



# Certificate of Calibration

<b>Equipment:</b>	pH METER	<b>Certificate No.:</b>	C07230044
<b>Model:</b>	Lab 855	<b>Issued Date:</b>	27 January 2023
<b>Serial No. (or ID.):</b>	18481308 (LB-EQ-07)	<b>Job No.:</b>	KSPR2300457
<b>Manufacturer:</b>	SI Analytics	<b>Page:</b>	1 of 4
<b>Electrode Serial No.:</b>	C224611073	<b>Model:</b>	BlueLine 14 pH Brand: SI Analytics
<b>Condition:</b>	In Condition		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Environment Condition:**

Temperature	23	°C	±	2	°C
Humidity	50	%RH	±	15	%RH

**Calibration Place:** Environment Laboratory, DKSH Technology Limited.  
2533 Sukhumvit Road, Bangchak,  
Phrakhanong, Bangkok 10260 Thailand


**Calibration By:** Mr.Nattapat Rungrueang

**Calibration Date:** 27 January 2023

**The Method used:** In house method, CAL-WI-58, base on ASTM E 70-07

**Traceability:** This certificate is traceable to SI Units, Sample Test is assured through primary measurement method Hamed cell, through CPAchem Ltd. (ISO/IEC 17034) Certificate No. 857394, 857395, 857396 And pH Scale traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through Industrial Foundation Electrical and Electronics Institute Certificate No. CA20220100EA

  
(Mr. Nattapat Rungrueang)  
Person in charge

  
(Mr. Nitinun Srihawan)  
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

## Calibration Results:

### pH Scale

Input (mV)	pH Meter Reading			Uncertainty of Measurement (mV)	Coverage Factor (k)
	(mV)	Error (mV)	(pH)		
414.12	414.0	-0.12	0.002	0.065	2.00
354.96	354.9	-0.06	1.001	0.065	2.00
295.8	295.7	-0.10	2.001	0.065	2.00
236.64	236.5	-0.14	3.002	0.065	2.00
177.48	177.5	0.02	4.000	0.065	2.00
118.32	118.3	-0.02	5.001	0.065	2.00
59.16	59.2	0.04	6.000	0.065	2.00
0	0.0	0.00	7.000	0.065	2.00
-59.16	-59.2	-0.04	8.000	0.065	2.00
-118.32	-118.3	0.02	9.000	0.065	2.00
-177.48	-177.4	0.08	9.999	0.065	2.00
-236.64	-236.6	0.04	11.000	0.065	2.00
-295.8	-295.8	0.00	11.999	0.065	2.00
-354.96	-354.9	0.06	12.999	0.065	2.00
-414.12	-414.0	0.12	13.999	0.065	2.00

**Electrode Test Results\***

The two-point calibration using two standard buffer solutions; pH 4.008 and pH 6.986

- During calibration, display of pH meter can be adjust to reading; pH 4.008 and pH 6.986

The practical slope of the pH electrode; 58.29 (mV/pH), 98.53%

The zero point of the pH electrode; 6.88 (pH)

**Sample Test Results**

Standard Buffer Solution (pH)	Unit Under Calibration (pH)	Difference (pH)	Uncertainty of Measurement (pH)	Coverage Factor (k)
4.008	4.010	0.002	0.0070	2.00
6.986	6.986	0.000	0.0075	2.00
10.010	10.049	0.039	0.0070	2.00

\* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

**Electrode Test Results\***

The two-point calibration using two standard buffer solutions; pH 6.986 and pH 10.010

- During calibration, display of pH meter can be adjust to reading; pH 6.986 and pH 10.010

The practical slope of the pH electrode; 58.93 (mV/pH), 99.62%

The zero point of the pH electrode; 6.88 (pH)

**Sample Test Results**

Standard Buffer Solution (pH)	Unit Under Calibration (pH)	Difference (pH)	Uncertainty of Measurement (pH)	Coverage Factor (k)
4.008	4.041	0.033	0.0070	2.00
6.986	6.979	-0.007	0.0075	2.00
10.010	10.007	-0.003	0.0070	2.00

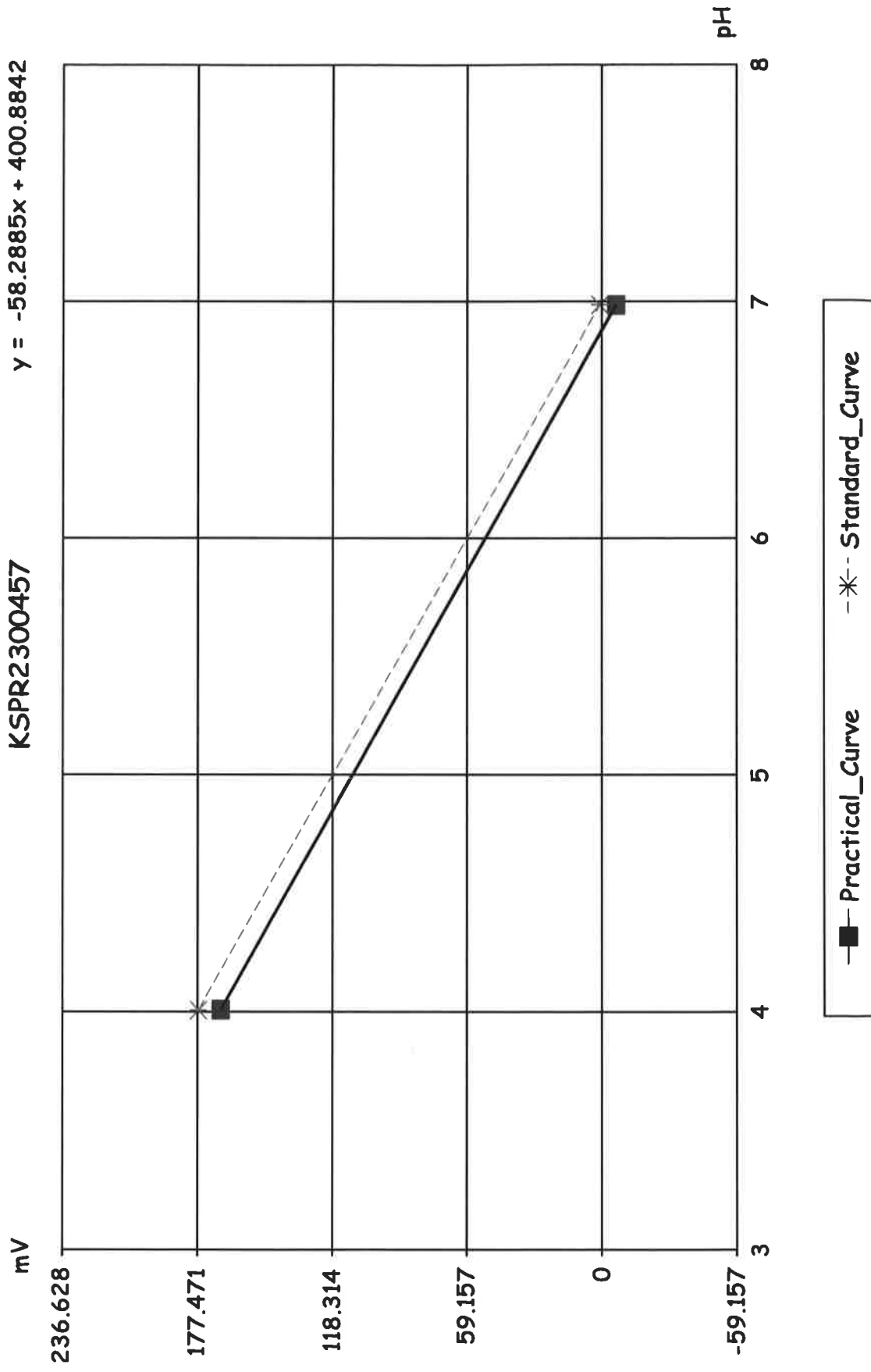
\* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

**The End of Certificate**

# Electrode test /Job No.

KSPR2300457

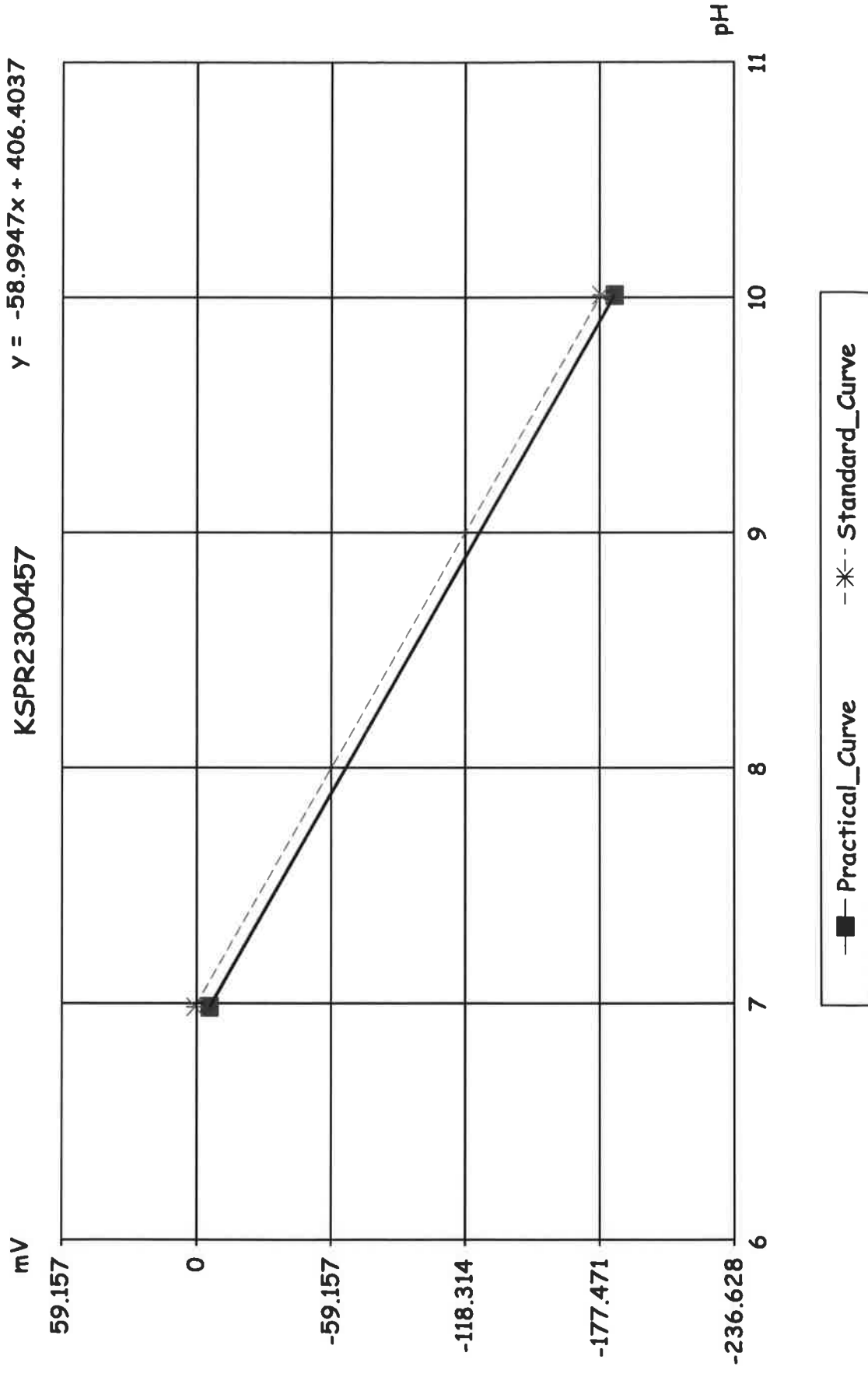
$$y = -58.2885x + 400.8842$$



# Electrode test /Job No.

KSPR2300457

$$Y = -58.9947x + 406.4037$$



## ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2300457

ชนิดเครื่องมือ: pH METER

รุ่น: Lab 855

หมายเลขเครื่อง: 18481308

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
27 Jan 2023			27 Jan 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด ( ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด ( Electrode and Connection Cable )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Turbidlmeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่เกิน 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติม/ข้อแนะนำ :

Mr.Nattapat Rungrueang  
Service Engineer



# Certificate of Calibration

<b>Equipment:</b>	Digital Thermometer with Probe	<b>Certificate No.:</b>	C15230133
<b>Model:</b>	Lab 855	<b>Issued Date:</b>	26 January 2023
<b>Serial No.:</b>	18481308	<b>Job No.:</b>	KSPR2300456
<b>Manufacturer:</b>	SI Analytics	<b>ID No.:</b>	LB-EQ-07
<b>Condition:</b>	In Condition	<b>Page:</b>	1 of 2

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean, Prachachuen Road, Ladyao,  
Jatujek, Bangkok 10900 Thailand.

**Environment Condition:** Temperature: 22 °C ± 3 °C  
Humidity: 50 %RH ± 20 %RH  
Voltage: 220 VAC ± 10 %

**Calibration Place:** Thermo-Hygro Laboratory, DKSH Technology Limited.  
2533 Sukhumvit Road, Bangchak,  
Phrakhanong, Bangkok 10260 Thailand

**Calibration By:** Mr. Anat Karapitak  
**Calibration Date:** 26 January 2023  
**The Method used:** In house method, CAL-WI-19, by comparison with standard thermometer  
**Traceability:** This certificate is traceable to the International System of Unit maintained by National Institute of Metrology Thailand Certificate No. TT-0111-21



(Mr. Anat Karapitak)

Person in charge



(Mr. Pramote Ramrong)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.



**Calibration Results:****Without Adjustment**

Sensor Type: RTD

Channel: -

Diameter (mm): 12

Length (mm): 120

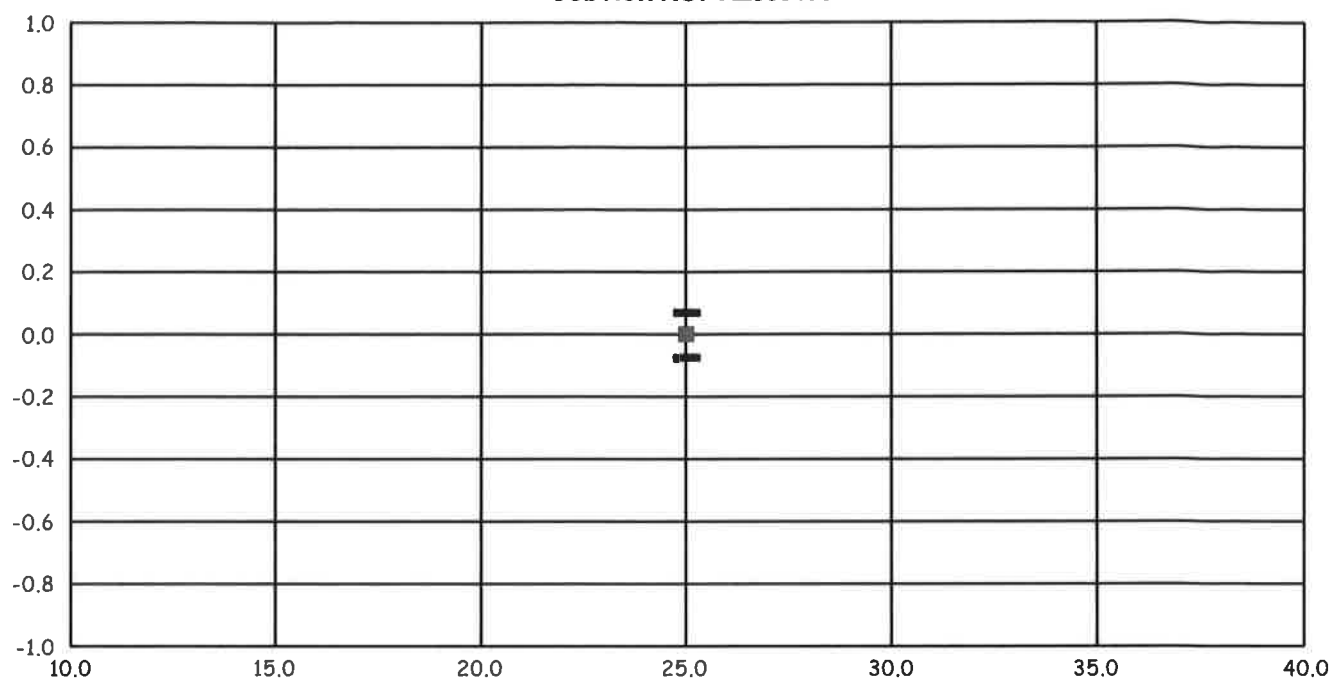
Immersion (mm): 120

Calibrate Point.(°C)	STD. Reading (°C)	UUC. Reading (°C)	Correction of UUC (°C)	Uncertainty ( $\pm$ °C)
25.0	25.0008	25.0	0.0008	0.072

**The End of Certificate**

Correction (°C)

Without Adjustment  
Job No.: KSPR2300456



■ Correction

— U\_Max

— U\_Min

Temperature (°C)

## ใบตรวจสอบสภาพเครื่องมือวัดอุณหภูมิ

เลขที่ใบงาน: KSPR2300456

ชนิดเครื่องมือ: Digital Thermometer with Probe

รุ่น: Lab 855

หมายเลขเครื่อง: 18481308

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
26-Jan-2023			26-Jan-2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Adapter / Power supply 220 / 110 VAC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	6. Battery	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Sensor ( In / Ex )	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

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Mr. Anat Karapitak

Service Engineer



# Certificate of Calibration

<b>Equipment:</b>	SPECTROPHOTOMETER	<b>Certificate No.:</b>	C06230054
<b>Model:</b>	Spectroquant Prove 100	<b>Issued Date:</b>	09 February 2023
<b>Serial No. (or ID.):</b>	1710112021 (LB-RQ-06)	<b>Job No.:</b>	KSPR2300455
<b>Manufacturer:</b>	Merck	<b>Page:</b>	1 of 3
<b>Condition:</b>	In Condition		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean, Prachachuen Road,  
Ladysao, Jatujek, Bangkok 10900 Thailand

**Environment Condition:**

Temperature	23	°C	±	2	°C
Humidity	50	%RH	±	15	%RH

**Calibration Place:** Environment Laboratory, DKSH Technology Limited.  
2533 Sukhumvit Road, Bangchak,  
Phrakhanong, Bangkok 10260 Thailand

**Calibration By:** Miss. Orawan Khlaiphloi

**Calibration Date:** 09 February 2023

**The Method used:** In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04

**Traceability:** This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Stama Scientific Limited.

The standard for Wavelength Certificate No. 93907 and 93914

The standard for Photometric Certificate No. 94010

The standard for Stray light Certificate No. 93902



(Miss Orawan Khlaiphloi)

Person in charge



(Mr. Nitinun Srihawan)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด

DKSH Technology Limited

2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260

2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

**Calibration Results:**
**Without Adjustment**
**Wavelength Accuracy (nm), The spectral bandwidth of Std at 4 nm and UUC at 4 nm**

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
361.26	361.0	0.26	0.13
460.06	459.2	0.86	0.13
637.94	637.2	0.74	0.13
528.72	528.2	0.52	0.13
740.27	739.7	0.57	0.13

**Photometric Accuracy (Absorbance)**

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.5816	0.580	0.0016	0.0045
	0.7130	0.712	0.0010	0.0045
	1.0151	1.012	0.0031	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.5649	0.562	0.0029	0.0045
	0.7012	0.700	0.0012	0.0045
	0.9982	0.996	0.0022	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.5249	0.525	-0.0001	0.0045
	0.6621	0.663	-0.0009	0.0045
	0.9420	0.943	-0.0010	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.5214	0.521	0.0004	0.0045
	0.6982	0.698	0.0002	0.0045
	0.9947	0.993	0.0017	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.5549	0.556	-0.0011	0.0045
	0.7736	0.773	0.0006	0.0045
	1.1041	1.103	0.0011	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.5621	0.563	-0.0009	0.0045
	0.7630	0.763	0.0000	0.0045
	1.0890	1.088	0.0010	0.0045

**Calibration Results:****Without Adjustment****Stray light \***

Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)
391.84 +/- 0.11 nm	391.8	1.65	1.783

\* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

**The End of Certificate**

## ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2300455

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: Spectroquant Prove

หมายเลขเครื่อง: 1710112021

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
09 Feb 2023			09 Feb 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด ( ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swich)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด ( Electrode and Connection Cable )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่นเกิน 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติม/ข้อแนะนำ :

Miss.Orawan Khlaiphloi

Service Engineer



## Certificate of Calibration

<b>Equipment:</b>	Cooled Incubator	<b>Certificate No.:</b>	C31230155
<b>Model:</b>	ICP 500	<b>Issued Date:</b>	30 January 2023
<b>Serial No.(or ID):</b>	K511.0019 (LB-EQ-01)	<b>Job No.:</b>	KSPR2300451
<b>Manufacturer:</b>	Memmert	<b>Page:</b>	1 of 3
<b>Condition:</b>	In Condition	<b>Ventilation Valve:</b>	None
<b>Shelves(pc.):</b>	2		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Environment Condition:**

Temperature:	20 °C	±	0.5 °C
Humidity:	51 %RH	±	5.2 %RH
Voltage:	230 VAC	±	1.2 VAC

**Calibration Place:** AQUA NISHIHARA CORPORATION LIMITED. (Laboratory Room)  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Calibration By:** Mr. Sittiphong Lekfu

**Calibration Date:** 13 January 2023

**The Method used:** In house method, SPCC-WI-16, base on TLAS-G20

**Traceability:** This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SPC RT Co., Ltd. Certificate No. C10220014



(Mr. Sittiphong Lekfu)

Person in charge



(Mr. Udon Srichana)

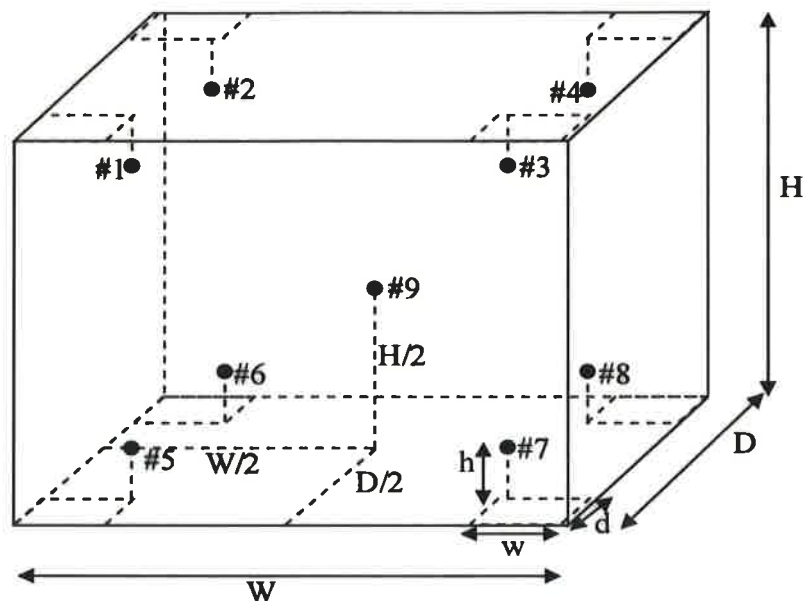
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.





### Standard Installation Locations

Volume (Calibration Zone)= 50 (Liters)

Inside chamber:  $W = 56$  (cm)  $D = 40$  (cm)  $H = 48$  (cm)

Standard Locations (#1, #2, #3, #4):  $w = 6$  (cm)  $d = 5$  (cm)  $h = 5$  (cm)

Standard Locations (#5, #6, #7, #8):  $w = 6$  (cm)  $d = 5$  (cm)  $h = 5$  (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	1	2	3	4	5	6	7	8	9

### Definitions

**Indicating Temperature:** The average reading of indicating device which forms the integral part of the enclosure.

**Measured Temperature:** The average reading of standards at any positions or location.

**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.

**Overall Variation:** The difference of maximum and minimum measured temperatures throughout observation time.

# Calibration Results:

## Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	19.85	-0.15	0.23
#2	19.91	-0.09	0.23
#3	19.98	-0.02	0.23
#4	19.91	-0.09	0.23
#5	20.01	0.01	0.23
#6	19.96	-0.04	0.23
#7	19.97	-0.03	0.23
#8	19.96	-0.04	0.23
#9	19.96	-0.04	0.23

## Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
20.0	20.0	20.0	19.85	19.91	19.98	19.91	20.01	19.96	19.97	19.96	19.96	0.23

## Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
20.0	0.14	0.05	0.26

Note: \* Maximum uncertainty of the each position

**The End of Certificate**

## Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not been assessed separately.

### Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :**
- ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk < 50% PFA
  - ☒ Choice B Non-binary statement with guard band ( $w = 1 U$ ), Specific Risk < 2.5% PFA
  - ☐ Choice C Customer defined, Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r U$ ) .  
; PFA – Probability of False Accept



(Mr. Udon Srichana)  
Authorized signatory

## Without adjustment

Desired Temperature : 20.0 °C Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	19.85	-0.15	0.23	1.0	Pass
#2	19.91	-0.09	0.23	1.0	Pass
#3	19.98	-0.02	0.23	1.0	Pass
#4	19.91	-0.09	0.23	1.0	Pass
#5	20.01	0.01	0.23	1.0	Pass
#6	19.96	-0.04	0.23	1.0	Pass
#7	19.97	-0.03	0.23	1.0	Pass
#8	19.96	-0.04	0.23	1.0	Pass
#9	19.96	-0.04	0.23	1.0	Pass

Correction of UUC.\* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

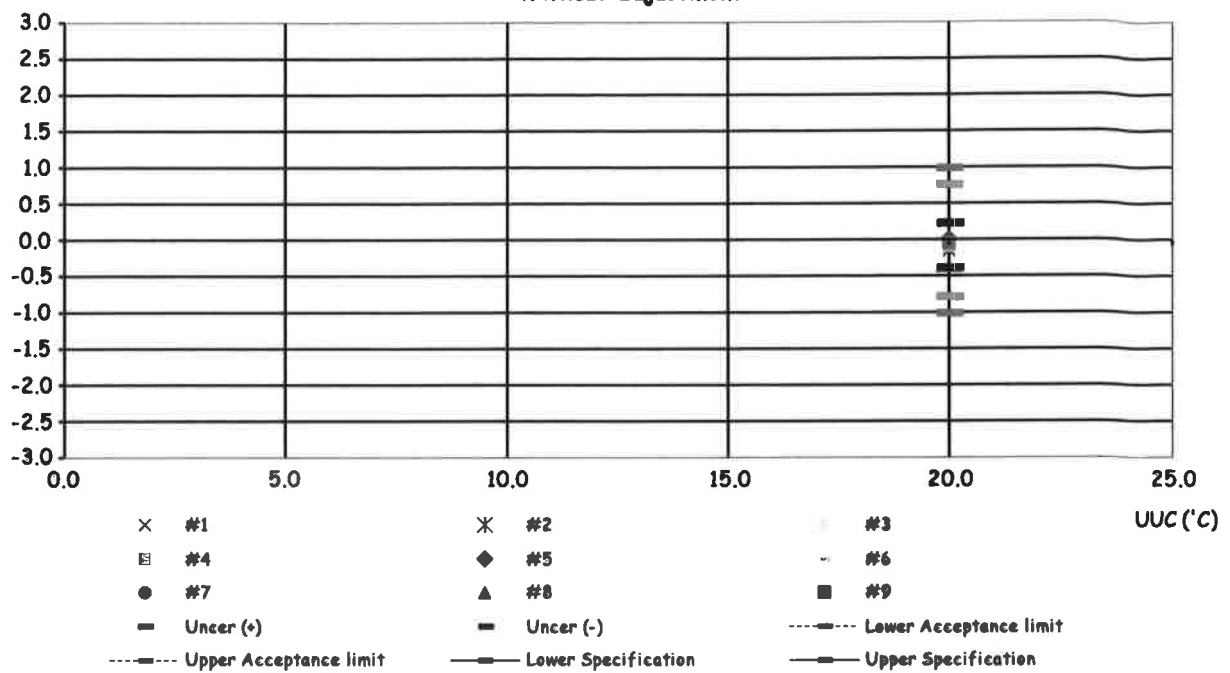
## The End of Statements of Conformity

# Corr\_Distribution & Max\_Measurement Uncertainty

Job\_No. KSPR2300451

Without adjustment

Correction ('C)

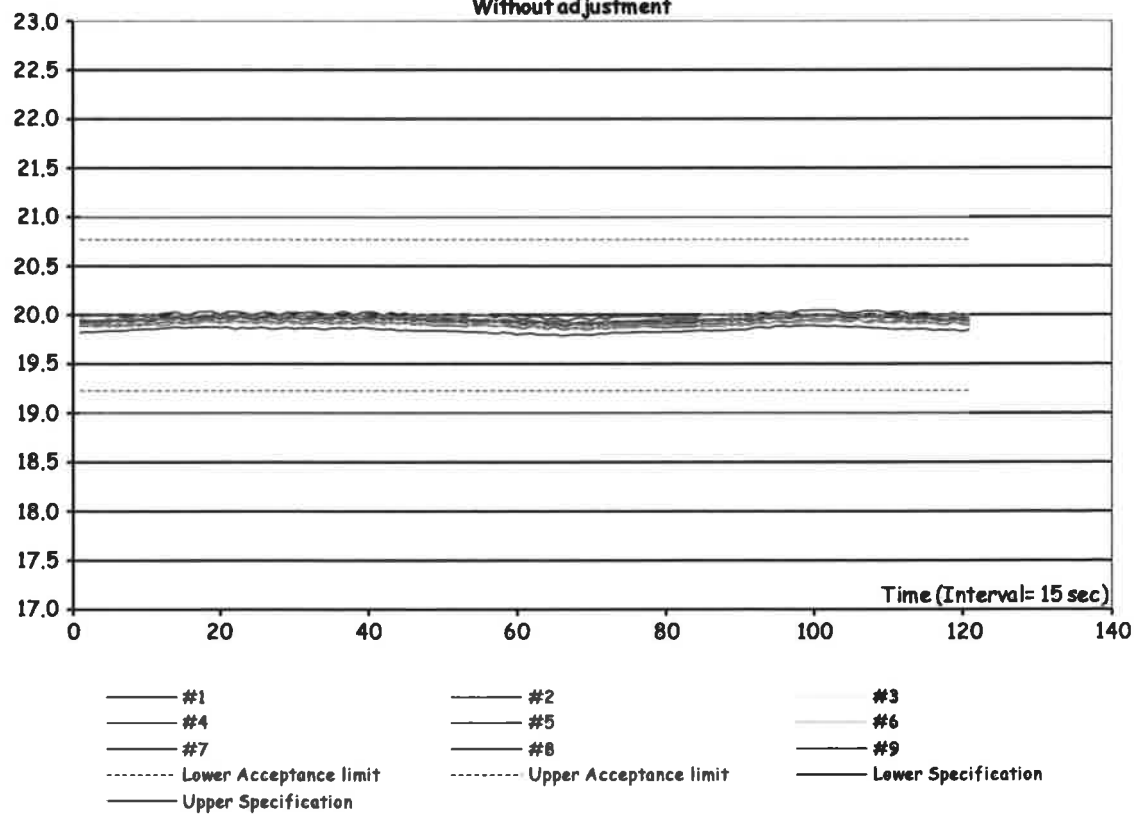


## Temperature Distribution @ 20.0°C

Job\_No. KSPR2300451

Without adjustment

Std('C)



## ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSPR2300451

ชนิดเครื่องมือ: Cooled Incubator

รุ่น: ICP 500

หมายเลขเครื่อง: K511.0019 (LB-EQ-01)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
13 Jan 2023			13 Jan 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความร้อน	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

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Mr. Sittiphong Lekfu

Service Engineer



# Certificate of Calibration

<b>Equipment:</b>	Cooled Incubator	<b>Certificate No.:</b>	C31230156
<b>Model:</b>	i250	<b>Issued Date:</b>	30 January 2023
<b>Serial No.(or ID):</b>	0408-0715-0056 (LB-EQ-04)	<b>Job No.:</b>	KSPR2300452
<b>Manufacturer:</b>	Accuplus	<b>Page:</b>	1 of 3
<b>Condition:</b>	In Condition	<b>Ventilation Valve:</b>	None
<b>Shelves(pc.):</b>	4		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Environment Condition:**

Temperature:	20 °C	±	0.5 °C
Humidity:	51 %RH	±	5.2 %RH
Voltage:	230 VAC	±	1.2 VAC

**Calibration Place:** AQUA NISHIHARA CORPORATION LIMITED. (Laboratory Room)  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Calibration By:** Mr. Sittiphong Lekfu

**Calibration Date:** 13 January 2023

**The Method used:** In house method, SPCC-WI-16, base on TLAS-G20

**Traceability:** This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SPC RT Co., Ltd. Certificate No. C10220014



(Mr. Sittiphong Lekfu)

Person in charge



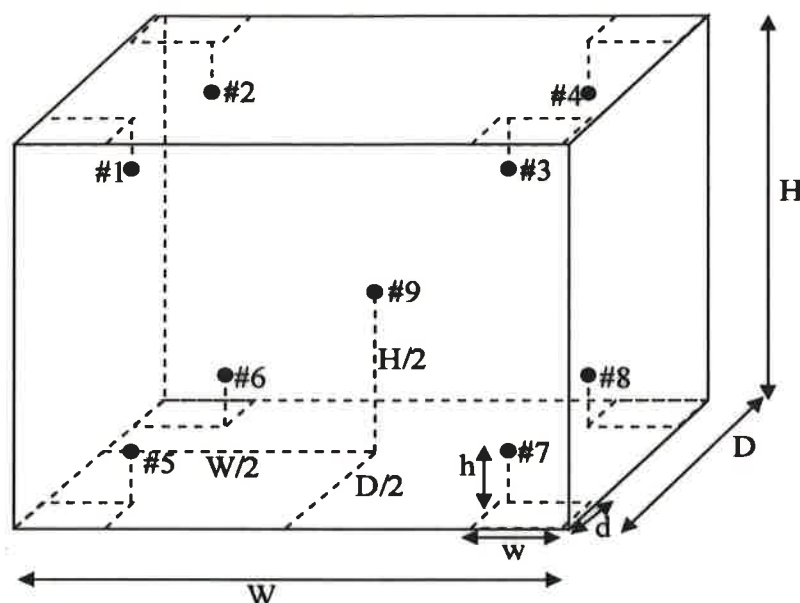
(Mr. Udon Srichana)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.



### Standard Installation Locations

Volume (Calibration Zone)= 120 (Liters)

Inside chamber:  $W = 50$  (cm)  $D = 48$  (cm)  $H = 119$  (cm)

Standard Locations (#1, #2, #3, #4):  $w = 5$  (cm)  $d = 5$  (cm)  $h = 25$  (cm)

Standard Locations (#5, #6, #7, #8):  $w = 5$  (cm)  $d = 5$  (cm)  $h = 15$  (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	1	2	3	4	5	6	7	8	9

### Definitions

**Indicating Temperature:** The average reading of indicating device which forms the integral part of the enclosure.

**Measured Temperature:** The average reading of standards at any positions or location.

**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.

**Overall Variation:** The difference of maximum and minimum measured temperatures throughout observation time.



**Calibration Results:**
**Without adjustment**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 3.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	3.40	0.40	0.23
#2	3.35	0.35	0.24
#3	3.29	0.29	0.24
#4	3.37	0.37	0.24
#5	3.01	0.01	0.24
#6	3.08	0.08	0.23
#7	3.07	0.07	0.23
#8	2.89	-0.11	0.24
#9	2.97	-0.03	0.24

**Temperature Distribution**

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
3.0	3.0	3.0	3.40	3.35	3.29	3.37	3.01	3.08	3.07	2.89	2.97	0.24

**Chamber Characterization**

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
3.0	0.47	0.08	0.66

Note: \* Maximum uncertainty of the each position

**The End of Certificate**



## Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not been assessed separately.

### Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :**
- ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk  $< 50\%$  PFA
  - ☒ Choice B Non-binary statement with guard band ( $w = 1$  U), Specific Risk  $< 2.5\%$  PFA
  - ☐ Choice C Customer defined, Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r$  U) .
- ; PFA – Probability of False Accept



(Mr. Udon Srichana)

Authorized signatory

## Without adjustment

Desired Temperature : 3.0°C Tolerances : 3.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 3.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	3.40	0.40	0.23	3.0	Pass
#2	3.35	0.35	0.24	3.0	Pass
#3	3.29	0.29	0.24	3.0	Pass
#4	3.37	0.37	0.24	3.0	Pass
#5	3.01	0.01	0.24	3.0	Pass
#6	3.08	0.08	0.23	3.0	Pass
#7	3.07	0.07	0.23	3.0	Pass
#8	2.89	-0.11	0.24	3.0	Pass
#9	2.97	-0.03	0.24	3.0	Pass

Correction of UUC.\* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or Improper use.

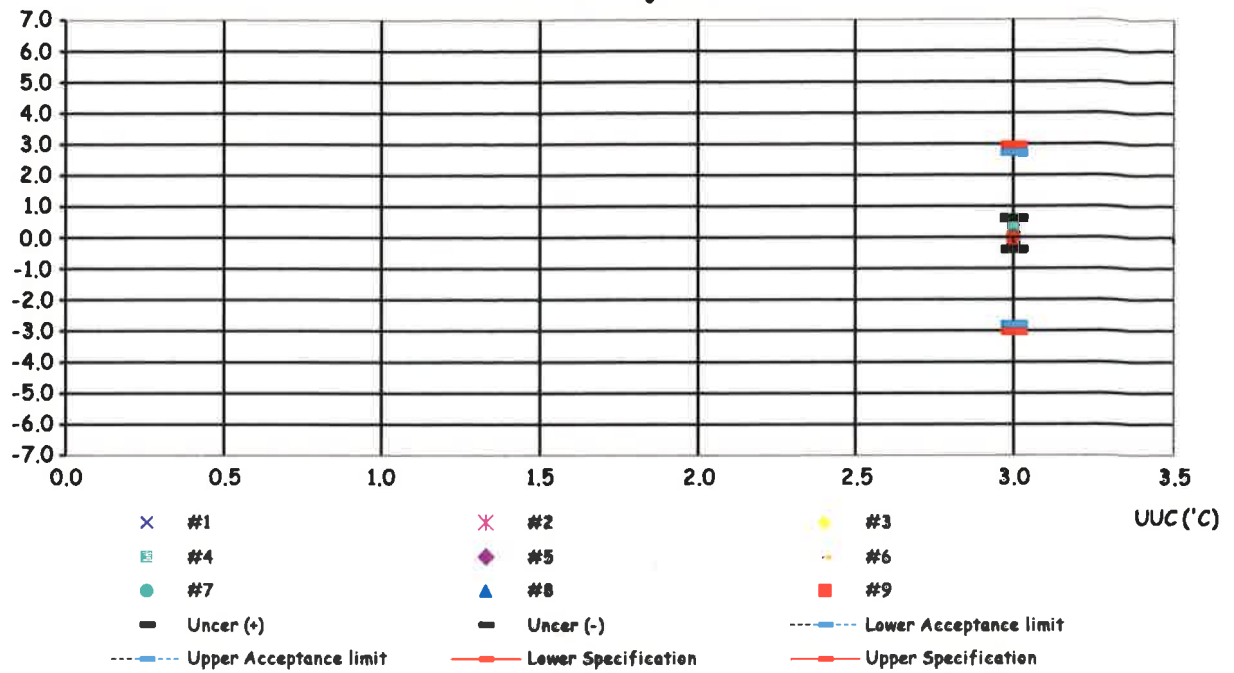
## The End of Statements of Conformity

# Corr\_Distribution & Max\_Measurement Uncertainty

Job\_No. KSPR2300452

Without adjustment

Correction ('C)

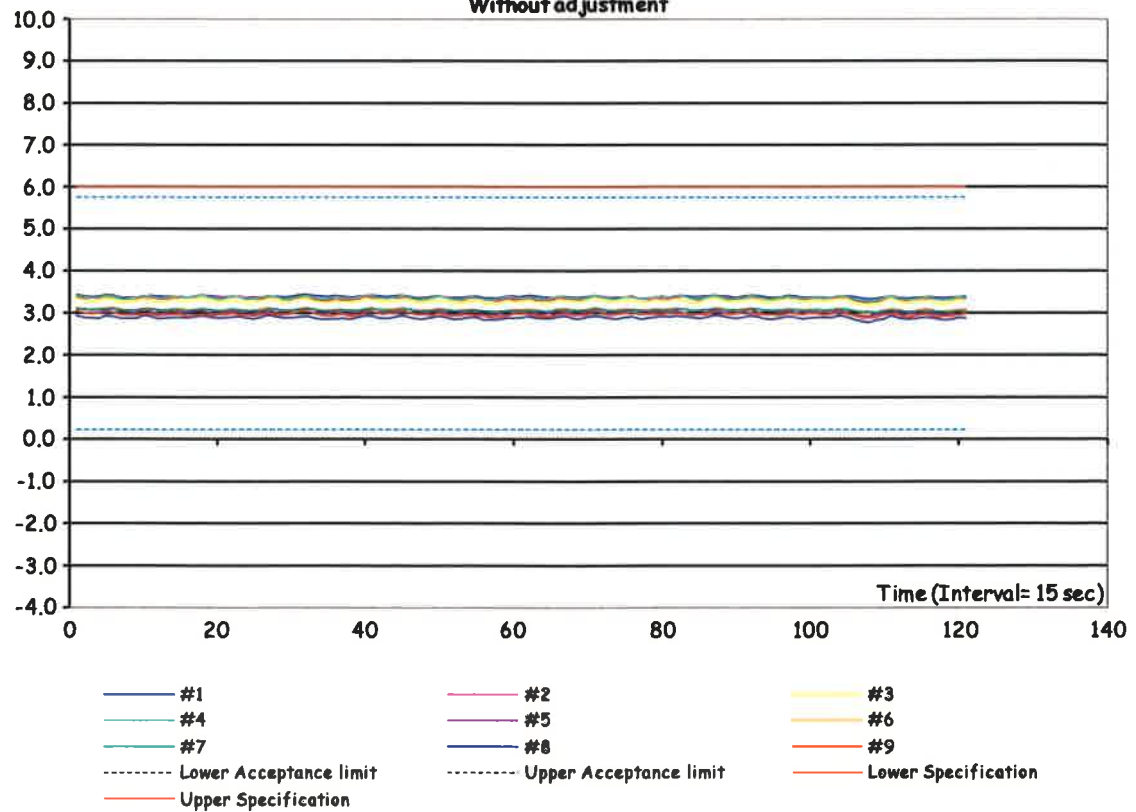


## Temperature Distribution @ 3.0°C

Job\_No. KSPR2300452

Without adjustment

Std('C)



## ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSPR2300452

ชนิดเครื่องมือ: Cooled Incubator

รุ่น: i250

หมายเลขเครื่อง: 0408-0715-0056 (LB-EQ-04)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
13 Jan 2023			13 Jan 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความร้อน	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

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Mr. Sittiphong Lekfu

Service Engineer



# Certificate of Calibration

<b>Equipment:</b>	Oven	<b>Certificate No.:</b>	C31230084
<b>Model:</b>	UN55	<b>Issued Date:</b>	18 January 2023
<b>Serial No.(or ID):</b>	B214.0901 ( LB-EQ-02 )	<b>Job No.:</b>	KSPR2300453
<b>Manufacturer:</b>	Memmert	<b>Page:</b>	1 of 4
<b>Condition:</b>	In Condition	<b>Ventilation Valve:</b>	Closed
<b>Shelves(pc.):</b>	2		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Environment Condition:**

Temperature:	32 °C	±	1.2 °C
Humidity:	47 %RH	±	4.2 %RH
Voltage:	229 VAC	±	2.5 VAC

**Calibration Place:** AQUA NISHIHARA CORPORATION LIMITED. ( Laboratory Room )  
202/12 Soi.Prawit Lae Phuean,Prachachuen Road,Ladyao,  
Jatujek,Bangkok 10900 Thailand.

**Calibration By:** Mr. Nattapat Rungrueang

**Calibration Date:** 13 January 2023

**The Method used:** In house method, CAL-WI-16, base on TLAS-G20

**Traceability:** This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SPC RT Co., Ltd. Certificate No. C10220010



(Mr. Nattapat Rungrueang)

Person in charge



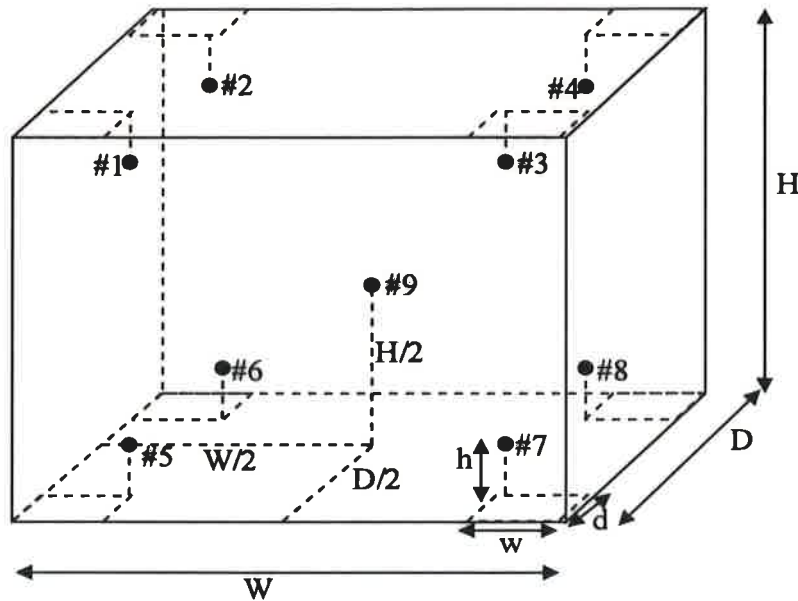
(Mr. Udon Srichana)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the Items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.



### Standard Installation Locations

Volume (Calibration Zone)= 21 (Liters)

Inside chamber:  $W = 40$  (cm)  $D = 33$  (cm)  $H = 40$  (cm)

Standard Locations (#1, #2, #3, #4):  $w = 5$  (cm)  $d = 5$  (cm)  $h = 5$  (cm)

Standard Locations (#5, #6, #7, #8):  $w = 5$  (cm)  $d = 5$  (cm)  $h = 5$  (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	1	2	3	4	5	6	7	8	9

### Definitions

**Indicating Temperature:** The average reading of indicating device which forms the integral part of the enclosure.

**Measured Temperature:** The average reading of standards at any positions or location.

**Measured Uniformity:** The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

**Measured Stability:** The one-half of greatest maximum difference of measured temperatures at any one probe.

**Overall Variation:** The difference of maximum and minimum measured temperatures throughout observation time.

**Calibration Results:**
**Before adjustment**

Setting:	Indicating:	#1:	#2:	#3:	#4:	#5:	#6:	#7:	#8:	#9:
104.0	104.0	104.76	104.61	104.93	104.79	104.10	103.87	104.01	104.01	104.44

**After adjustment**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	104.38	0.38	0.39
#2	104.19	0.19	0.39
#3	104.57	0.57	0.39
#4	104.37	0.37	0.39
#5	103.73	-0.27	0.42
#6	103.48	-0.52	0.46
#7	103.58	-0.42	0.39
#8	103.73	-0.27	0.41
#9	104.06	0.06	0.40

**Temperature Distribution**

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.0	104.0	104.38	104.19	104.57	104.37	103.73	103.48	103.58	103.73	104.06	0.46

**Chamber Characterization**

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.0	0.80	0.25	1.53

Note: \* Maximum uncertainty of the each position

### After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 180.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	180.59	0.59	0.69
#2	180.22	0.22	0.65
#3	180.47	0.47	0.65
#4	179.97	-0.03	0.65
#5	180.53	0.53	0.71
#6	178.21	-1.79	0.70
#7	179.63	-0.37	0.71
#8	179.37	-0.63	0.70
#9	180.35	0.35	0.67

### Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	180.0	180.0	180.59	180.22	180.47	179.97	180.53	178.21	179.63	179.37	180.35	0.71

### Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
180.0	2.44	0.27	2.86

Note: \* Maximum uncertainty of the each position

**The End of Certificate**



## Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not been assessed separately.

### Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk  $< 50\%$  PFA.
- ☒ Choice B Non-binary statement with guard band ( $w = 1 U$ ), Pass or Fail Specific Risk  $< 2.5\%$  PFA and Condition Pass or Condition Fail Specific Risk  $< 50\%$  PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r U$ ).  
; PFA – Probability of False Accept



(Mr. Udon Srichana)  
Authorized signatory

## After adjustment

Desired Temperature : 104.0°C Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.38	0.38	0.39	1.0	Pass
#2	104.19	0.19	0.39	1.0	Pass
#3	104.57	0.57	0.39	1.0	Pass
#4	104.37	0.37	0.39	1.0	Pass
#5	103.73	-0.27	0.42	1.0	Pass
#6	103.48	-0.52	0.46	1.0	Pass
#7	103.58	-0.42	0.39	1.0	Pass
#8	103.73	-0.27	0.41	1.0	Pass
#9	104.06	0.06	0.40	1.0	Pass

Correction of UUC.\* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.



**Statements of conformity:(Cont.)****After adjustment (Cont.)****Desired Temperature : 180.0°C Tolerances : 2.0 °C****Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 180.0 °C**

Locations	Measured (°C)	Correction of UUC.* (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	180.59	0.59	0.69	2.0	Pass
#2	180.22	0.22	0.65	2.0	Pass
#3	180.47	0.47	0.65	2.0	Pass
#4	179.97	-0.03	0.65	2.0	Pass
#5	180.53	0.53	0.71	2.0	Pass
#6	178.21	-1.79	0.70	2.0	Condition Pass
#7	179.63	-0.37	0.71	2.0	Pass
#8	179.37	-0.63	0.70	2.0	Pass
#9	180.35	0.35	0.67	2.0	Pass

Correction of UUC.\* = Measured Temperature - Desired Temperature

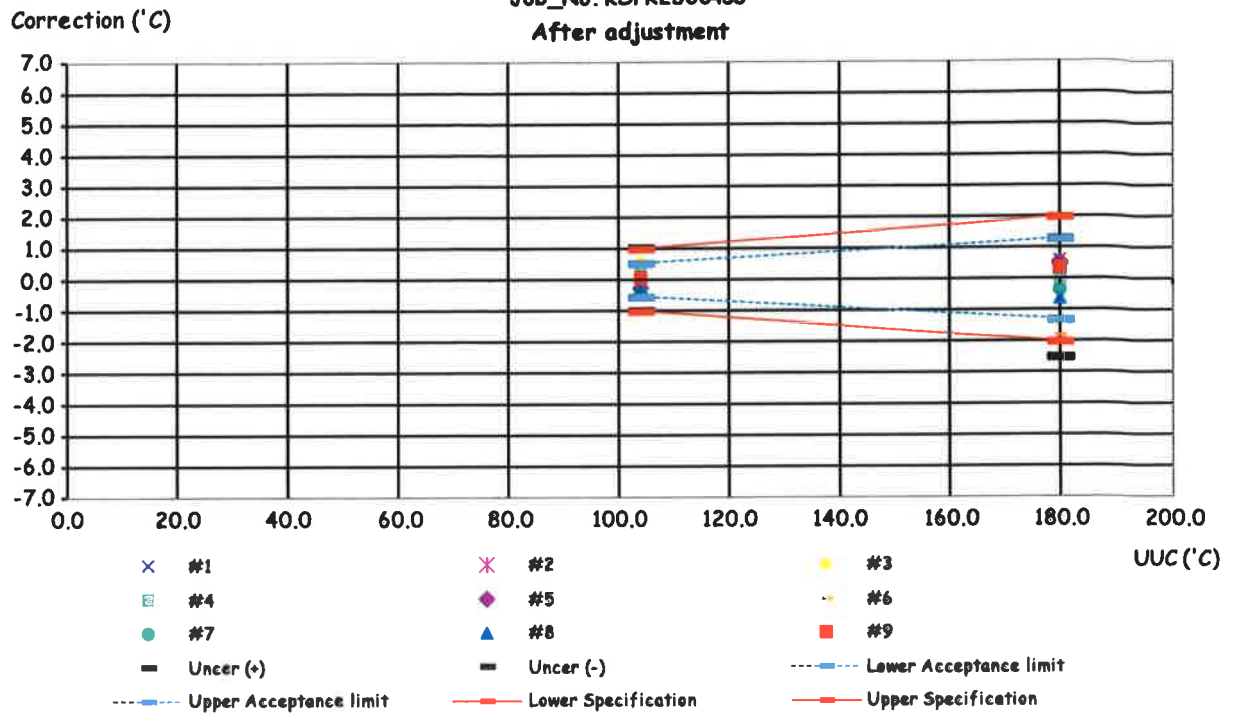
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

**The End of Statements of Conformity**

# Corr\_Distribution & Max\_Measurement Uncertainty

Job\_No. KSPR2300453

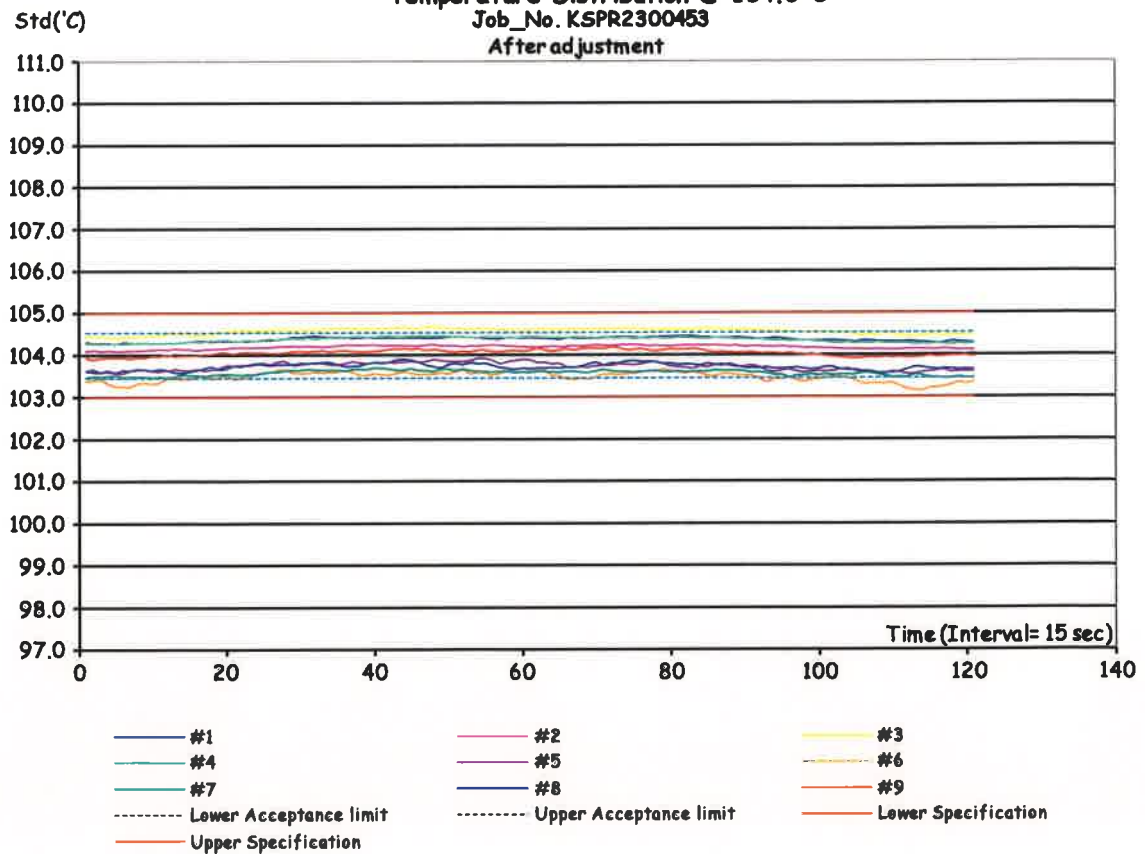
After adjustment



## Temperature Distribution @ 104.0°C

Job\_No. KSPR2300453

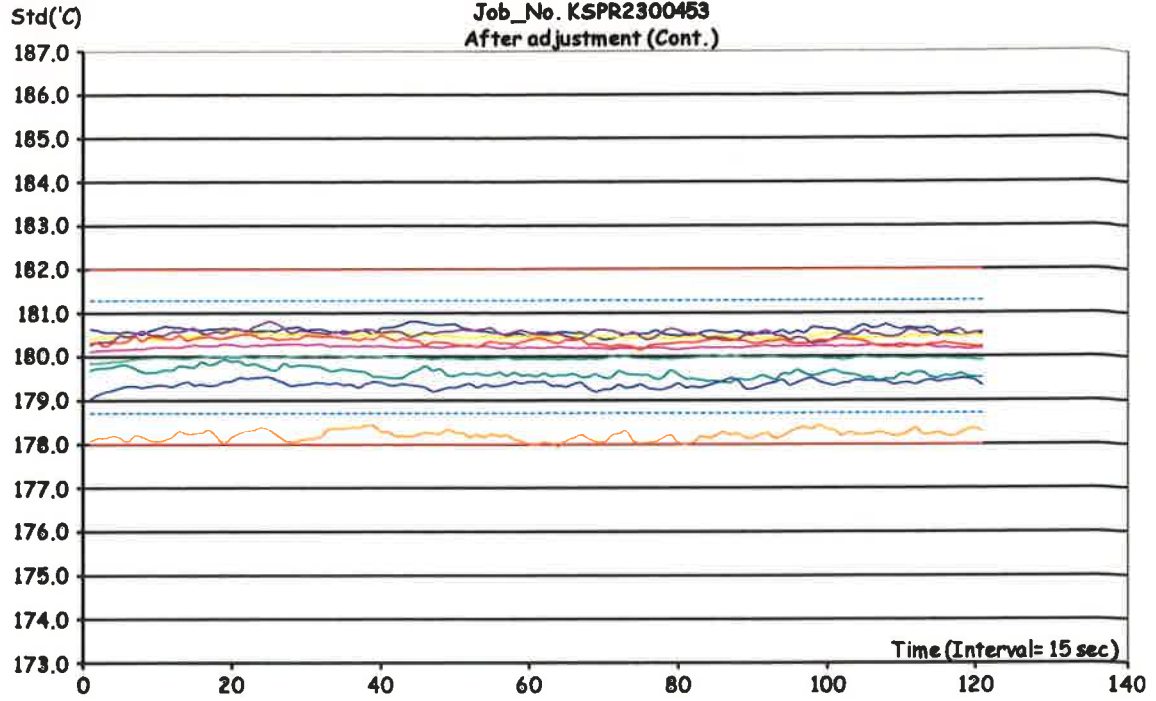
After adjustment



# Temperature Distribution @ 180.0°C

Job\_No. KSPR2300453

After adjustment (Cont.)



- #1
- #2
- #3
- #4
- #5
- #6
- #7
- #8
- #9
- Lower Acceptance limit
- Upper Acceptance limit
- Lower Specification
- Upper Specification

## ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSPR2300453

ชนิดเครื่องมือ: Oven

รุ่น: UN55

หมายเลขเครื่อง: B214.0901 ( LB-EQ-02 )

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
13 Jan 2023			13 Jan 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input type="checkbox"/>	<input type="checkbox"/>	ไม่ได้ตรวจสอบ
<input type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความร้อน	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

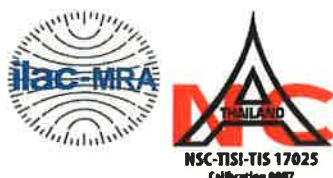
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Mr. Nattapat Rungrueang

Service Engineer



# Certificate of Calibration

<b>Equipment:</b>	Balance	<b>Certificate No.:</b>	C01230213
<b>Model:</b>	BSA224S-CW	<b>Issued Date:</b>	18 January 2023
<b>Serial No. (or ID.):</b>	36693117 (LB-EQ-03)	<b>Job No.:</b>	KSPR2300454
<b>Manufacturer:</b>	Sartorius	<b>Page:</b>	1 of 3
<b>Condition:</b>	In condition		

**Customer:** AQUA NISHIHARA CORPORATION LIMITED.  
202/12 Soi.Prawit Lae Phuean, Prachachuen Road, Ladyao,  
Jatujek, Bangkok 10900 Thailand.

**Environment Condition:** Temperature 24 °C ± 0.5 °C  
Humidity 65 %RH ± 2.2 %RH

**Calibration Place:** AQUA NISHIHARA CORPORATION LIMITED. ( Laboratory Room )  
202/12 Soi.Prawit Lae Phuean, Prachachuen Road, Ladyao,  
Jatujek, Bangkok 10900 Thailand.

**Calibration By:** Mr. Nattapat Rungruang

**Calibration Date:** 13 January 2023

**The Method used:** In-house method, CAL-WI-47, based on UKAS Lab 14

**Traceability:** This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02220051



(Mr. Nattapat Rungrueang)

Person in charge



(Mr. Rungrod Jenkitrakulchai)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด  
DKSH Technology Limited

2533 ถนนสุขุมวิท แขวงบางนา เขตคลองเตย กรุงเทพมหานคร 10260

2533 Sukhumvit Road, Bangchak, Phra Khanong, Bangkok 10260

Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

## Calibration Results:

### Before Adjustment

**Eccentric Error:** Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.

Nominal Test Value	100	(g)		
Reference Points (g)				
A	B	C	D	E
-	0.0001	0.0003	0.0001	0.0001

**Repeatability:** Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

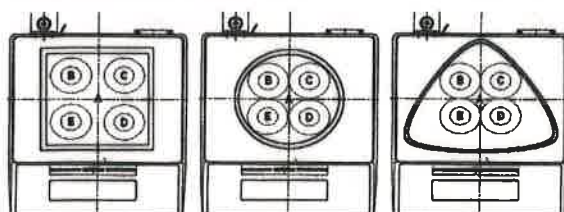
Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00005

**Error of Indication from nominal or conventional mass value.,** Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
0.01	0.01000	0.0100	0.0000	0.00010	2.03
0.1	0.10000	0.1000	0.0000	0.00010	2.03
0.5	0.50000	0.5000	0.0000	0.00010	2.03
1	1.00001	1.0000	0.0000	0.00010	2.03
2	2.00002	2.0000	0.0000	0.00010	2.03
5	4.99999	5.0000	0.0000	0.00010	2.03
10	10.00003	10.0000	0.0000	0.00011	2.02
20	19.99998	20.0000	0.0000	0.00011	2.02
50	50.00002	50.0002	0.0002	0.00012	2.01
100	100.00000	100.0004	0.0004	0.00017	2.00
200	200.00005	200.0013	0.0012	0.00029	2.00

### After Adjustment

**Eccentric Error:** Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.

			Nominal Test Value		100	(g)
Reference Points (g)						
A	B	C	D	E		
-	0.0001	0.0001	0.0000	-0.0001		

**Repeatability:** Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00005

**Error of Indication from nominal or conventional mass value.,** Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of Indication (g)	Uncertainty (g)	k
0.01	0.01000	0.0100	0.0000	0.00010	2.03
0.1	0.10000	0.1000	0.0000	0.00010	2.03
0.5	0.50000	0.5000	0.0000	0.00010	2.03
1	1.00001	1.0000	0.0000	0.00010	2.03
2	2.00002	2.0000	0.0000	0.00010	2.03
5	4.99999	5.0000	0.0000	0.00010	2.03
10	10.00003	10.0000	0.0000	0.00011	2.02
20	19.99998	20.0000	0.0000	0.00011	2.02
50	50.00002	50.0000	0.0000	0.00012	2.01
100	100.00000	100.0000	0.0000	0.00017	2.00
200	200.00005	200.0001	0.0001	0.00029	2.00

**The End of Certificate**



## Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, UKAS Lab14. Therefore, those parameters have not been assessed separately.

### Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule : ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk < 50% PFA.
- ☒ Choice B Non-binary statement with guard band ( $w = 1 U$ ), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r U$ ) .
- ; PFA – Probability of False Accept



(Mr. Rungrod Jenkitrakulchai)

Authorized signatory



## Statements of conformity:

### Before Adjustment

Readability; 0.0001 g

Tolerances : 0.0005 g

Nominal Value g	Error of Indication g	Guard band (w) g	Tolerance (±) g	Conformity
0.01	0.0000	0.00010	0.0005	Pass
0.1	0.0000	0.00010	0.0005	Pass
0.5	0.0000	0.00010	0.0005	Pass
1	0.0000	0.00010	0.0005	Pass
2	0.0000	0.00010	0.0005	Pass
5	0.0000	0.00010	0.0005	Pass
10	0.0000	0.00011	0.0005	Pass
20	0.0000	0.00011	0.0005	Pass
50	0.0002	0.00012	0.0005	Pass
100	0.0004	0.00017	0.0005	Condition Pass
200	0.0012	0.00029	0.0005	Fail

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

**Statements of conformity:****After Adjustment****Readability; 0.0001 g****Tolerances : 0.0005 g**

Nominal Value g	Error of indication g	Guard band (w) g	Tolerance (±) g	Conformity
0.01	0.0000	0.00010	0.0005	Pass
0.1	0.0000	0.00010	0.0005	Pass
0.5	0.0000	0.00010	0.0005	Pass
1	0.0000	0.00010	0.0005	Pass
2	0.0000	0.00010	0.0005	Pass
5	0.0000	0.00010	0.0005	Pass
10	0.0000	0.00011	0.0005	Pass
20	0.0000	0.00011	0.0005	Pass
50	0.0000	0.00012	0.0005	Pass
100	0.0000	0.00017	0.0005	Pass
200	0.0001	0.00029	0.0005	Pass

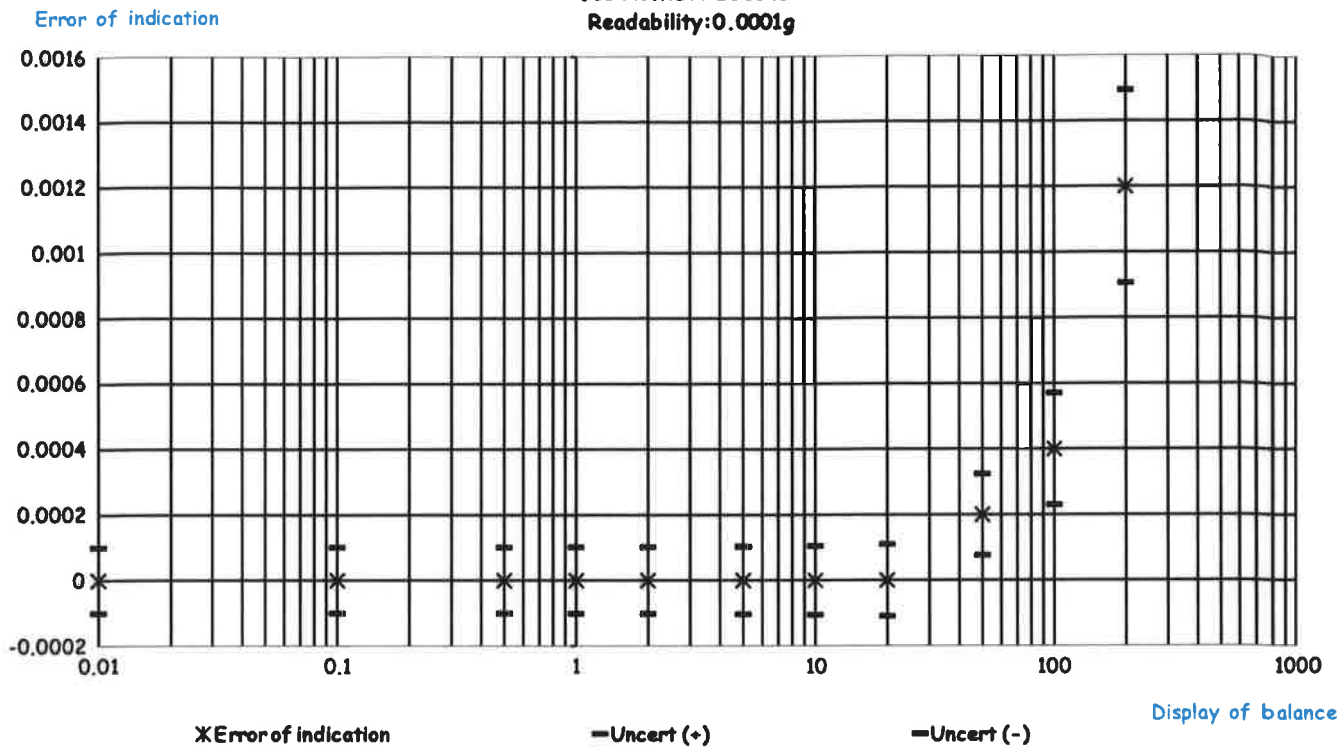
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

**The End of Statements of conformity**

### Before Adjustment

Job No.KSPR2300454

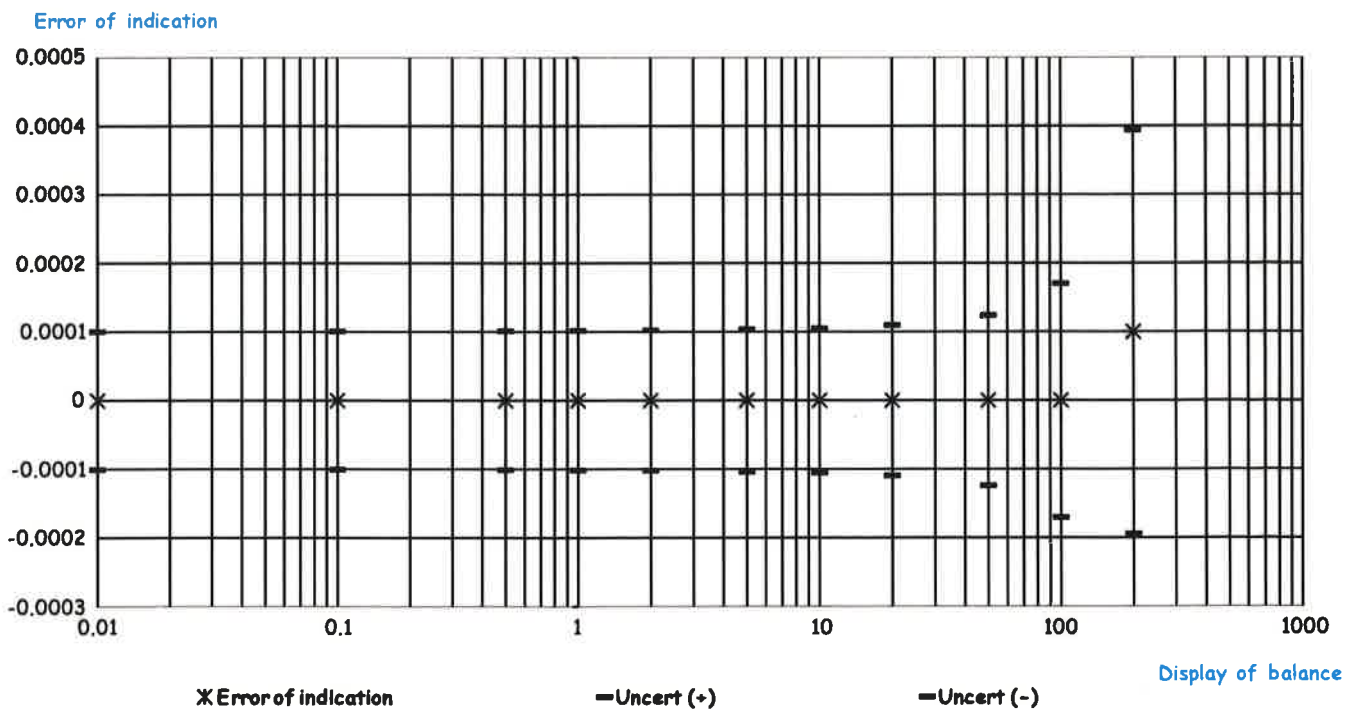
Readability:0.0001g



### After Adjust

Job No.KSPR2300454

Readability:0.0001g



## ใบตรวจสอบสภาพเครื่องชั่ง

เลขที่ใบงาน: KSPR2300454

ชนิดเครื่องมือ: Balance

รุ่น: BSA224S-CW

หมายเลขเครื่อง: 36693117

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
13 Jan 2023			13 Jan 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ/Adapter, power supply 220/110V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสมบูรณ์ชุดกระจกกันลม (Cover)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. ความสมบูรณ์ชุดของระดับน้ำ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การปรับระดับของขาตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การตอบสนองของปุ่มกด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. ความสมบูรณ์ของ Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. การแสดงผลของ Display หลังวางน้ำหนัก	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ชุดรองจานชั่ง (Stopper) / pan support	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของ Function Internal / External	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. ความสะอาดของตัวเครื่องภายนอกและแกน load cell	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

หมายเหตุเพิ่มเติม/ข้อแนะนำ :

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Mr. Nattapat Rungruang

Service Engineer