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ใบรับรองการสอบเทียบ “เครื่องวัด pH”  
(Calibration Certificate of pH Meter)



## Certificate of Calibration

Certificate No. : 63-420111-1

Page : 1 of 2

Submitted by : Test Tech Co.,Ltd. (Head Office)

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

Equipment : pH Meter with electrode

pH meter

Manufacturer : TOA DKK

Model : HM-25R

Range : 0.00 pH to 14.00 pH

Resolution : 0.01 pH

Serial No. : 760205

ID No. : EQL-183

Electrode

Model : GST-5731C

Serial No. : 002F0035MK

Environment : Ambient Temperature :  $(25 \pm 2)$  °C

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

Date of Received : 27 June 2020

Date of Calibration : 01 July 2020

Date of Issue : 01 July 2020

Calibrated by : Bunjerd Masri

Calibration Method : In-house method CAL-M4201 direct measurement by using certified reference material (CRM)

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.004	61208711	684575	29 Jan 2021	CPA chem
6.985	61191143	684576	29 Jan 2021	CPA chem
9.963	61208865	684577	29 Jan 2021	CPA chem

Approved by :



( Surachai Promthong )

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 63-420111-1

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### Result of Calibration :

UUC Condition As-Received : Good

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer ( pH )	UUC Reading ( pH )	Correction ( pH )	Uncertainty ( $\pm$ pH )
4, 7, 10	4.004	4.00	0.00	0.011
	6.985	7.00	-0.01	0.020
	9.963	10.00	-0.04	0.053

### Remark

1 UUC : Unit Under Calibration

2 pH meter does not have voltage mode because the plug can not BNC socket

This result of calibration was found accurate as shown on date and place of calibration only.

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

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## Certificate of Calibration

**Certificate No. :** 63-400409-1

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**Submitted by :** Test Tech Co.,Ltd. (Head Office)  
30, 32 Rama II Soi 63, Rama II Rd., Samaedam, Bangkhunthain, Bangkok 10150

**Equipment :** Digital Thermometer with Thermistor Probe  
Temperature Indicator

Manufacturer :	TOA DKK	Model :	HM-25R
Range :	0.0 to 100.0 °C	Resolution :	0.1 °C
Serial No. :	760205	ID No. :	EQL-183
Thermistor Probe			
Model :	GST-5731C	Sheath Material :	Glass
Diameter :	12 mm.	Length :	120 mm.
Serial No. :	002F0035MK	ID No. :	EQL-183

**Environment :** Ambient Temperature : (23 ± 2) °C  
Relative Humidity : (50 ± 15) %  
Line Voltage : (220 ± 22) VAC

**Date of Received :** 27 June 2020

**Date of Calibration :** 01 July 2020

**Date of Issue :** 01 July 2020

**Calibrated by :** Bunjerd Masri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units

### 1. Platinum Resistance Thermometer (PRT)

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400001	TT-0016-20	04 Mar 2022	National Institute of Metrology Thailand (NIMT)

### 2. Standard Digital Thermometer

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400003	19E134	06 Jun 2021	National Institute of Metrology Thailand (NIMT)
400004	19E134	06 Jun 2021	National Institute of Metrology Thailand (NIMT)

Approved by :

( Surachai Promthong )  
Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 20CH1554

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## Certificate of Calibration

Equipment : pH Meter  
Manufacturer : TOA-DKK  
Model : HM-41X  
Serial No. : 784787  
ID No. : EQL-199  
Condition As-Received: Used Item  
Received Date : 12 October 2020  
Calibration Date : 16 October 2020  
Reference : 2010-0434DN-5  
Submitted by : TEST TECH CO.,LTD (HEAD Office)  
30,32 Rama II Soi 63, Rama II Rd.,  
Samaedam, Bangkhunthian, Bangkok 10150  
Ambient Temperature : (25  $\pm$  2.5) °C  
Relative Humidity : (50  $\pm$  15) %  
Calibration Procedure : In - house method :  
- CP-CH5 : based on direct measurement by  
using standard voltage calibrator and  
certified reference material (CRM)  
- CP-CH8 : based on comparison technique by  
comparison with reference standard thermometer

Calibrated by : Warakorn Lerngagtrakul

Approved by :

Approved Signatory

( ) Ponthippa Tameyakul

( ☒ ) Malee Butkruea

( ) Saithip Meangmai

Issue Date : 20 October 2020

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.



Cert.No.: 20CH1554

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**Condition of this calibration result**

**1. Reference Standard Instrument : -**

<u>Instrument</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Ref. Standard Thermometer	2188080	130RC044	1911510	27 Nov 2020

This certification is traceable to the International System of Unit maintained at:-

- Traceable to National Institute of Metrology (Thailand), NIMT

**2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835**

<u>Buffer Solution</u>	<u>Manufacturer</u>	<u>Lot No.</u>	<u>Exp. date</u>
pH 4.008	CPA chem	693945	21 June 2022
pH 6.985	CPA chem	706696	06 Sep 2021
pH 10.008	CPA chem	699315	16 July 2021

3. 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 (±)	Coverage factor <i>k</i>
pH Electrode S/N.: 603F0107YK	4.008	4.011	173	0.0046	2.00
	6.985	6.993	-1	0.0075	2.00
	10.008	10.018	-180	0.013	2.05

**Remark** - Can not connect the BNC because the plug does not match with the socket.

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Cert.No.: 20CH1554

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### Calibration Results

#### Function : Temperature Measurement

#### (\*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : GST-5821C

- Serial No. : 603F0107YK

Dimension of probe;

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point ( °C )	Standard Temperature ( °C )	UUC* Reading ( °C )	Error ( °C )	Uncertainty of measurement ( ± °C )	Coverage factor <i>k</i>
25.0	25.003	24.9	-0.103	0.20	2.00

Remark : - UUC\* = Unit Under Calibration

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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