ponpan Paipim	
(✓) Saithip Meangmai	
Issue Date :	09 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Calibration and Testing Equipment Services.



Cert.No.: 26CH16
Page.: 2 of 2

Condition of this calibration result

1. Certified Reference Materials : Standard buffer solution (Traceable to NIST, U.S.A.)

<u>Buffer Solution</u>	<u>Manufacturer</u>	<u>Lot No.</u>	<u>Exp. date</u>
pH 4.01	Thermo Scientific	234/04	07 June 2027
pH 7.00	Thermo Scientific	174/01	26 Apr 2027
pH 10.01	Thermo Scientific	363/03	08 Sep 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement ($\pm$)	Coverage factor k
pH Electrode S/N.: 5003714	4.01	4.00	N/A	0.013	2.00
	7.00	7.00	N/A	0.013	2.00
	10.01	10.02	N/A	0.017	2.00

Remark

- pH meter does not have voltage mode.
- Can not connect the BNC because the plug does not match with the socket.
- N/A = Not Available

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

-o0o-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 26TM92

Page : 1 of 3

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UF 110

Serial No. : B414.0652

ID No. : ERTC-L-In-098

Submitted by : Environment Research & Technology Company Limited.
25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi,
Bangkok 10210

Location : หน้าห้อง 510

Received Order : 06 January 2026

Calibration Date : 06 January 2026

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by :

Approved Signatory

- () Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 23 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2601-0016ON-3

Cert. No.: 26TM92

Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

<u>Instrument</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Traceable</u>	<u>Due Date</u>
1) Data Acquisition	MY49001451	25LM45	TPA	15 Mar 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.

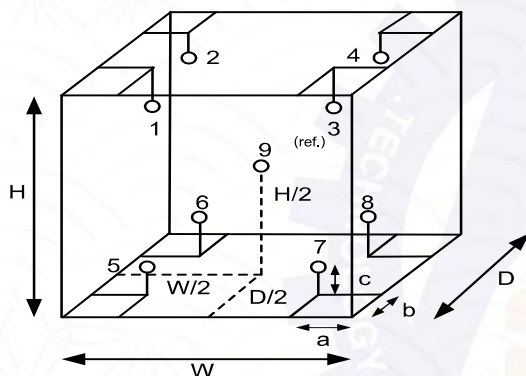
3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	30
REL.Humid. (%)	47	53
AC Supply (Volt)	220	221

Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	19RTD-2/1	24-19TC-01
2	19RTD-2/2	24-19TC-02
3	19RTD-2/3	24-19TC-03
4	19RTD-2/4	24-19TC-04
5	19RTD-2/5	24-19TC-05
6	24-19RTD-2/6	24-19TC-06
7	19RTD-2/7	24-19TC-07
8	19RTD-2/8	24-19TC-08
9 (ref.)	19RTD-2/9	24-19TC-09

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.40 m
W = 0.56 m
H = 0.48 m
Capacity = 0.11 m³



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2601-0016ON-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 26TM92

Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor <i>k</i>
104.0	104.0	104.0	0.087	0.76	1.3	2
180.0	180.0	180.0	0.26	2.1	3.3	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (±°C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.789	103.617	103.728	104.014	104.595	104.034	104.201	103.758	104.320	0.42
180.0	181.961	178.946	179.766	180.263	181.771	180.723	179.204	180.550	180.823	1.1

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 26TM91

Page : 1 of 3

Equipment : Hot Air Oven

Manufacturer : Binder

Model : FED 115 E2

Serial No. : 11-22823

ID No. : ERTC-L-In-076

Submitted by : Environment Research & Technology Company Limited.
25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi,
Bangkok 10210

Location : หน้าห้อง 510

Received Order : 06 January 2026

Calibration Date : 06 January 2026

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by :

Approved Signatory

- () Chakrit Waewwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 23 January 2026

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2601-0016ON-2

Cert. No.: 26TM91

Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

<u>Instrument</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Traceable</u>	<u>Due Date</u>
1) Data Acquisition	MY49001451	25LM45	TPA	15 Mar 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.

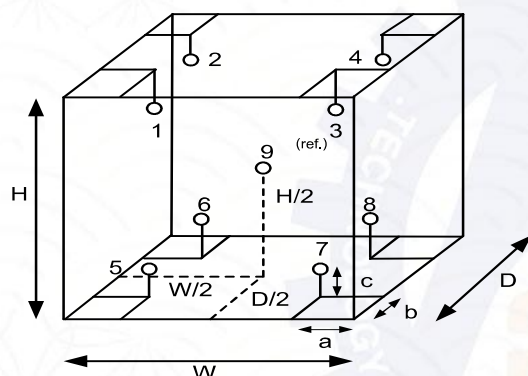
3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	30
REL.Humid. (%)	47	53
AC Supply (Volt)	220	221

Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	19RTD-2/1	24-19TC-01
2	19RTD-2/2	24-19TC-02
3	19RTD-2/3	24-19TC-03
4	19RTD-2/4	24-19TC-04
5	19RTD-2/5	24-19TC-05
6	24-19RTD-2/6	24-19TC-06
7	19RTD-2/7	24-19TC-07
8	19RTD-2/8	24-19TC-08
9 (ref.)	19RTD-2/9	24-19TC-09

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.40 m
W = 0.60 m
H = 0.48 m
Capacity = 0.12 m³



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2601-0016ON-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 26TM91

Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor <i>k</i>
104	105	105	0.13	2.7	3.0	2
180	180	180	0.37	5.0	6.1	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (±°C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104	105.267	104.091	105.896	104.807	104.687	103.614	106.458	104.250	103.847	0.90
180	179.002	177.717	181.894	179.943	179.396	177.051	182.606	178.649	178.035	1.7

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

Mettler-Toledo (Thailand) Limited

846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District

Bangna District, Bangkok 10260

+662 723 0382

MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong
City: Laksi Contact: Ramita Taengthai
Zip / Postal: 10210
State / Province: Bangkok
Order Number: 
0 3 3 3 7 8 4 4 8 2

Weighing Device

Manufacturer: Mettler Toledo Terminal Model: N/A
Model: MS204S/01 Terminal Serial No.: N/A
Serial No.: B334691537 Terminal Asset No.: N/A
Instrument Type: Weighing Instrument Building: N/A
Asset Number: ERTC-L-IN-088 Floor: 5
Room: 504

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

As Found	Temperature		Humidity	
	Start: 24.2 °C	End: 23.8 °C	Start: 39.3 %	End: 33.6 %

As Found Calibration Date: 26-Jan-2026
As Left Calibration Date: N/A
Issue Date: 27-Jan-2026

Calibrator: 
Surachai Pidkanpai

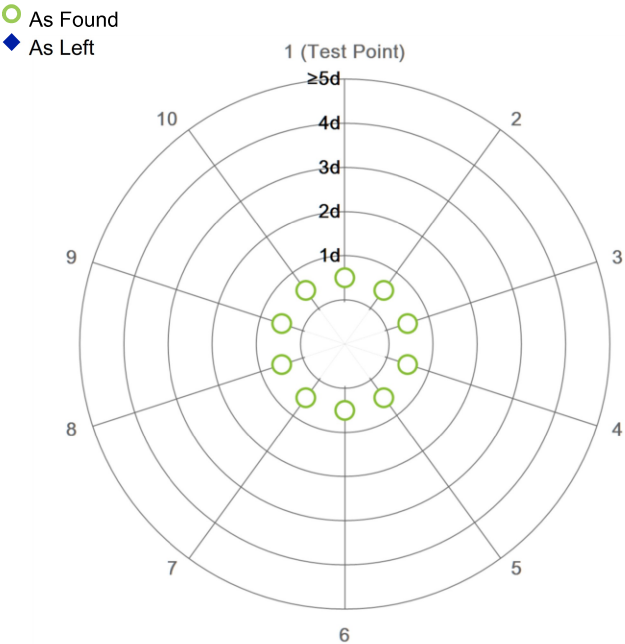
Approved Signatory: 
Technical Manager / Head of Calibration Center

Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0001 g	N/A
2	100.0001 g	N/A
3	100.0000 g	N/A
4	100.0001 g	N/A
5	100.0001 g	N/A
6	100.0000 g	N/A
7	100.0000 g	N/A
8	100.0001 g	N/A
9	100.0000 g	N/A
10	100.0000 g	N/A
Standard Deviation	0.00005 g	N/A



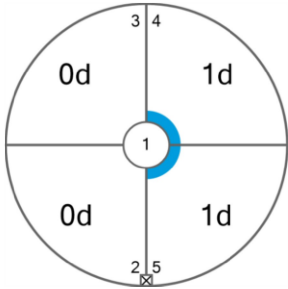
The "d" in the graph represents the readability of the range/interval in which the test was performed.

The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0001 g	N/A
2	100.0001 g	N/A
3	100.0001 g	N/A
4	100.0002 g	N/A
5	100.0002 g	N/A
Maximum Deviation	0.0001 g	N/A



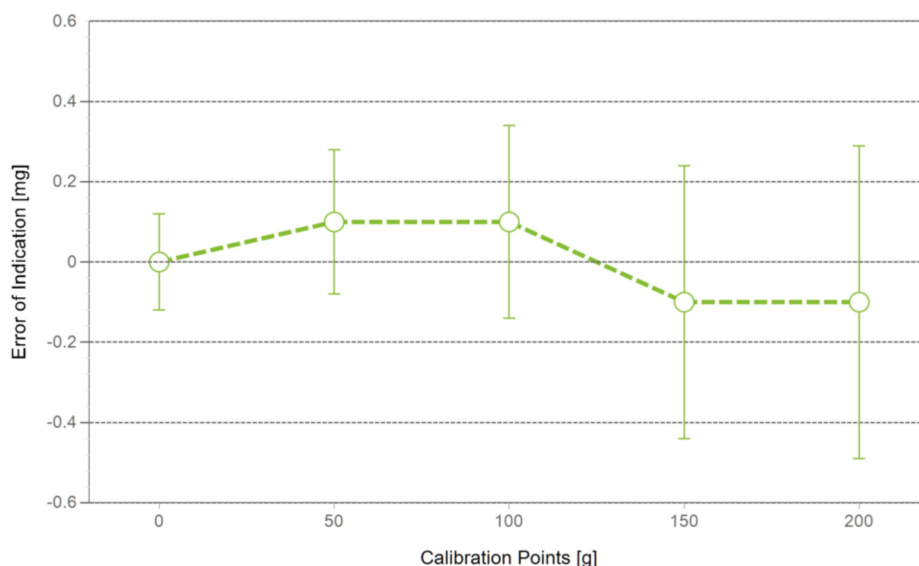
As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.12 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.13 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.13 mg	2
4	0.5000 g	0.5001 g	0.0001 g	0.14 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.14 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.14 mg	2
7	10.0000 g	10.0001 g	0.0001 g	0.15 mg	2
8	50.0000 g	50.0001 g	0.0001 g	0.18 mg	2
9	100.0000 g	100.0001 g	0.0001 g	0.24 mg	2
10	150.0001 g	150.0000 g	-0.0001 g	0.34 mg	2
11	200.0001 g	200.0000 g	-0.0001 g	0.39 mg	2



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS105	Date of Issue:	14-Apr-2025
Certificate Number:	C515828262	Calibration Due Date:	02-Oct-2026

Thermo Hygrometer

Equipment No.:	IN305	Date of Issue:	17-Oct-2025
Certificate Number:	SG-H-00885/68	Calibration Due Date:	14-Oct-2026

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

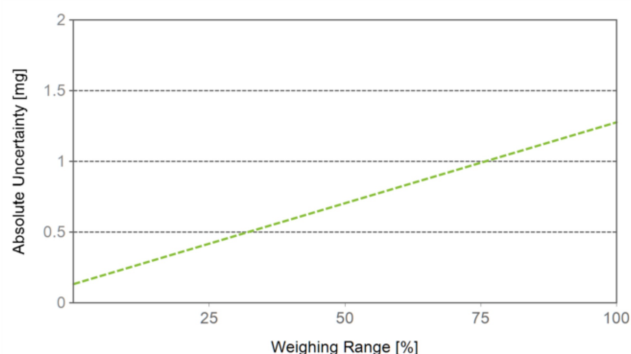
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.13 \text{ mg} + 0.00520 \text{ mg/g} \cdot R$	N/A

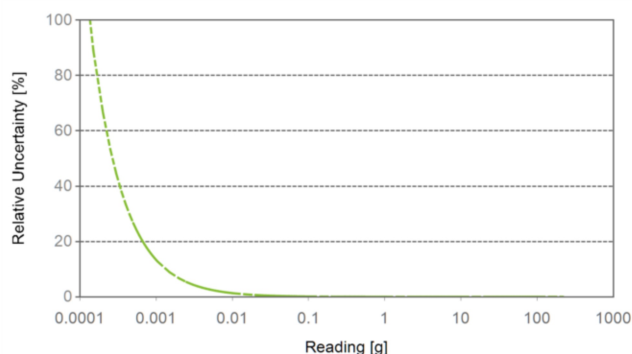
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.13 mg	0.59%	N/A	N/A
0.2200 g	0.13 mg	0.060%	N/A	N/A
2.2000 g	0.14 mg	0.0064%	N/A	N/A
22.0000 g	0.24 mg	0.0011%	N/A	N/A
220.0000 g	1.3 mg	0.00058%	N/A	N/A



As Found



As Left



Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
www.mt.com/ACC-Cert-Info



GWP™ Certificate



Process Requirements

Weighing Tolerance	1%
Smallest Net Weight	0.0500 g
Safety Factor	As found = 1; As left = 2

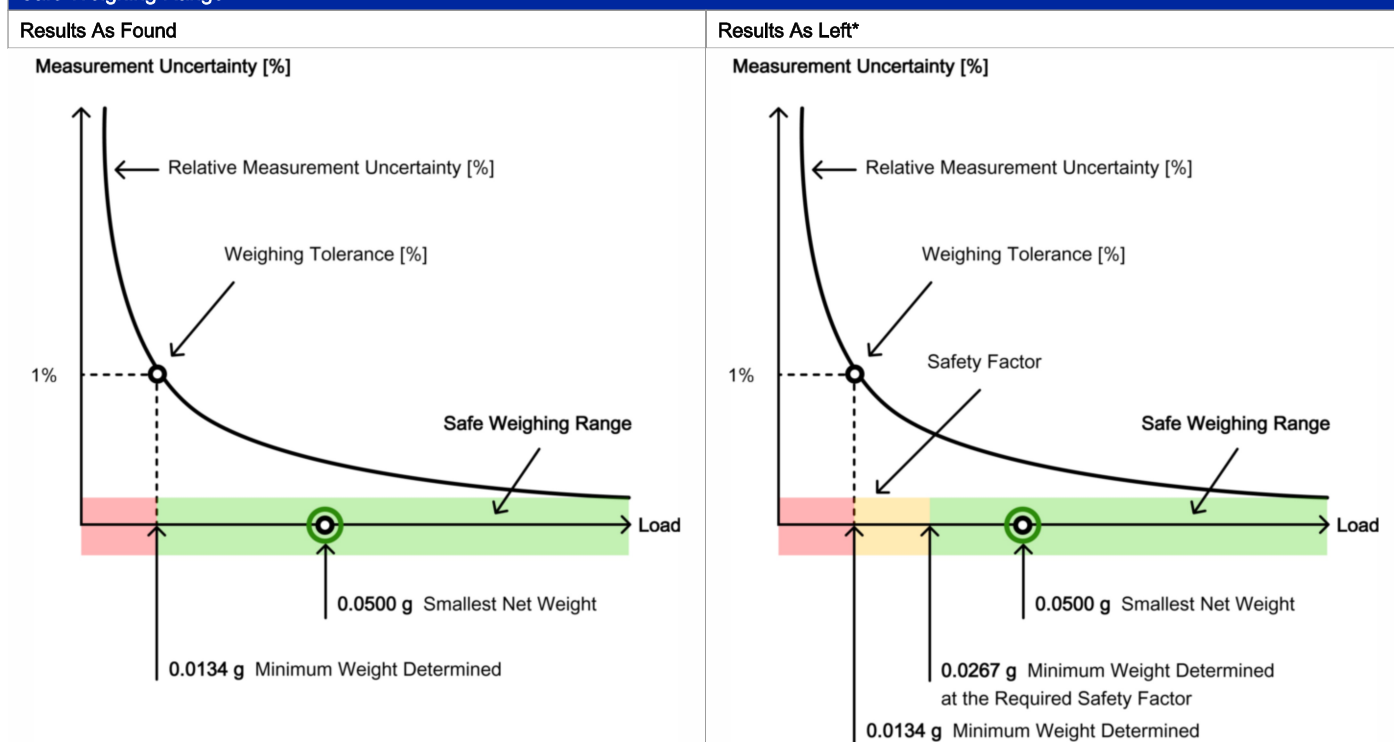
Results As Found

Minimum Weight Determined	0.0134 g	The instrument meets the process requirements.
Measurement Uncertainty at the Smallest Net Weight	0.27%	

Results As Left*

Minimum Weight Determined at the Safety Factor	0.0267 g	The instrument meets the process requirements.
Minimum Weight Determined	0.0134 g	
Measurement Uncertainty at the Smallest Net Weight	0.27%	

Safe Weighing Range



* No adjustments/modifications made. As Left results correspond to As Found.



Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:

► www.mt.com/GWP-Cert-Info



Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1341 g	0.2695 g	0.4064 g	0.6845 g	1.4065 g
0.2%	0.0669 g	0.1341 g	0.2016 g	0.3378 g	0.6845 g
0.5%	0.0267 g	0.0535 g	0.0803 g	0.1341 g	0.2695 g
1%	0.0134 g	0.0267 g	0.0401 g	0.0669 g	0.1341 g
2%	0.0067 g	0.0134 g	0.0201 g	0.0334 g	0.0669 g
5%	0.0027 g	0.0054 g	0.0081 g	0.0134 g	0.0267 g

Result:



Pass

The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1341 g	0.2695 g	0.4064 g	0.6845 g	1.4065 g
0.2%	0.0669 g	0.1341 g	0.2016 g	0.3378 g	0.6845 g
0.5%	0.0267 g	0.0535 g	0.0803 g	0.1341 g	0.2695 g
1%	0.0134 g	0.0267 g	0.0401 g	0.0669 g	0.1341 g
2%	0.0067 g	0.0134 g	0.0201 g	0.0334 g	0.0669 g
5%	0.0027 g	0.0054 g	0.0081 g	0.0134 g	0.0267 g

Result:



Pass

The instrument meets the process requirements.

No adjustments or modifications were made and thus As Left results correspond to As Found.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors.

At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 25TW195

Page.: 1 of 2

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5000-115
Serial No. :	17H104220
ID No. :	ERTC-L-In.137
Received Date :	23 September 2025
Test Date :	25 September 2025
Reference :	2509-0785DN-1
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	Approved Signatory
() Chakrit Waewwanjua	
() Ponpan Paipim	
(✓) Saithip Meangmai	
Issue Date :	26 September 2025



Cert.No.: 25TW195

Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

<u>Instruments</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**

Dissolved Oxygen Probe No.: 5010 03G1489

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.22	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced
other in full, without written approval of the laboratory

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Inctech Metrological Center Co.Ltd.

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen.

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MT25-7002

Page : 1 of 2

Customer : Environment Research & Technology Company Limited
Address : 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210

Description : Incubator
Manufacturer : Accuplus
Model : SMART i250
Serial No. : 2059-0218-0002
Identification No. : ERTC-L-In-143
Calibration Place : Customer Laboratory

Order No. : 3296/25
Received date : Oct 03, 2025
Calibration date : Oct 03, 2025
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT25-5654	Aug 15, 2026

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : Mr.Yuttakorn Jamneansri

Approved by : (Mr.Panuwat Phuklan)

Issue date : Oct 09, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd



Certificate No. : MT25-7002

Page : 2 of 2

Function : Temperature measurement

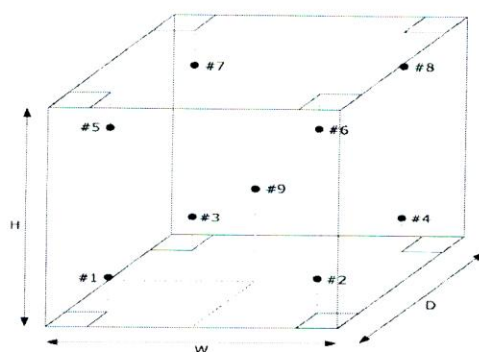
Calibration point : 20 °C

Result : Without adjustment

Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	20.442	20.192	20.437	20.294	20.569	20.361	20.531	20.424	19.997	0.42

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20.0 to 20.2	0.29	0.88	1.0



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.



Certificate of Calibration

Certificate No. : MT25-6999

Page : 1 of 3

Customer : Environment Research & Technology Company Limited
Address : 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210

Description : Heating Block (COD Reactor)
Manufacturer : Hanna
Model : HI 839800-02
Serial No. : G0059491
Identification No. : ERTC-L-In-112
Calibration Place : Customer Laboratory

Order No. : 3296/25
Received date : Oct 03, 2025
Calibration date : Oct 05, 2025
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-009* According to comparison with LXI Data Acquisition Switch Unit with Sensor.

Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
LXI Data Acquisition Switch Unit with Sensor	34972A	MY49028922	MT24-8770	Nov 22, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : Mr.Yuttakorn Jamneansri

Approved by : (Mr.Panuwat Phuklan)

Issue date : Oct 09, 2025

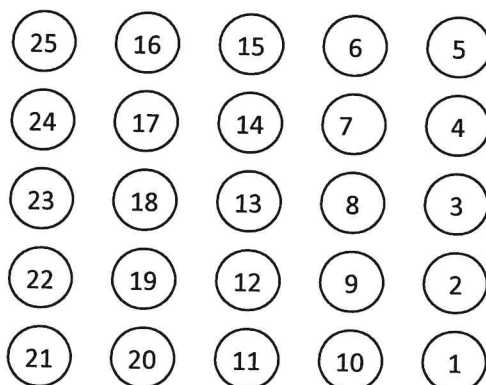
This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd



Certificate No. : MT25-6999

Page : 2 of 3

Position



Top view

Function : Temperature measurement

Result : Without adjustment

Calibration point : 150 °C

Immersion depth : 50 mm

Position No.	UUC* setting (°C)	Standard reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
1	150	149.187	-0.813	0.16
2	150	149.430	-0.570	0.16
3	150	149.524	-0.476	0.16
4	150	149.860	-0.140	0.16
5	150	149.747	-0.253	0.16
6	150	148.815	-1.185	0.16
7	150	151.466	1.466	0.16
8	150	150.484	0.484	0.16
9	150	150.724	0.724	0.16
10	150	149.558	-0.442	0.16

UUC* = Unit under calibration

**Inctech Metrological Center Co.Ltd.**

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Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.comCalibration Cert. # 3884.01
ISO/IEC 17025

Certificate No. : MT25-6999

Page : 3 of 3

Function : Temperature measurement Cont.

Result : Without adjustment

Calibration point : 150 °C

Immersion depth : 50 mm

Position No.	UUC* setting (°C)	Standard reading (°C)	UUC* correction (°C)	Uncertainty of measurement (+/- °C)
11	150	149.398	-0.602	0.16
12	150	149.829	-0.171	0.16
13	150	151.231	1.231	0.16
14	150	151.100	1.100	0.16
15	150	149.720	-0.280	0.16
16	150	151.299	1.299	0.16
17	150	150.736	0.736	0.16
18	150	151.377	1.377	0.16
19	150	149.792	-0.208	0.16
20	150	150.842	0.842	0.16
21	150	148.648	-1.352	0.16
22	150	149.505	-0.495	0.16
23	150	149.487	-0.513	0.16
24	150	150.858	0.858	0.16
25	150	148.682	-1.318	0.16

UUC* = Unit under calibration

Mettler-Toledo (Thailand) Limited

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Bangna District, Bangkok 10260

+662 723 0382

MT-TH.ServiceSupport@mt.com



NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong
City: Laksi Contact: Ramita Taengthai
Zip / Postal: 10210
State / Province: Bangkok
Order Number: 
0 3 3 3 7 8 4 4 8 2

Weighing Device

Manufacturer: Mettler Toledo Terminal Model: N/A
Model: MS204TS/00 Terminal Serial No.: N/A
Serial No.: B547728937 Terminal Asset No.: N/A
Instrument Type: Weighing Instrument Building: N/A
Asset Number: ERTC-L-IN-114 Floor: 5
Room: 504

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

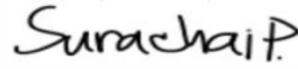
This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 24.8 °C	End: 24.6 °C	Start: 37.9 %	End: 37.9 %

As Found Calibration Date: 26-Jan-2026
As Left Calibration Date: N/A
Issue Date: 27-Jan-2026

Calibrator: 
Surachai Pidkanpai

Approved Signatory: 
Technical Manager / Head of Calibration Center

Measurement Results

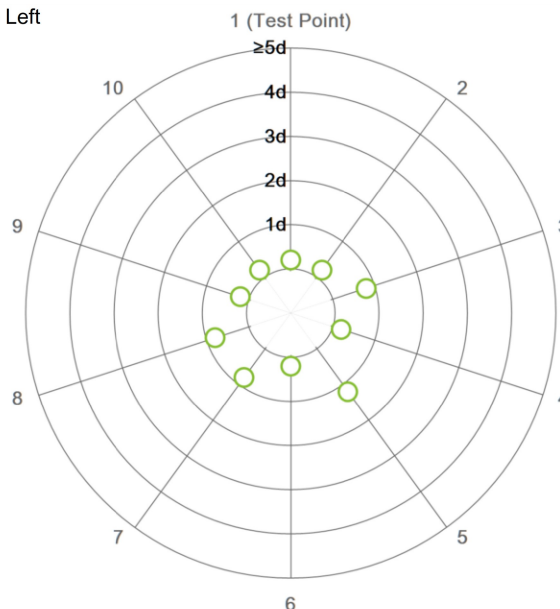
Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	100.0001 g	N/A
6	100.0000 g	N/A
7	99.9999 g	N/A
8	99.9999 g	N/A
9	100.0000 g	N/A
10	100.0000 g	N/A

Standard Deviation	0.00006 g	N/A
--------------------	-----------	-----

○ As Found
◆ As Left



The "d" in the graph represents the readability of the range/interval in which the test was performed.

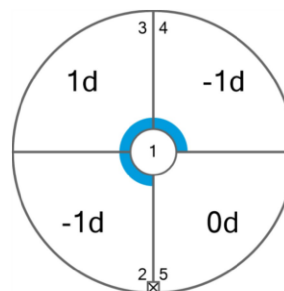
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	99.9999 g	N/A
3	100.0001 g	N/A
4	99.9999 g	N/A
5	100.0000 g	N/A

Maximum Deviation	0.0001 g	N/A
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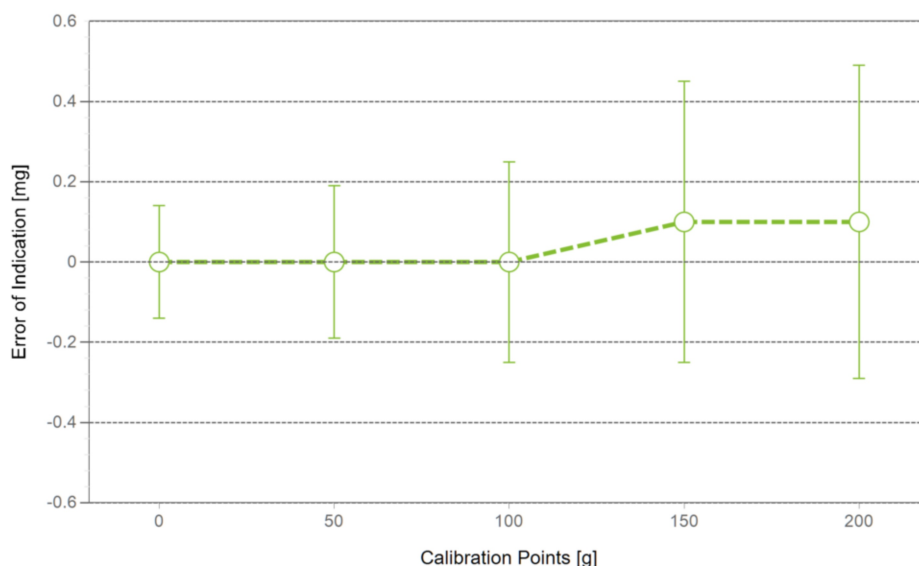
As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5001 g	0.0001 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	4.9999 g	-0.0001 g	0.16 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.16 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.19 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.25 mg	2
10	150.0001 g	150.0002 g	0.0001 g	0.35 mg	2
11	200.0001 g	200.0002 g	0.0001 g	0.39 mg	2



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS105	Date of Issue:	14-Apr-2025
Certificate Number:	C515828262	Calibration Due Date:	02-Oct-2026

Thermo Hygrometer

Equipment No.:	IN305	Date of Issue:	17-Oct-2025
Certificate Number:	SG-H-00885/68	Calibration Due Date:	14-Oct-2026

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

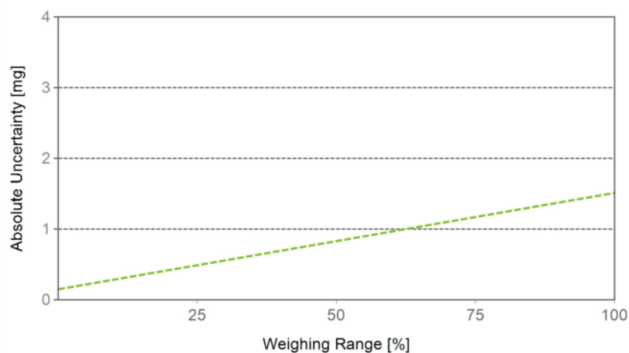
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.15 \text{ mg} + 0.00620 \text{ mg/g} \cdot R$	N/A

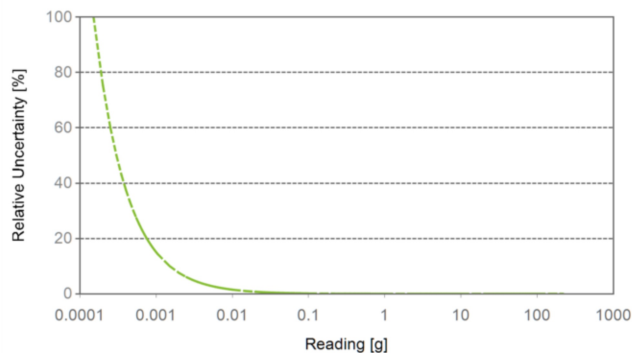
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.069%	N/A	N/A
2.2000 g	0.16 mg	0.0074%	N/A	N/A
22.0000 g	0.29 mg	0.0013%	N/A	N/A
220.0000 g	1.5 mg	0.00069%	N/A	N/A



As Found



As Left



Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
► www.mt.com/ACC-Cert-Info



GWP™ Certificate



Process Requirements

Weighing Tolerance	1%
Smallest Net Weight	0.0500 g
Safety Factor	As found = 1; As left = 2

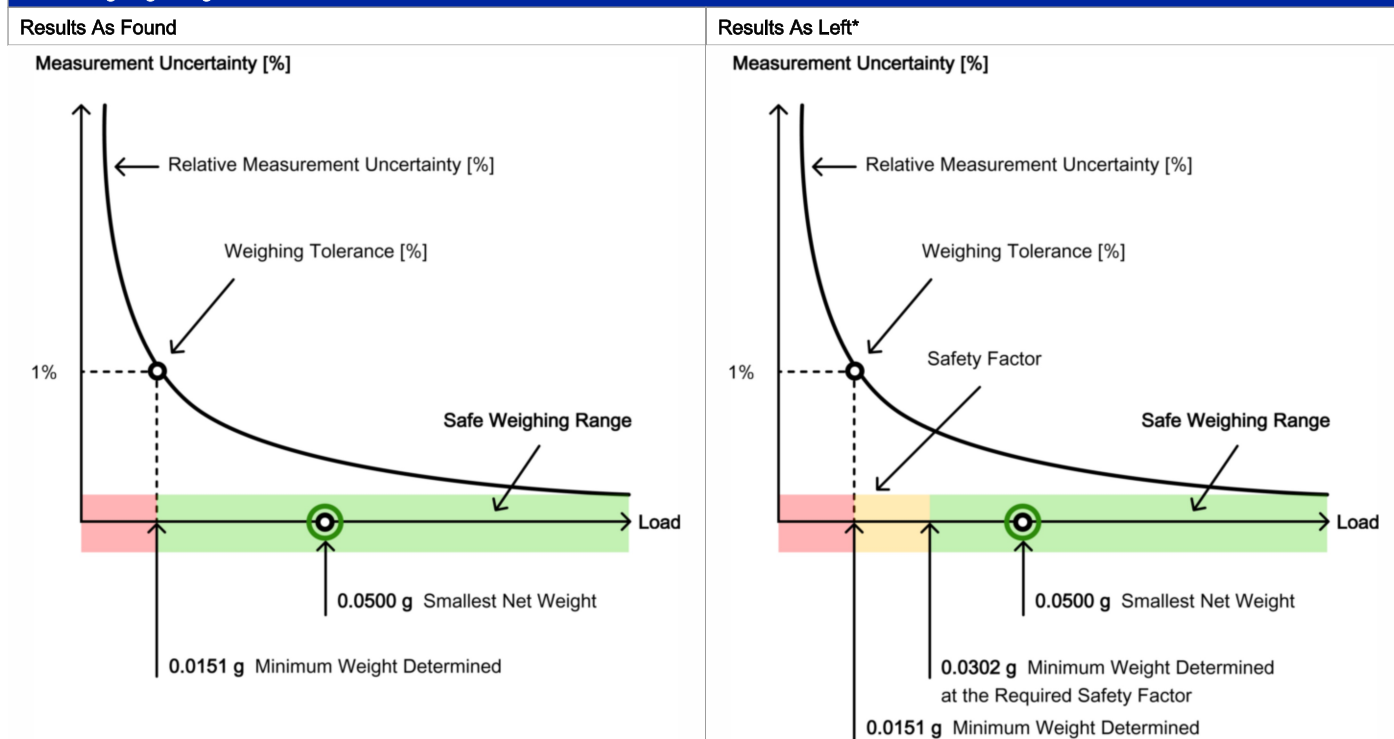
Results As Found

Minimum Weight Determined	0.0151 g	The instrument meets the process requirements.
Measurement Uncertainty at the Smallest Net Weight	0.30%	

Results As Left*

Minimum Weight Determined at the Safety Factor	0.0302 g	The instrument meets the process requirements.
Minimum Weight Determined	0.0151 g	
Measurement Uncertainty at the Smallest Net Weight	0.30%	

Safe Weighing Range



* No adjustments/modifications made. As Left results correspond to As Found.



Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:

► www.mt.com/GWP-Cert-Info



Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1515 g	0.3049 g	0.4603 g	0.7769 g	1.6051 g
0.2%	0.0756 g	0.1515 g	0.2280 g	0.3824 g	0.7769 g
0.5%	0.0302 g	0.0604 g	0.0907 g	0.1515 g	0.3049 g
1%	0.0151 g	0.0302 g	0.0453 g	0.0756 g	0.1515 g
2%	0.0076 g	0.0151 g	0.0227 g	0.0377 g	0.0756 g
5%	0.0031 g	0.0061 g	0.0091 g	0.0151 g	0.0302 g

Result:



Pass

The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors

Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1515 g	0.3049 g	0.4603 g	0.7769 g	1.6051 g
0.2%	0.0756 g	0.1515 g	0.2280 g	0.3824 g	0.7769 g
0.5%	0.0302 g	0.0604 g	0.0907 g	0.1515 g	0.3049 g
1%	0.0151 g	0.0302 g	0.0453 g	0.0756 g	0.1515 g
2%	0.0076 g	0.0151 g	0.0227 g	0.0377 g	0.0756 g
5%	0.0031 g	0.0061 g	0.0091 g	0.0151 g	0.0302 g

Result:



Pass

The instrument meets the process requirements.

No adjustments or modifications were made and thus As Left results correspond to As Found.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors.

At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 26TM123

Page : 1 of 3

Equipment : Incubator

Manufacturer : Memmert

Model : IF160

Serial No. : D522.0070

ID No. : ERTC-L-In-181

Submitted by : Environment Research & Technology Company Limited
25/114 Moo 6 Soi Chinaket 1,
Ngamwongwan Road, Toongsonghong, Laksi,
Bangkok 10210

Location : 408/2 ห้องปฏิบัติการบ่มอาหารเลี้ยงเชื้อ

Received Order : 06 January 2026

Calibration Date : 07 January 2026

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

AC Line Voltage : (220 ± 22) V

Calibrated by : Uthen Kankawi

Approved by :

Approved Signatory

() Chakrit Waewwanjua

() Suwit Imjai

(✓) Kunchit Promprat

Issue Date : 23 January 2026

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2601-0016ON-5

Cert. No.: 26TM123

Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

<u>Instrument</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Traceable</u>	<u>Due Date</u>
1) Data Acquisition	MY57013711	25LM117	TPA	17 Jul 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.

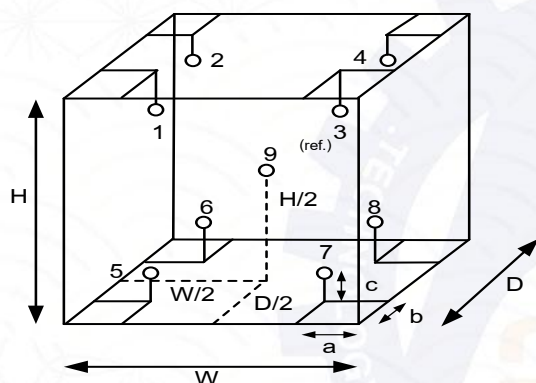
3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	23
REL.Humid. (%)	46	45
AC Supply (Volt)	222	222

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	24-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	23-18RTD-06
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	24-18RTD-09

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.40 m
W = 0.56 m
H = 0.73 m
Capacity = 0.16 m³



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2601-0016ON-5
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 26TM123

Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor <i>k</i>
35.0	35.0	35.0	0.017	0.14	0.19	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (±°C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	35.004	35.048	34.997	34.981	35.024	34.977	34.885	35.005	35.014	0.30

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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