

เอกสารชุด ช.

เอกสารรับรองการสอบเทียบเครื่องมือ

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ใบรับรองการสอบเทียบ “เทอร์โมมิเตอร์”

(Calibration Certificate of Liquid in Glass Thermometer)



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No. : 20T1031

Page : 1 of 2

Equipment : Digital Thermometer With Sensor

Manufacturer: Testo

Model : 926

Serial No.: 5609260110250914

ID No.: EQL-058

Condition As-Received: Used Item

Received Date: 07 May 2020

Calibration Date: 20 May 2020
to 27 May 2020

Reference: 2005-0091DN

Submitted by: TEST TECH CO.,LTD (HEAD Office)

Ambient Temperature: (25 ± 3) °C

Relative Humidity: (50 ± 20) %

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

30,32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with
Platinum Resistance Thermometer (PRT) into liquid bath temperature controller.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1.Reference standards instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Digital Thermometer	1529-R	B19520	191698	03 Jun 2020
2) Platinum Resistance Thermometer	935-14-95	261589/1	191698	03 Jun 2020
3) Platinum Resistance Thermometer	935-14-95	261589/2	191698	03 Jun 2020
4) Platinum Resistance Thermometer	5615	848970	191698	03 Jun 2020

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

3.This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Ratcharit Limwong
Issue Date : 04 June 2020

Approved Signatory :

[] Phalinee Prabpaipal

[✓] Chatchawan Khunpiluek

[] Wanlop Larpkurn



Cert. No.: 20T1031

Page.: 2 of 2

Result of Calibration:-

Without Adjustment

Function:

Temperature measurement

This equipment was connected with Thermocouple Type T

ID No. EQL-058

Immersion	Standard	UUC*		Uncertainty
Depth	Temperature	Reading	Error	of Measurement
(mm.)	(°C)	(°C)	(°C)	(±°C)
150	4.0020	4.0	-0.0020	0.26
150	20.0026	20.0	-0.0026	0.24
150	35.0046	34.9	-0.1046	0.24
150	55.0042	55.0	-0.0042	0.26
150	84.0036	83.8	-0.2036	0.33
150	104.0033	103.8	-0.2033	0.38
150	120.0036	119.7	-0.3036	0.43
150	140.0033	139.6	-0.4033	0.47
150	150.0032	149.5	-0.5032	0.49
150	170.0037	169.5	-0.5037	0.56
150	180.0037	179.4	-0.6037	0.59

Result of Calibration:-

Without Adjustment

Function:

Temperature measurement

This equipment was connected with Thermocouple Type T Model 0603 1243 ID No. EQL-058 Water Proof

Dimension of probe : Diameter 5 mm., Length 112 mm. Sheath material : Stainless Steel

Immersion	Standard	UUC*		Uncertainty
Depth	Temperature	Reading	Error	of Measurement
(mm.)	(°C)	(°C)	(°C)	(±°C)
90	41.5041	41.4	-0.1041	0.27
90	45.0043	44.9	-0.1043	0.26
90	50.0031	49.9	-0.1031	0.24
90	85.0038	84.8	-0.2038	0.34
90	95.0040	94.7	-0.3040	0.36
90	150.0028	149.5	-0.5028	0.49

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

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CERTIFICATE No : 20T8527
REFERENCE No : 58381-2

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : ---
SERIAL No : 8925
ID No : EQL-103
RESOLUTION : 0.1 °C
TYPE : TOTAL IMMERSION
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHARUKIT L.
CALIBRATION DATE : 02-Sep-20
APPROVED BY : 
PONGSAK J.
ISSUED DATE : 02-Sep-20
RECEIVED DATE : 26-Aug-20

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkac, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 20T8527

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : 0 °C TO 100 °C
ID No : EQL-103
RESOLUTION : 0.1 °C
RECEIVED DATE : 26-Aug-20
AMBIENT TEMPERATURE : 23 °C ± 3 °C

SERIAL NUMBER : 8925
TYPE : TOTAL IMMERSION
CALIBRATION DATE : 02-Sep-20
RELATIVE HUMIDITY : 50 %RH ± 20 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON ASTM E77:1992 BY COMPARISON WITH STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT) INTO LIQUID BATH TEMPERATURE CONTROLLER. THE TEMPERATURE SCALE USED WAS BASED ON ITS-90.

2. REFERENCE STANDARD INSTRUMENTS :-

<u>INSTRUMENT</u>	<u>MODEL</u>	<u>SERIAL No</u>	<u>CERTIFICATE No</u>	<u>DUE DATE</u>
1) STANDARD THERMOMETER	1502	77964	20T3461	13-Mar-21
2) SPRT PROBE	5614	636626	20T3461	13-Mar-21
3) PRECISION BATH	7320	A21105	19T12225	16-Dec-20
4) PRECISION BATH	CTR-40	A68155	19T12224	11-Dec-20

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND).

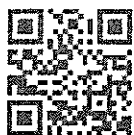
RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

STANDARD READING (°C)	UUC* READING (°C)	IMMERSION DEPTH (mm)	CORRECTION (°C)	EMERGENT STEM TEMPERATURE (°C)	UNCERTAINTY OF MEASUREMENT (±°C)
19.976	20.0	140	-0.024	N/A	0.090
24.983	25.0	160	-0.017	N/A	0.090
41.491	41.5	230	-0.009	N/A	0.090
44.494	44.5	240	-0.006	N/A	0.090
44.997	45.0	244	-0.003	N/A	0.090
50.003	50.0	270	0.003	N/A	0.090

UUC* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR $k=2$, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

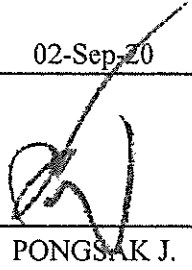


CERTIFICATE No : 20T8526
REFERENCE No : 58381-1

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Certificate of Calibration

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : G13004
SERIAL No : ---
ID No : EQL-111
RESOLUTION : 1 °C
TYPE : TOTAL IMMERSION
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHARUKIT L.
CALIBRATION DATE : 02-Sep-20
APPROVED BY : 
PONGSAK J.
ISSUED DATE : 02-Sep-20
RECEIVED DATE : 26-Aug-20

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 20T8526

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER : PRECISION
MODEL : G13004
ID No : EQL-111 SERIAL NUMBER : ---
RESOLUTION : 1 °C TYPE : TOTAL IMMERSION
RECEIVED DATE : 26-Aug-20 CALIBRATION DATE : 02-Sep-20
AMBIENT TEMPERATURE : 23 °C ± 3 °C RELATIVE HUMIDITY : 50 %RH ± 20 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON ASTM E77:1992 BY COMPARISON WITH STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT) INTO LIQUID BATH TEMPERATURE CONTROLLER. THE TEMPERATURE SCALE USED WAS BASED ON ITS-90.

2. REFERENCE STANDARD INSTRUMENTS :-

<u>INSTRUMENT</u>	<u>MODEL</u>	<u>SERIAL No</u>	<u>CERTIFICATE No</u>	<u>DUE DATE</u>
1) STANDARD THERMOMETER	1502	77964	20T3461	13-Mar-21
2) SPRT PROBE	5614	636626	20T3461	13-Mar-21
3) PRECISION BATH	7320	A21105	19T12225	16-Dec-20

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND).

RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

STANDARD READING (°C)	UUC* READING (°C)	IMMERSION DEPTH (mm)	CORRECTION (°C)	EMERGENT STEM TEMPERATURE (°C)	UNCERTAINTY OF MEASUREMENT (±°C)
115.010	115.0	115	0.010	N/A	0.15
121.035	121.0	120	0.035	N/A	0.15

UUC* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR $k=2$, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



Certificate of Calibration

Certificate No. : 20H2567

Page : 1 of 2

Equipment : Dial Thermo-Hygrometer

Manufacturer: Barigo

Model : -

Serial No.: -

ID No.: EQL-064

Condition As-Received: Used Item

Received Date: 03 November 2020

Calibration Date: 05 November 2020
to 06 November 2020

Reference: 2011-0073DN

Submitted by: TEST TECH CO.,LTD (HEAD Office)

Ambient Temperature: (25 \pm 3) °C

Relative Humidity: (50 \pm 20) %

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

30,32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Standard Chilled Mirror Hygrometer Sensor	Dew Prime II	31863	18540	28 Jul 2021
2) Standard Humidity/Temperature Meter	400	10240757	TH-0056-19	11 Dec 2020

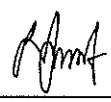
2. The certificate is valid only to the item calibrated on date and place of calibration.

3. This Certification is traceable to the International System of Unit maintained at:-

- National Institute of Standards and Technology (NIST) , The United States of America
- National Institute of Metrology Thailand (NIMT)

Calibrated by : Kraipop Onrat
Issue Date : 10 November 2020

Approved Signatory : _____


[☒] Chakrit Waewanjua

[☐] Pornthlppa Tameyakul

[☐] Pitak Srimongkol



Cert. No.: 20H2567

Page.: 2 of 2

Result of Calibration:-

Without Adjustment

Function:

Humidity measurement.

<u>Reference</u> <u>Temperature</u> (°C)	<u>Standard</u> <u>Humidity</u> (%R.H.)	<u>UUC*</u> <u>Reading</u> (%R.H.)	<u>Error</u> (%R.H.)	<u>Uncertainty</u> <u>of Measurement</u> (±%R.H.)
25.0	30.1	28.5	-1.6	1.5
25.0	40.1	39.0	-1.1	1.5
25.0	50.1	50.5	0.4	1.7
25.0	60.0	61.0	1.0	1.7
25.0	75.2	77.0	1.8	1.7

Result of Calibration:-

Without Adjustment

Function:

Temperature measurement.

<u>Standard</u> <u>Temperature</u> (°C)	<u>UUC*</u> <u>Reading</u> (°C)	<u>Error</u> (°C)	<u>Uncertainty</u> <u>of Measurement</u> (±°C)
15.02	15.0	-0.02	0.72
20.03	20.0	-0.03	0.72
25.00	25.0	0.00	0.72
29.97	30.0	0.03	0.72

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor $k = 2.00$, providing confidence level approximately 95%.

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