

ภาคผนวกที่ 5

เอกสารการสอบเทียบเครื่องมือ

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| เอกสาร | 5-1 | เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศในบรรยากาศ |
| เอกสาร | 5-2 | เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศจากปล่อง |
| เอกสาร | 5-3 | เอกสารสอบเทียบเครื่องมือการตรวจคุณภาพอากาศในสถานประกอบการ
(Working Area) |
| เอกสาร | 5-4 | เอกสารสอบเทียบเครื่องมือการตรวจระดับเสียงโดยทั่วไปและเสียงในสถานประกอบการ
(Working Area) |
| เอกสาร | 5-5 | เอกสารสอบเทียบเครื่องมือการตรวจค่าความร้อนในสถานประกอบการ
(Working Area) |

**ตารางสรุปรายการเอกสารการสอบเทียบความถูกต้องของเครื่องมือเก็บตัวอย่าง
และเครื่องมือตรวจวิเคราะห์**

รายการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
1. คุณภาพอากาศในบรรยากาศ <ul style="list-style-type: none"> TSP 	<ul style="list-style-type: none"> High Volume Air Sampler No. B02, B15, B22 	<ul style="list-style-type: none"> Digital Balance
<ul style="list-style-type: none"> PM₁₀ 	<ul style="list-style-type: none"> High Volume PM-10 Air Sampler No. B14, B08, R10, R11 	<ul style="list-style-type: none"> Digital Balance
<ul style="list-style-type: none"> SO₂ 	<ul style="list-style-type: none"> Gas Sampler Box No. B01, B02, B03 	<ul style="list-style-type: none"> Spectrophotometer
<ul style="list-style-type: none"> NO₂ 	<ul style="list-style-type: none"> NO₂ Analyzer No. B13, B16, B18 	<ul style="list-style-type: none"> NO₂ Analyzer No. B13, B16, B18
2. ระดับเสียงโดยทั่วไป <ul style="list-style-type: none"> Leq 1 hr Leq 24 hr L_{max} L₉₀ 	<ul style="list-style-type: none"> Acoustic Calibrator Sound Level Meter No. B03, B04, B10, B40, B44, B45, B46 	-
3. คุณภาพอากาศจากปล่องระบาย <ul style="list-style-type: none"> TSP 	<ul style="list-style-type: none"> Console No. B05 Pitot Tube No. B35 	<ul style="list-style-type: none"> Digital Balance
<ul style="list-style-type: none"> SO₂ 	<ul style="list-style-type: none"> Personal Pump SKC No. B69 Rotameter No. H-B07 	-
<ul style="list-style-type: none"> NO_x 	<ul style="list-style-type: none"> Vacuum Gauge 	<ul style="list-style-type: none"> Spectrophotometer
<ul style="list-style-type: none"> CO 	<ul style="list-style-type: none"> Gas Bag 	<ul style="list-style-type: none"> Non-Dispersive Infrared Detection Method
4. คุณภาพอากาศในสถานประกอบการ <ul style="list-style-type: none"> Total Dust 	<ul style="list-style-type: none"> Personal Pump SKC No. B05, B18, B52, B68, B74, B91 Rotameter No. H-B06, H-B10 	<ul style="list-style-type: none"> Digital Balance
5. ระดับเสียงในสถานประกอบการ <ul style="list-style-type: none"> Leq 8 hr 	<ul style="list-style-type: none"> Acoustic Calibrator Sound Level Meter No. ACO-B18, B29, B33, B36, B41, B43 	-
6. ความร้อนในสถานประกอบการ <ul style="list-style-type: none"> WBGT 	<ul style="list-style-type: none"> Digital Thermometer with Probe No. B05, B07, B11, B31, B32, B33 	-

เอกสารที่ 5-1

เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศในบรรยากาศ

High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Office Flow Transfer Standard				Model : TE 5025A	S/N : 3611
Calibration Data					
High Volume Air Sampler Data		Calibration Data			
Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²	
B01	B01	01/08/2024	y = 1.171x-2.911	0.998	
B02	B02	02/08/2024	y = 1.163x+0.020	0.999	
B03	B03	05/08/2024	y = 1.195x-3.992	0.998	
B04	B04	02/08/2024	y = 1.212x-3.522	0.999	
B05	B05	02/08/2024	y = 1.222x-5.699	0.997	
B06	B06	05/08/2024	y = 1.192x-3.521	0.999	
B07	B07	08/08/2024	y = 1.173x-2.945	0.998	
B08	B08	02/08/2024	y = 1.181x-2.549	0.999	
B09	B09	02/08/2024	y = 1.202x-4.007	0.999	
B10	B10	05/08/2024	y = 1.187x-0.531	0.998	
B11	B11	05/08/2024	y = 1.092x+1.351	1.000	
B12	B12	07/08/2024	y = 1.186x-4.168	0.998	
B13	B13	05/08/2024	y = 1.182x-3.641	0.996	
B14	B14	05/08/2024	y = 1.226x-5.106	0.999	
B15	B15	05/08/2024	y = 1.218x-3.602	1.000	
B16	B16	02/08/2024	y = 1.174x-1.318	0.997	
B17	B17	05/08/2024	y = 1.188x-1.593	1.000	
B18	B18	02/08/2024	y = 1.218x-5.796	0.999	
B19	B19	02/08/2024	y = 1.225x-6.976	0.998	
B20	B20	02/08/2024	y = 1.197x-2.746	0.999	
B21	B21	05/08/2024	y = 1.214x-5.212	0.997	
B22	B22	05/08/2024	y = 1.205x-5.711	0.999	
B23	B23	02/08/2024	y = 1.221x-4.197	0.998	
B24	B24	02/08/2024	y = 1.164x-1.349	0.999	
B25	B25	07/08/2024	y = 1.125x-0.794	1.000	
B26	B26	07/08/2024	y = 1.181x-2.418	0.998	
B27	B27	07/08/2024	y = 1.109x-1.204	0.998	
B28	B28	07/08/2024	y = 1.183x-5.519	1.000	
B29	B29	02/08/2024	y = 1.227x-3.979	0.996	
B30	B30	05/08/2024	y = 1.174x-2.401	0.999	
B31	B31	05/08/2024	y = 1.190x-4.450	1.000	
B32	B32	05/08/2024	y = 1.203x-1.091	0.999	
B33	B33	05/08/2024	y = 1.218x-3.935	1.000	
B34	B34	05/08/2024	y = 1.224x-5.708	0.996	

Calibrated by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by :

Peera Detudom
(Mr. Peera Detudom)

High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Office Flow Transfer Standard				Model : TE 5025A	S/N : 3611
Calibration Data					
High Volume Air Sampler Data		Calibration Data			
Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²	
B35	B35	05/08/2024	y = 1.186x-3.084	0.999	
B36	B36	05/08/2024	y = 1.210x-3.778	0.997	
B37	B37	06/08/2024	y = 1.196x-3.291	0.998	
B38	B38	06/08/2024	y = 1.176x-3.769	1.000	
B39	B39	05/08/2024	y = 1.200x-1.884	0.999	
B40	B40	05/08/2024	y = 1.192x-3.238	0.999	
B41	B41	05/08/2024	y = 1.170x-2.205	0.996	
B42	B42	05/08/2024	y = 1.141x-0.385	1.000	
B43	B43	02/08/2024	y = 1.175x-1.695	0.996	
B44	B44	02/08/2024	y = 1.167x-1.577	0.998	
R01	R01	02/08/2024	y = 1.177x-4.285	0.999	
R02	R02	02/08/2024	y = 1.216x-7.757	0.997	
R03	R03	02/08/2024	y = 1.198x-6.621	0.999	
R04	R04	08/08/2024	y = 1.170x-2.838	0.997	
R05	R05	08/08/2024	y = 1.184x-4.669	1.000	
R06	R06	01/08/2024	y = 1.205x-5.684	0.998	
R07	R07	01/08/2024	y = 1.114x+0.237	1.000	
R08	R08	01/08/2024	y = 1.073x+1.881	0.997	
R09	R09	01/08/2024	y = 1.186x-1.865	0.999	
R10	R10	02/08/2024	y = 1.171x-3.610	0.996	
R11	R11	02/08/2024	y = 1.201x-4.470	1.000	
R12	R12	02/08/2024	y = 1.167x-3.984	0.998	
R13	R13	06/08/2024	y = 1.171x-3.661	0.997	
R14	R14	06/08/2024	y = 1.194x-2.635	0.998	
R15	R15	02/08/2024	y = 1.207x-5.878	0.999	
R16	R16	02/08/2024	y = 1.212x-6.360	1.000	
R17	R17	05/08/2024	y = 1.194x-4.223	0.999	
R18	R18	05/08/2024	y = 1.151x-2.849	0.999	
R19	R19	05/08/2024	y = 1.172x-3.442	0.998	
R20	R20	05/08/2024	y = 1.184x-3.473	0.999	



Calibrated by :

Adul Dangklom
(Mr.Adul Dangklom)



Approved by :

Peera Detudom
(Mr. Peera Detudom)

High Volume PM-10 Air Sampler Calibration Report				
Calibration Method : Multipoint Office Flow Transfer Standard			Model : TE 5025A	S/N : 3611
Calibration Data				
High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²
B01	B01	02/08/2024	y = 1.192x-3.010	0.997
B02	B02	05/08/2024	y = 1.166x-1.422	0.998
B03	B03	07/08/2024	y = 1.198x-2.675	0.997
B04	B04	02/08/2024	y = 1.195x-4.555	0.999
B05	B05	05/08/2024	y = 1.215x-6.792	0.999
B06	B06	02/08/2024	y = 1.184x-3.554	0.997
B07	B07	01/05/2024	y = 1.132x-0.786	1.000
B08	B08	02/08/2024	y = 1.203x-1.746	0.997
B09	B09	05/08/2024	y = 1.198x-3.274	0.999
B10	B10	02/08/2024	y = 1.175x-1.634	0.996
B11	B11	02/08/2024	y = 1.188x-1.290	0.999
B12	B12	07/08/2024	y = 1.200x-4.619	0.997
B13	B13	05/08/2024	y = 1.140x-2.044	0.997
B14	B14	06/08/2024	y = 1.137x+0.196	0.996
B15	B15	05/08/2024	y = 1.156x-0.963	1.000
B16	B16	06/08/2024	y = 1.178x+0.511	0.999
B17	B17	02/08/2024	y = 1.167x-2.529	0.998
B18	B18	01/08/2024	y = 1.193x-2.801	0.997
B19	B19	05/08/2024	y = 1.174x-2.984	0.998
B20	B20	01/08/2024	y = 1.197x-4.582	0.999
B21	B21	05/08/2024	y = 1.195x-3.263	0.998
B22	B22	02/08/2024	y = 1.137x-0.996	0.998
B23	B23	05/08/2024	y = 1.191x-2.392	0.998
B24	B24	01/08/2024	y = 1.185x-3.393	0.997
B25	B25	02/08/2024	y = 1.202x-3.881	0.997
B26	B26	02/08/2024	y = 1.193x-3.733	0.997
B27	B27	02/08/2024	y = 1.165x-4.778	0.999
B28	B28	02/08/2024	y = 1.182x-4.730	0.999
B29	B29	05/08/2024	y = 1.177x-4.217	0.999
B30	B30	05/08/2024	y = 1.188x-3.046	0.998
B31	B31	01/08/2024	y = 1.173x-1.247	1.000
B32	B32	01/08/2024	y = 1.157x-3.072	1.000
B33	B33	05/08/2024	y = 1.153x-0.882	0.997
B34	B34	05/08/2024	y = 1.193x-1.943	0.996

Calibrated by :  (Mr. Adul Dangklom)	Approved by :  (Mr. Peera Detudom)
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High Volume PM-10 Air Sampler Calibration Report				
Calibration Method : Multipoint Office Flow Transfer Standard			Model : TE 5025A	S/N : 3611
Calibration Data				
High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²
R01	R01	05/08/2024	y = 1.192x-5.034	0.998
R02	R02	07/08/2024	y = 1.182x-2.772	0.998
R03	R03	07/08/2024	y = 1.199x-4.793	1.000
R04	R04	07/08/2024	y = 1.189x-6.456	0.996
R05	R05	07/08/2024	y = 1.162x-3.444	1.000
R06	R06	07/08/2024	y = 1.194x-3.230	0.999
R07	R07	01/08/2024	y = 1.127x-0.967	0.998
R08	R08	01/08/2024	y = 1.181x-3.206	0.998
R09	R09	01/08/2024	y = 1.197x-3.914	0.999
R10	R10	01/08/2024	y = 1.133x-1.368	0.999
R11	R11	01/08/2024	y = 1.129x+0.073	0.999
R12	R12	06/08/2024	y = 1.194x-5.439	0.998
R13	R13	06/08/2024	y = 1.166x-1.899	1.000
R14	R14	06/08/2024	y = 1.181x-3.793	0.999
R15	R15	02/08/2024	y = 1.186x-3.195	0.997
R16	R16	02/08/2024	y = 1.174x-3.244	1.000
R17	R17	01/08/2024	y = 1.120x+0.523	0.999
R18	R18	07/08/2024	y = 1.146x-2.616	1.000
R19	R19	07/08/2024	y = 1.180x-1.421	1.000
R20	R20	07/08/2024	y = 1.123x-3.226	0.996

Calibrated by :  (Mr. Adul Dangklom)	Approved by :  (Mr. Peera Detudom)
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Gas Sampler Box Calibration Report

Calibration Method : Dry Cal Primary Flowmeter			Model : Dry Cal DCL-ML			S/N : 136164	
Calibration Data							
Gas Sampler		Calibration Data					
No.	Rotameter	Date	Setting (Constant Flow) (ml/min)	Actual Flow Rate (ml/min)			
				Sampling Line A		Sampling Line B	
				Normal Condition	Standard Condition		Normal Condition
B01	2 (A&B)	03/06/2024	200	200.5	200.3	200.6	200.4
B02	2 (A&B)	03/06/2024	200	200.3	200.2	200.5	200.3
B03	2 (A&B)	04/06/2024	200	200.4	200.3	200.7	200.5
B04	2 (A&B)	04/06/2024	200	200.6	200.4	200.5	200.3
B05	2 (A&B)	04/06/2024	200	200.7	200.5	200.7	200.5
B06	2 (A&B)	04/06/2024	200	200.6	200.4	200.4	200.3
B07	2 (A&B)	05/06/2024	200	200.7	200.5	200.6	200.4
B08	2 (A&B)	05/06/2024	200	200.4	200.2	200.5	200.3
B09	2 (A&B)	03/06/2024	200	200.5	200.3	200.7	200.5
B10	2 (A&B)	03/06/2024	200	200.4	200.2	200.6	200.4
B11	2 (A&B)	03/06/2024	200	200.7	200.5	200.7	200.5
B12	2 (A&B)	03/06/2024	200	200.6	200.4	200.5	200.3
B13	2 (A&B)	05/06/2024	200	200.4	200.2	200.3	200.2
B14	2 (A&B)	05/06/2024	200	200.7	200.5	200.5	200.3
B15	2 (A&B)	05/06/2024	200	200.4	200.3	200.6	200.4
B16	2 (A&B)	04/06/2024	200	200.6	200.4	200.7	200.5
B17	2 (A&B)	04/06/2024	200	200.5	200.3	200.6	200.4

Calibrated by : Adul Dangklom
(Mr. Adul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)

CALIBRATION REPORT

CHEMILUMINESCENT NO / NO₂ / NO_x ANALYZER

DATE : 02 September 2024	BRAND : API	MODEL : 200A
NO. NOX-B13		SERIAL NO. 1983
Calibrator (Dilution System)		
Brand : Telebyte	Model : 700E	
Last Cal. Date : 30 October 2023	Serial No. : 201-S	
Reference Standard Gas		
Standard Gas : Nitric Oxide (NO)	Cylinder No. : A007650V	
Certified Date : 05 January 2023	Expired Date : 05 January 2026	Cylinder Conc. : 48.8 ppm
CALIBRATING CONDITION		
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49
CALIBRATION SETTING		
Span	Initial Reading (Before Adj.) PPB	Final Reading (After Adj.) PPB
Set Point	Expected Concentration	Analyzer Response
Zero	0	-0.11
NO Span	400	399.9
NO ₂ Span	400	400.1
API Model 200E NO _x Analyzer Check List		
Test Values	Observed Value	Units
RANGE	500	PPB
STABILITY (Zero Gas)	0.1	PPB
SAMPLE FLOW	507	cc/min
OZONE FLOW	78	cc/min
PMT	103.1	mV
AZERO	93.9	mV
HVPS	672	V
RCCELL TEMP	50.4	°C
BOX TEMP	29.3	°C
PMT TEMP	7.2	°C
MOLY TEMP	314.9	°C
RCCELL PRESS	8.4	IN-Hg-A
SAMPLE PRESS	28.7	IN-Hg-A
NO Span Conc	400	PPB
NO _x Span Conc	400	PPB
NO Slope	1.006	-
NO _x Slope	1.010	-
NO Offset	1.3	mV
NO ₂ Offset	0.9	mV
Stability at Zero	0.1	PPB
Stability at Span	0.2	PPB
< 2 ppb @ 400 ppb span gas		

Calibrated by : Adul Dangklom
(Mr. Adul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)

CALIBRATION REPORT									
CHEMILUMINESCENT NO _x / NO _x ANALYZER									
DATE : 02 September 2024	BRAND : API		MODEL : 200E						
NO. NOX-B16			SERIAL NO. 249						
Calibrator (Dilution System)									
Brand : Teledyne		Model : 700E							
Last Cal. Date : 30 October 2023		Serial No. : 201-S							
Standard Gas : Nitric Oxide (NO)		Cylinder No. : A007265V							
Certified Date : 05 January 2023		Expired Date : 05 January 2026		Cylinder Conc. : 48.8 ppm					
CALIBRATING CONDITION									
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49							
CALIBRATION SETTING									
Span	Initial Reading (Before Adj.) PPB		Final Reading (After Adj.) PPB						
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope				
Zero	0	0.11	-	0	-				
NO Span	400	400.1	0.025	400.0	1.009				
NO _x Span	400	400.2	0.050	400.0	1.012				
API Model 200E NO _x Analyzer Check List									
Test Values		Observed Value		Units	Nominal Range				
RANGE		500	PPB		500 standard				
STABILITY (Zero Gas)		0.1	PPB		< 2 with zero air				
SAMPLE FLOW		510	cc/min		500 ± 50				
OZONE FLOW		79	cc/min		80 ± 15				
PMT		103.3	mV		-20 - 150				
AZERO		94.1	mV		-20 - 150				
HVPS		674	V		420 - 900 constant				
RCCELL TEMP		50.2	°C		50 ± 1				
BOX TEMP		29.0	°C		8 - 48				
PMT TEMP		7.3	°C		7 ± 2				
MOLY TEMP		315.2	°C		315 ± 5				
RCCELL PRESS		8.3	IN-Hg-A		2 - 10 constant				
SAMPLE PRESS		28.5	IN-Hg-A		25 - 30 constant				
NO Span Conc		400	PPB		20 - 20,000				
NO _x Span Conc		400	PPB		20 - 20,000				
NO Slope		1.009	-		1.0 ± 0.3				
NO _x Slope		1.012	-		1.0 ± 0.3				
NO Offset		1.7	mV		-20 to +150				
NO _x Offset		1.0	mV		-20 to 150				
Stability at Zero		0.1	PPB		< 0.2				
Stability at Span		0.2	PPB		< 2 ppb @ 400 ppb span gas				

Calibrated by : Adul Dangklom Approved by : (Mr. Peera Detudom)

CALIBRATION REPORT									
CHEMILUMINESCENT NO _x / NO _x ANALYZER									
DATE : 02 September 2024	BRAND : API		MODEL : TML-41M						
NO. NOX-B18			SERIAL NO. N07543						
Calibrator (Dilution System)									
Brand : Teledyne		Model : 700E							
Last Cal. Date : 30 October 2023		Serial No. : 201-S							
Standard Gas : Nitric Oxide (NO)		Cylinder No. : A007265V							
Certified Date : 05 January 2023		Expired Date : 05 January 2026		Cylinder Conc. : 48.8 ppm					
CALIBRATING CONDITION									
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49							
CALIBRATION SETTING									
Span	Initial Reading (Before Adj.) PPB		Final Reading (After Adj.) PPB						
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope				
Zero	0	-0.10	-	0	-				
NO Span	400	399.6	-0.100	400.0	1.004				
NO _x Span	400	399.9	-0.025	400.0	1.008				
API Model TML-41M NO _x Analyzer Check List									
Test Values		Observed Value		Units	Nominal Range				
RANGE		500	PPB		500 standard				
STABILITY (Zero Gas)		0.1	PPB		< 2 with zero air				
SAMPLE FLOW		509	cc/min		500 ± 50				
OZONE FLOW		79	cc/min		80 ± 15				
PMT		103.0	mV		-20 - 150				
AZERO		93.7	mV		-20 - 150				
HVPS		670	V		420 - 900 constant				
RCCELL TEMP		50.5	°C		50 ± 1				
BOX TEMP		29.2	°C		8 - 48				
PMT TEMP		7.4	°C		7 ± 2				
MOLY TEMP		314.7	°C		315 ± 5				
RCCELL PRESS		8.2	IN-Hg-A		2 - 10 constant				
SAMPLE PRESS		28.4	IN-Hg-A		25 - 30 constant				
NO Span Conc		400	PPB		20 - 20,000				
NO _x Span Conc		400	PPB		20 - 20,000				
NO Slope		1.004	-		1.0 ± 0.3				
NO _x Slope		1.008	-		1.0 ± 0.3				
NO Offset		1.2	mV		-20 to +150				
NO _x Offset		0.8	mV		-20 to 150				
Stability at Zero		0.1	PPB		< 0.2				
Stability at Span		0.2	PPB		< 2 ppb @ 400 ppb span gas				

Calibrated by : Adul Dangklom Approved by : (Mr. Peera Detudom)



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com




CERTIFICATE No : 24M2227
REFERENCE No : 72448-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : METTLER TOLEDO
MODEL : XS105DU
SERIAL No : 1126422905
ID No : BA05/50
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.
CALIBRATION DATE : 08-Mar-24
APPROVED BY : 
PONGSAK J.
ISSUED DATE : 14-Mar-24
RECEIVED DATE : 08-Mar-24

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

F-G010 REV 03



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

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CERTIFICATE No : 24M2227

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : METTLER TOLEDO
ID No : BA05/50
AIR PRESSURE : 1010mbar \pm 1mbar
AMBIENT TEMPERATURE : 25°C \pm 1°C
MODEL : XS105DU
S/N : 1126422905
RECEIVED DATE : 08-Mar-24
CALIBRATION DATE : 08-Mar-24
RELATIVE HUMIDITY : 53 %RH \pm 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6/2019 BY USING KNOWN WEIGHT
STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION, THE BALANCE HAS NO ZERO
TRACKING FUNCTION, REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS
MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE
PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED
ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

REFERENCE STANDARD INSTRUMENTS :-

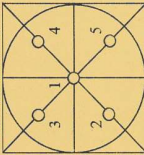
1) STANDARD WEIGHT SET : E2
2) STANDARD WEIGHT : E2
3) THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (\pm g)
0.00	0.00000	0.00000	0.0000065
0.02	0.02001	-0.00001	0.0000065
0.10	0.10002	-0.00002	0.0000066
0.20	0.20001	-0.00001	0.0000066
0.50	0.50001	-0.00001	0.0000065
1.00	1.00003	-0.00003	0.0000066
2.00	2.00001	-0.00001	0.0000067
5.00	5.00001	-0.00001	0.0000068
10.00	9.99994	0.00006	0.0000070
20.00	20.00008	-0.00008	0.0000078
50.00	50.00000	0.00000	0.000013
100.00	100.00001	-0.00001	0.000019
120.00	120.00001	-0.00001	0.000022

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0000
3	50.0000
4	50.0000
5	50.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA
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



F-G010 REV 03

Calibration Certificate

Equipment : UV-VIS SPECTROPHOTOMETER
Manufacturer : PERKINELMER
Model : LAMBDA 25
Serial No.: 501S14123010
ID No.: SP03/58
Calibration Mode : WAVELENGTH ACCURACY
PHOTOMETRIC ACCURACY
Condition As Found : GOOD
Customer : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN ROAD,
CHOMPON, CHATUCHAK,
BANGKOK 10900, THAILAND.

Location : WET CHEMISTRY LABORATORY IV

Ambient Temperature : (28.1 ± 5) °C
Relative Humidity : (47.2 ± 25) %

Received Date : 27 AUGUST 2024
Calibration Date : 27 AUGUST 2024
Date of Issue : 27 AUGUST 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Calibration Method :

This instrument was calibrated by using on-site calibration procedure In-house method : CP-SP-01
The calibration procedure to direct measurement wavelength accuracy by using wavelength standard solution, Photometric accuracy by using absorbance standard filter and absorbance standard solution
The calibration procedure used was based on ASTM E275-01, ASTM E925-02

Condition of this result of calibration :

1. Certified reference materials

Material	Ref. type	Cell serial No.	Cert. No.	Due Date
Holmium liquid	RM-HL	29706	106864	01/11/2024
Didymium liquid	RM-DL	28912	106905	02/11/2024
Neutral density filter	RM-1N2N3N	13877	106918	03/11/2024
Potassium dichromate solutions	RM-0204060810	14204	106902	02/11/2024
Potassium Iodide solution	-	KI-0701-001	CI-0185-24	14/05/2026

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

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 The UK National Physical Laboratory (NPL)
- 3.2 The National Institute of Standards and Technology, NIST.

Result of calibration : Wavelength Accuracy (Without adjustment)

Material	Certified Values of Reference Material (nm)	UUC* Reading (nm)	Error (nm)	Uncertainty ± (nm)	k Factor
RM-HL	278.13	278.3	0.17	0.16	2.00
	361.25	361.4	0.15	0.16	2.00
	467.82	467.7	-0.12	0.16	2.00
	536.56	536.5	-0.06	0.16	2.00
RM-DL	640.50	640.4	-0.10	0.16	2.00
	740.09	739.9	-0.19	0.16	2.00
	864.94	865.2	0.26	0.16	2.00

UUC* = Unit Under Calibration

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : SP24020
Job No. : VC67SP0013
Pages : 3 of 3

Result of calibration : Photometric Accuracy

(Without adjustment)

Material	Wavelength (nm)	Filter S/N	Nominal Absorbance (A)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	k Factor
Neutral Density glass filter	440.0	29360	1.0	1.0517	1.0550	0.0033	0.0029	2.00
		29914	0.7	0.7445	0.7460	0.0015	0.0029	2.00
		29381	0.5	0.5416	0.5431	0.0015	0.0030	2.00
	546.1	29360	1.0	0.9821	0.9820	-0.0001	0.0028	2.00
		29914	0.7	0.6961	0.6958	-0.0003	0.0028	2.00
		29381	0.5	0.5073	0.5080	0.0007	0.0029	2.00
	590.0	29360	1.0	1.0222	1.0210	-0.0012	0.0028	2.00
		29914	0.7	0.7237	0.7221	-0.0016	0.0029	2.00
		29381	0.5	0.5361	0.5361	0.0000	0.0031	2.00
	635.0	29360	1.0	0.9753	0.9745	-0.0008	0.0028	2.00
29914		0.7	0.6910	0.6900	-0.0010	0.0029	2.00	
29381		0.5	0.5211	0.5210	-0.0001	0.0032	2.00	
RM-0204060810	235.0	Solution (mg/l)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	k Factor	
		20	0.2422	0.2418	-0.0004	0.0101	2.00	
		40	0.4866	0.4852	-0.0014	0.0115	2.00	
	80	60	0.7414	0.7389	-0.0025	0.0067	2.00	
		80	0.9858	0.9842	-0.0016	0.0093	2.00	
100	1.2442	1.2414	-0.0028	0.0086	2.00			

UUC* = Unit Under Calibration

Condition of this result of calibration : Spectrophotometer PERKINELMER Model Lambda 25 S/N 501S14123010

Resolution of Wavelength Mode	0.1 nm
Resolution of Photometric Mode	0.0001 A
Parameter Setting	
Measurement Mode	Wavelength, Absorbance
Wavelength Scan	1100 nm-190 nm
Scanning Speed	7.5 nm/min
Data Pitch	0.1 nm
Band width(Wavelength)	1.0 nm
Band width(Vis)	1.0 nm
Band width(Uv)	1.0 nm

Stray Light** UUC* Reading at 220 nm	
Transmission T(%)	Absorbance(A)
0.0117	3.8659

**Specific Acceptance :
Transmission ≤ 1.0 T(%), Absorbance ≥ 2.0 A
**Stray light not TISI Accredited

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

— End of Calibration Certificate —

เอกสารที่ 5-2

เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศจากปล่อง

Console Calibration Report

Critical Offices

Console Data		Calibration Data		
No.	Serial No.	Date	y	ΔH_g (mmH ₂ O)
B01	1563	02/09/2024	0.998	50.16
B02	8002514	04/09/2024	1.002	50.08
B03	1503016	02/09/2024	1.005	50.02
B04	00006659	03/09/2024	0.997	49.84
B05	00007428	02/09/2024	1.003	49.95
R01	1561	03/09/2024	0.998	50.11
R02	8002513	04/09/2024	0.997	49.97
R03	1570	03/09/2024	1.004	49.82
R04	8002519	02/09/2024	0.996	49.74
R05	1503015	04/09/2024	0.999	49.88

Remark : Accept Value of y (test) is $0.97 < y < 1.03$

Accept Value of ΔH_g (test) is 46.7 ± 6.4 (mmH₂O)

Calibrated by :

Adul Dangklom
(Mr. Adul Dangklom)

Approved by :

Peera Detudom
(Mr. Peera Detudom)

Pitot Tube Calibration Report

Calibration Method

Standard Pitot Tube

Pitot Tube Data		Calibration Data		
No.	Type of Pitot	Coefficiency of Standard Pitot	Date	Avg. of Cp (test)
B03	S	0.99	02/08/2024	Side A 0.84 Side B 0.83
B04	S	0.99	02/08/2024	0.85 0.84
B05	S	0.99	05/08/2024	0.84 0.84
B07	S	0.99	05/08/2024	0.84 0.83
B08	S	0.99	02/08/2024	0.84 0.84
B09	S	0.99	02/08/2024	0.84 0.85
B11	S	0.99	02/08/2024	0.84 0.84
B16	S	0.99	01/08/2024	0.83 0.84
B18	S	0.99	01/08/2024	0.84 0.84
B19	S	0.99	05/08/2024	0.84 0.84
B21	S	0.99	07/08/2024	0.84 0.85
B24	S	0.99	05/08/2024	0.83 0.84
B27	S	0.99	05/08/2024	0.84 0.83
B30	S	0.99	07/08/2024	0.85 0.84
B31	S	0.99	02/08/2024	0.84 0.85
B33	S	0.99	01/08/2024	0.84 0.84
B35	S	0.99	02/08/2024	0.84 0.85

Remark : Accept value of Cp (test) is 0.84 ± 0.01

Calibrated by :

Adul Dangklom
(Mr. Adul Dangklom)

Approved by :

Peera Detudom
(Mr. Peera Detudom)



Rotameter Calibration Report (For Personal Pump High Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter

Model : Defender 510-H

SN : 136164

Environmental Conditions

Temperature

Pressure

± 3 °C

± 13 mmbar

Personal Pump Data

Calibration Data

Value From Calibration Curve

No.	Brand	Model	Serial No.	Date	Flow Rate (m/min)			R ²				
					Setting	1	2					
B81	SKC	Z24-PC08	612669	02/07/2024	1	2	3	1	2	3	Y	
B82	SKC	Z24-PC08	620041	02/07/2024	1	1500	2000	1009	1302	2005	1.006± 11.46	0.999
B83	SKC	Z24-PC08	604666	02/07/2024	1	1500	2000	1005	1499	2005	0.977± 6.432	1.000
B84	SKC	Z24-PC08	529241	02/07/2024	1	1500	2000	1004	1305	2013	1.010± 15.091	0.999
B85	SKC	Z24-PC08	329594	03/07/2024	1	1500	2000	1004	1506	2005	1.008± 9.731	0.999
B86	SKC	Z24-PC08	567673	03/07/2024	1	1500	2000	996	1491	2002	1.009± 16.399	1.000
B87	SKC	Z24-PC08	560747	03/07/2024	1	1500	2000	996	1495	2001	1.001± 5.621	1.000
B88	SKC	Z24-PC08	560755	03/07/2024	1	1500	2000	1003	1496	1994	0.995± 7.632	1.000
B89	SKC	Z24-PC08	560780	05/07/2024	1	1500	2000	1007	1503	2005	1.007± 9.407	0.999
B90	SKC	Z24-PC08	500400	05/07/2024	1	1500	2000	1005	1492	2001	0.998± 2.047	1.000
B91	SKC	Z24-PC08	500363	05/07/2024	1	1500	2000	997	1513	2006	1.008± 10.870	1.000
B92	SKC	Z24-PC08	093186	05/07/2024	1	1500	2000	1007	1496	2011	1.003± 3.758	1.000
B93	SKC	Z24-PC08	701970	01/07/2024	1	1500	2000	1003	1496	2002	0.999± 1.439	1.000
B94	SKC	Z24-PC08	500921	05/07/2024	1	1500	2000	999	1501	1998	1.003± 4.254	0.999
B95	SKC	Z24-PC08	510710	05/07/2024	1	1500	2000	1000	1503	1998	1.003± 5.549	1.000
B96	SKC	Z24-PC08	511450	03/07/2024	1	1500	2000	998	1519	2003	1.006± 5.785	0.999
B97	SKC	Z24-PC08	510798	01/07/2024	1	1500	2000	1003	1506	2001	1.004± 7.148	1.000
B98	SKC	Z24-PC08	500852	05/07/2024	1	1500	2000	1008	1305	2008	1.010± 16.191	0.999
B99	SKC	Z24-PC08	500842	01/07/2024	1	1500	2000	997	1505	2007	1.012± 20.201	0.999
B00	SKC	Z24-PC08	512655	05/07/2024	1	1500	2000	997	1501	1999	1.000± 0.760	1.000
B01	SKC	Z24-PC08	403915	05/07/2024	1	1500	2000	1014	1507	2003	1.002± 1.563	0.999
B02	SKC	Z24-PC08	500975	05/07/2024	1	1500	2000	999	1517	2000	0.998± 5.513	0.999
B03	SKC	Z24-PC08	511432	05/07/2024	1	1500	2000	1000	1501	2010	1.008± 7.876	1.000
B04	SKC	Z24-PC08	500830	05/07/2024	1	1500	2000	1005	1506	2009	1.010± 11.514	1.000
B05	SKC	Z24-PC08	500810	05/07/2024	1	1500	2000	999	1512	2009	1.003± 11.825	1.000
B06	SKC	Z24-PC08	500961	05/07/2024	1	1500	2000	998	1499	2004	1.008± 11.973	1.000
B07	SKC	Z24-PC08	506295	03/07/2024	1	1500	2000	999	1517	2000	0.999± 4.094	0.999
B08	SKC	Z24-PC08	500872	01/07/2024	1	1500	2000	997	1505	2006	1.011± 17.514	0.999
B09	SKC	Z24-PC08	500875	01/07/2024	1	1500	2000	999	1517	2009	0.998± 3.374	0.999
B10	SKC	Z24-PC08	510623	01/07/2024	1	1500	2000	1008	1505	2009	1.013± 17.610	0.999
B71	SKC	Z24-PC08	500867	01/07/2024	1	1500	2000	996	1504	2002	1.006± 9.933	1.000
B72	SKC	Z24-PC08	505777	01/07/2024	1	1500	2000	997	1499	1996	1.001± 8.495	1.000
B73	SKC	Z24-PC08	512066	03/07/2024	1	1500	2000	997	1496	1999	1.008± 12.009	1.000
B74	SKC	Z24-PC08	510993	03/07/2024	1	1500	2000	1007	1504	2007	1.009± 15.183	0.999
B75	SKC	Z24-PC08	509920	03/07/2024	1	1500	2000	1004	1504	2002	1.007± 14.720	0.999
B76	SKC	Z24-PC08	509811	03/07/2024	1	1500	2000	1005	1493	2002	1.000± 3.068	1.000
B77	SKC	Z24-PC08	508001	04/07/2024	1	1500	2000	1000	1495	2002	0.999± 0.580	1.000
B78	SKC	Z24-PC08	510677	04/07/2024	1	1500	2000	1005	1505	2010	1.008± 12.643	0.999
B79	SKC	Z24-PC08	510920	04/07/2024	1	1500	2000	998	1509	2005	1.009± 17.250	1.000
B80	SKC	Z24-PC08	510920	04/07/2024	1	1500	2000	998	1509	1996	1.002± 3.822	1.000

Calibrated by :

Approved by :

Abul Danyal Khan

(Mr. Asst. Engineer)

Mr. Peera Delusom

Approved by :

(Mr. Peera Detudom)

(Mr. Peera Detudom)



CALIBRATION LABORATORY CO., LTD.

210-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : HI-LIGHT
MODEL / TYPE : N/A
SERIAL NO. : N/A[64-220088-1]
CLID. NO. : 212301419
JOB CONTROL NO. : 240720076545
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24 ROAD., JOMPOL,
CHATUCHAK, BANGKOK 10900

DATE OF RECEIVED : 20 July 2024

DATE OF ISSUED : 23 July 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Sittipong Pimdee
Calibration Engineer



Approved By :

Authorized Signatory
23 July 2024

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q24076545
F3-011-05/12-23

page 1 of 3



@ccalibration



CALIBRATION LABORATORY CO., LTD.

210-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : HI-LIGHT
MODEL / TYPE : N/A
SERIAL NO. : N/A[64-220088-1]
DATE OF CALIBRATION : 22 July 2024
DUE DATE OF CALIBRATION : 22 July 2025

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-05 according to DKD-R 6-1 as calibration guidelines.
The calibration was performed by direct measurement with Document Process Calibrator and Pressure Module which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Document Process Calibrator, Fluke Model 741B S/N. 8295020 with Pressure Module Model 700PD5 S/N. 89404505.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. MP-0040-24, Due Date 08 February 2025.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

Certificate No. Q24076545
F3-011-05/12-23

page 2 of 3



@ccalibration



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com



CERTIFICATE No : 24M2227
REFERENCE No : 72448-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE

MANUFACTURER : METTLER TOLEDO

MODEL : XS105DU

SERIAL No : 1126422905

ID No : BA05/50

CONDITION AS RECEIVED : USED ITEM

SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.

CALIBRATION DATE : 08-Mar-24

APPROVED BY

ISSUED DATE

RECEIVED DATE

14-Mar-24

08-Mar-24

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

F-G010 REV 03

CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd, Ladphrao, Bangkok 10230

Tel. 02-578-0353-4 Fax: 02-578-2672 www.ccl-laboratory.com Email: sale@ccl-laboratory.com



Accredited
ISO/IEC 17025



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (inHg)	STD Reading (kPa)		Conversion to inHg		Correction (inHg)	
	Up	Down	Up	Down	Up	Down
0	0.00	0.00	0.0	0.0	0.0	0.0
-5	-15.58	-15.58	-4.6	-4.6	+0.4	+0.4
-10	-32.51	-32.84	-9.6	-9.7	+0.4	+0.3
-15	-49.44	-49.77	-14.6	-14.7	+0.4	+0.3
-20	-66.70	-66.70	-19.7	-19.7	+0.3	+0.3
-25	-83.63	-83.97	-24.7	-24.8	+0.3	+0.2
-30	-100.90	-100.90	-29.8	-29.8	+0.2	+0.2

Uncertainty of measurement ± 0.2 inHg

Transmitting fluid : Air.

Technical Note. Conversion factor 1 kPa : 0.2953003 inHg

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 43 of 67

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q24076545

F3-011-05/12-23

page 3 of 3



@cclcalibration



CERTIFICATE No : 24M2227

Calibration Report

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : METTLER TOLEDO
ID No : BA0550
AIR PRESSURE : 1010mbar ± 1mbar
AMBIENT TEMPERATURE : 25° C ± 1° C

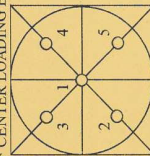
CONDITION OF THIS RESULTS OF CALIBRATION
1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 62019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

2. REFERENCE STANDARD INSTRUMENTS :-
1) STANDARD WEIGHT SET E2
2) STANDARD WEIGHT E2
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE 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) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT
1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE / LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (±g)
0.00	0.00000	0.00000	0.000065
0.02	0.02001	-0.00001	0.000065
0.10	0.10002	-0.00002	0.000066
0.20	0.20001	-0.00001	0.000066
0.50	0.50001	-0.00001	0.000065
1.00	1.00003	-0.00003	0.000066
2.00	2.00001	-0.00001	0.000067
5.00	5.00001	-0.00001	0.000068
10.00	9.99994	0.00006	0.000070
20.00	20.00008	-0.00008	0.000078
50.00	50.00000	0.00000	0.00013
100.00	100.00001	-0.00001	0.00019
120.00	120.00001	-0.00001	0.00022

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0000
3	50.0000
4	50.0000
5	50.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA. THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

Calibration Certificate

Equipment : UV-VIS SPECTROPHOTOMETER
Manufacturer : PERKINELMER
Model : LAMBDA 25
Serial No. : 501S14123010
ID No. : SP03/58
Calibration Mode : WAVELENGTH ACCURACY
PHOTOMETRIC ACCURACY

Condition As Found : GOOD

Customer : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN ROAD,
CHOMPON, CHATUCHAK,
BANGKOK 10900, THAILAND.

Location : WET CHEMISTRY LABORATORY IV

Ambient Temperature : (28.1 ± 5) °C
Relative Humidity : (47.2 ± 25) %

Received Date : 27 AUGUST 2024
Calibration Date : 27 AUGUST 2024
Date of Issue : 27 AUGUST 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : (Thanakul Petchurai)

Cert. No. : SP24020

Job No. : VC67SP0013

Pages : 2 of 3

Calibration Method :

This instrument was calibrated by using on-site calibration procedure In-house method : CP-SP-01

The calibration procedure to direct measurement wavelength accuracy by using wavelength standard

solution, Photometric accuracy by using absorbance standard filter and absorbance standard solution

The calibration procedure used was based on ASTM E275-01, ASTM E925-02

Condition of this result of calibration :

1. Certified reference materials

Material	Ref. type	Cell serial No.	Cert. No.	Due Date
Holmium liquid	RM-HL	29706	106864	01/11/2024
Didymium liquid	RM-DL	28912	106905	02/11/2024
Neutral density filter	RM-IN2N3N	13877	106918	03/11/2024
Potassium dichromate solutions	RM-0204060810	14204	106902	02/11/2024
Potassium Iodide solution	-	KI-0701-001	CI-0185-24	14/05/2026

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

3. This certificate is traceable to the international system of unit maintained at :

3.1 The UK National Physical Laboratory (NPL)

3.2 The National Institute of Standards and Technology, NIST.

Result of calibration : Wavelength Accuracy

(Without adjustment)

Material	Certified Values of Reference Material (nm)	UUC* Reading (nm)	Error (nm)	Uncertainty ± (nm)	k	Factor
RM-HL	278.13	278.3	0.17	0.16	2.00	2.00
	361.25	361.4	0.15	0.16	2.00	2.00
	467.82	467.7	-0.12	0.16	2.00	2.00
	536.56	536.5	-0.06	0.16	2.00	2.00
RM-DL	640.50	640.4	-0.10	0.16	2.00	2.00
	740.09	739.9	-0.19	0.16	2.00	2.00
	864.94	865.2	0.26	0.16	2.00	2.00

UUC* = Unit Under Calibration

Cert. No. : SP24020

Job No. : VC67SP0013

Pages : 3 of 3

Result of calibration : Photometric Accuracy

(Without adjustment)

Material	Wavelength (nm)	Filter S/N	Nominal Absorbance (A)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	k
Neutral Density glass filter	440.0	29360	1.0	1.0517	1.0550	0.0033	0.0029	2.00
		29914	0.7	0.7445	0.7460	0.0015	0.0029	2.00
		29381	0.5	0.5416	0.5431	0.0015	0.0030	2.00
	546.1	29360	1.0	0.9821	0.9820	-0.0001	0.0028	2.00
		29914	0.7	0.6961	0.6958	-0.0003	0.0028	2.00
		29381	0.5	0.5073	0.5080	0.0007	0.0029	2.00
	590.0	29360	1.0	1.0222	1.0210	-0.0012	0.0028	2.00
		29914	0.7	0.7237	0.7221	-0.0016	0.0029	2.00
		29381	0.5	0.5361	0.5361	0.0000	0.0031	2.00
	635.0	29360	1.0	0.9753	0.9745	-0.0008	0.0028	2.00
29914		0.7	0.6910	0.6900	-0.0010	0.0029	2.00	
29381		0.5	0.5211	0.5210	-0.0001	0.0032	2.00	
Material	Wavelength (nm)	Solution (mg/l)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	k	
RM-0204060810	235.0	20	0.2422	0.2418	-0.0004	0.0101	2.00	
		40	0.4866	0.4852	-0.0014	0.0115	2.00	
		60	0.7414	0.7389	-0.0025	0.0067	2.00	
	100	80	0.9858	0.9842	-0.0016	0.0093	2.00	
		100	1.2442	1.2414	-0.0028	0.0086	2.00	

UUC* = Unit Under Calibration

Condition of this result of calibration : Spectrophotometer PERKINELMER Model Lambda 25 S/N 501S14123010

Resolution of Wavelength Mode 0.1 nm

Resolution of Photometric Mode 0.0001 A

Parameter Setting

Measurement Mode Wavelength, Absorbance

Wavelength Scan 1100 nm-190 nm

Scanning Speed 7.5 nm/min

Data Pitch 0.1 nm

Band width(Wavelength) 1.0 nm

Band width(Vis) 1.0 nm

Band width(Uv) 1.0 nm

Stray Light** UUC* Reading at 220 nm	
Transmission T(%)	Absorbance(A)
0.0117	3.8659

**Specific Acceptance :

Transmission ≤ 1.0 T(%), Absorbance ≥ 2.0 A

**Stray light not TISI Accredited

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

End of Calibration Certificate


เอกสารที่ 5-3

เอกสารสอบเทียบเครื่องมือการตรวจคุณภาพอากาศ
ในสถานประกอบการ (Working Area)

Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter		Model : Defender 5104-H		S/N : 136164	
Environmental Conditions		Temperature		± 3 °C	
Pressure		± 10 mmbar			

Personal Pump Data			Serial No.			Date			Flow Rate (m³/min)			Actual (Q std.)			Value From Calibration Curve		
No.	Brand	Model	1	2	3	Setting	1	2	3	1	2	3	1	2	3	Y	R²
801	SKC	224-PC084	62101	05/07/2024	1.00	1.50	2.00	999	1.499	2.000	1.000	1.494	1.997	0.995	1.249	1.000	0.999
802	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.000	1.000	1.494	1.997	0.995	1.249	1.000	1.000	0.995	1.249
803	SKC	224-PC084	61268	05/07/2024	1.00	1.50	2.00	1.006	1.510	2.005	1.006	1.510	2.005	1.006	1.510	1.006	0.999
804	SKC	224-PC084	61268	05/07/2024	1.00	1.50	2.00	1.006	1.510	2.005	1.006	1.510	2.005	1.006	1.510	1.006	0.999
805	SKC	224-PC084	61268	05/07/2024	1.00	1.50	2.00	998	1.502	2.001	1.000	1.494	1.995	1.249	1.000	0.999	0.999
806	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
807	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.002	1.498	2.002	0.999	1.531	2.000	0.995	1.249	1.000	0.999
808	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.005	1.506	2.005	1.005	1.506	2.005	1.005	1.506	2.005	0.999
809	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.003	1.503	2.002	1.003	1.503	2.002	1.003	1.503	2.002	0.999
810	SKC	224-PC084	61268	05/07/2024	1.00	1.50	2.00	994	1.495	2.003	1.000	1.494	1.995	1.249	1.000	0.999	0.999
811	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
812	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.005	1.513	2.006	1.005	1.513	2.006	1.005	1.513	2.006	0.999
813	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.006	1.512	2.007	1.006	1.512	2.007	1.006	1.512	2.007	0.999
814	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.006	1.512	2.007	1.006	1.512	2.007	1.006	1.512	2.007	0.999
815	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	997	1.499	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
816	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
817	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.005	1.513	2.006	1.005	1.513	2.006	1.005	1.513	2.006	0.999
818	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	996	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
819	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
820	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	995	1.494	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
821	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
822	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.004	1.502	2.002	1.004	1.502	2.002	1.004	1.502	2.002	0.999
823	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	999	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
824	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	996	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
825	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.012	1.504	2.004	1.012	1.504	2.004	1.012	1.504	2.004	0.999
826	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	999	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
827	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.000	1.498	2.004	1.000	1.498	2.004	1.000	1.498	2.004	0.999
828	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.003	1.504	2.009	1.003	1.504	2.009	1.003	1.504	2.009	0.999
829	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.509	2.006	1.007	1.509	2.006	1.007	1.509	2.006	0.999
830	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	998	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
831	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.003	1.503	2.007	1.003	1.503	2.007	1.003	1.503	2.007	0.999
832	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	996	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
833	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.000	1.500	2.000	1.000	1.500	2.000	1.000	1.500	2.000	0.999
834	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.005	1.504	2.008	1.005	1.504	2.008	1.005	1.504	2.008	0.999
835	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	998	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
836	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	999	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999
837	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.007	1.513	2.006	1.007	1.513	2.006	1.007	1.513	2.006	0.999
838	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.001	1.498	2.003	1.001	1.498	2.003	1.001	1.498	2.003	0.999
839	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	1.006	1.506	2.006	1.006	1.506	2.006	1.006	1.506	2.006	0.999
840	SKC	224-PC084	62616	05/07/2024	1.00	1.50	2.00	998	1.495	1.999	1.000	1.494	1.995	1.249	1.000	0.999	0.999

Calibrated by :  Approved by : 

(Mr. Adul Darakorn) (Mr. Peera Detudom)

Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter		Model : Defender 5104-H		S/N : 136164	
Environmental Conditions		Temperature		± 3 °C	
Pressure		± 10 mmbar			

Personal Pump Data			Calibration Data										Value From Calibration Curve		
No.	Brand	Model	Serial No.	Date	Flow Rate (m³/min)			Setting			Actual (Q std.)			Y	R²
					1	2	3	1	2	3	1	2	3		
B81	SKC	224-PC084	626699	02/07/2024	1.000	1.500	2.000	1.009	1.502	2.005	1.006	-11.146	0.999		
B82	SKC	224-PC084	626041	02/07/2024	1.000	1.500	2.000	1.005	1.499	2.005	0.9974 + 4.532	1.000			
B83	SKC	224-PC084	034636	02/07/2024	1.000	1.500	2.000	1.004	1.505	2.013	1.0106 + 15.591	0.999			
B84	SKC	224-PC088	592943	02/07/2024	1.000	1.500	2.000	1.004	1.506	2.013	1.0106 + 15.591	0.999			
B85	SKC	224-PC088	529994	03/07/2024	1.000	1.500	2.000	996	1.491	2.002	1.0096 + 16.399	1.000			
B86	SKC	224-PC088	566743	03/07/2024	1.000	1.500	2.000	996	1.495	2.001	1.0011 + 5.621	1.000			
B87	SKC	224-PC088	566747	03/07/2024	1.000	1.500	2.000	1.003	1.496	1.996	0.9954 + 3.652	1.000			
B88	SKC	224-PC088	566753	03/07/2024	1.000	1.500	2.000	1.007	1.501	1.995	1.0075 + 9.047	0.999			
B89	SKC	224-PC088	566780	05/07/2024	1.000	1.500	2.000	1.005	1.492	2.001	0.9956 + 2.047	1.000			
B90	SKC	224-PC088	590040	05/07/2024	1.000	1.500	2.000	997	1.513	2.006	1.0086 + 10.780	1.000			
B91	SKC	224-PC088	590063	05/07/2024	1.000	1.500	2.000	1.007	1.496	2.010	1.0033 + 3.758	1.000			
B92	SKC	224-PC088	093186	05/07/2024	1.000	1.500	2.000	1.003	1.446	2.002	0.9994 + 1.439	1.000			
B93	SKC	224-PC088	707070	05/07/2024	1.000	1.500	2.000	999	1.501	1.998	1.0026 + 4.254	0.999			
B94	SKC	224-PC083	590921	05/07/2024	1.000	1.500	2.000	1.001	1.503	1.998	1.0026 + 4.254	1.000			
B95	SKC	224-PC083	510710	03/07/2024	1.000	1.500	2.000	998	1.519	2.003	1.0066 + 5.785	0.999			
B96	SKC	224-PC083	511450	03/07/2024	1.000	1.500	2.000	1.003	1.506	2.001	1.0046 + 7.748	1.000			
B97	SKC	224-PC083	510798	01/07/2024	1.000	1.500	2.000	1.008	1.505	2.008	1.0106 + 16.191	0.999			
B98	SKC	224-PC083	590852	01/07/2024	1.000	1.500	2.000	1.002	1.505	2.007	1.0126 + 26.261	0.999			
B99	SKC	224-PC083	590852	01/07/2024	1.000	1.500	2.000	997	1.501	1.999	1.0026 + 4.260	1.000			
B00	SKC	224-PC083	512653	05/07/2024	1.000	1.500	2.000	1.014	1.507	2.003	1.0092 + 1.563	0.999			
B01	SKC	224-PC083	509159	05/07/2024	1.000	1.500	2.000	999	1.517	2.000	0.9986 + 5.233	0.999			
B02	SKC	224-PC083	505975	05/07/2024	1.000	1.500	2.000	1.000	1.501	2.010	1.0096 + 8.876	1.000			
B03	SKC	224-PC083	511432	05/07/2024	1.000	1.500	2.000	1.005	1.506	2.009	1.0106 + 11.514	1.000			
B04	SKC	224-PC083	548302	05/07/2024	1.000	1.500	2.000	999	1.512	2.009	1.0096 + 11.825	1.000			
B05	SKC	224-PC083	508310	05/07/2024	1.000	1.500	2.000	998	1.499	2.004	1.0086 + 11.573	1.000			
B06	SKC	224-PC083	590961	05/07/2024	1.000	1.500	2.000	999	1.517	2.000	0.9996 + 4.064	0.999			
B07	SKC	224-PC083	506295	03/07/2024	1.000	1.500	2.000	997	1.505	2.006	1.0116 + 17.514	1.000			
B08	SKC	224-PC083	595972	01/07/2024	1.000	1.500	2.000	999	1.517	1.999	0.9996 + 3.174	0.999			
B09	SKC	224-PC083	598575	01/07/2024	1.000	1.500	2.000	1.008	1.505	2.009	1.0136 + 17.610	0.999			
B70	SKC	224-PC083	510623	01/07/2024	1.000	1.500	2.000	996	1.504	2.002	1.0066 + 9.483	1.000			
B71	SKC	224-PC083	598367	01/07/2024	1.000	1.500	2.000	997	1.499	1.996	1.0016 + 8.945	1.000			
B72	SKC	224-PC083	505977	01/07/2024	1.000	1.500	2.000	997	1.496	1.999	1.0066 + 12.009	1.000			
B73	SKC	224-PC083	512606	03/07/2024	1.000	1.500	2.000	1.007	1.504	2.007	1.0096 + 15.183	0.999			
B74	SKC	224-PC083	595993	03/07/2024	1.000	1.500	2.000	1.004	1.504	2.002	1.0076 + 14.720	0.999			
B75	SKC	224-PC083	590920	03/07/2024	1.000	1.500	2.000	1.005	1.493	2.002	1.0006 + 3.960	1.000			
B76	SKC	224-PC083	590911	03/07/2024	1.000	1.500	2.000	1.000	1.495	2.002	0.9996 + 0.586	1.000			
B77	SKC	224-PC083	598301	04/07/2024	1.000	1.500	2.000	1.005	1.505	2.010	1.008 + 12.453	0.999			
B78	SKC	224-PC083	510677	04/07/2024	1.000	1.500	2.000	998	1.503	2.005	1.0096 + 17.250	1.000			
B79	SKC	224-PC083	510920	02/07/2024	1.000	1.500	2.000	998	1.509	1.996	1.0026 + 3.822	1.000			



Rotameter Calibration Report (For Personal Pump High Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter	Model : Defender S/D-H	S/N : 136164
Environmental Conditions		

Calibration Method : Dry Cal. Primary Flowmeter	Model : Defender 510-H	S/N : 136164
Calibration Data		

Rotameter Data			Flow Rate (ml/min)							Value From Calibration Curve		
No.	Brand	Model	Date	Flow Rate (Reading)			Actual (Q std)			y	R ²	
				1	2	3	1	2	3			
H-801	Dwyer	VRB-65	04/07/2024	500	1,000	2,000	504.1	997.1	1991.2	0.995x + 6.628	1,000	
H-802	Dwyer	VRB-65	04/07/2024	500	1,000	2,000	497.3	1003.5	1991.2	0.998 + 5.168	1,000	
H-803	Dwyer	VRB-65	05/07/2024	500	1,000	2,000	498.4	994.8	2013.0	1.005x - 12.628	0.999	
H-804	Dwyer	VRB-65	02/07/2024	500	1,000	2,000	503.1	997.9	1992.5	0.996x + 6.085	1,000	
H-805	Dwyer	VRB-65	02/07/2024	500	1,000	2,000	497.9	1004.0	1991.2	0.998x + 4.472	1,000	
H-806	Dwyer	VRB-65	01/07/2024	500	1,000	2,000	499.7	997.9	2015.7	1.006x - 9.662	0.999	
H-807	Dwyer	VRB-65	01/07/2024	500	1,000	2,000	501.4	1002.3	1990.2	0.999x + 4.103	1,000	
H-808	Dwyer	VRB-65	04/07/2024	500	1,000	2,000	501.5	999.6	1989.9	0.991x + 12.846	1,000	
H-809	Dwyer	VRB-65	05/07/2024	500	1,000	2,000	502.7	1003.8	1984.8	0.997x + 6.523	0.999	
H-810	Dwyer	VRB-65	05/07/2024	500	1,000	2,000	501.5	999.7	1988.7	0.994x 9.648	1,000	

8971	SAC	224-PC-018	A12019	02/07/2024	1,000	1,500	2,000	1,014x - 22,160	0.999
892	SAC	224-PC-018	A12087	02/07/2024	1,000	1,500	2,000	1,012x - 20,401	0.999
893	SAC	224-PC-013	509645	02/07/2024	1,000	1,500	2,000	1,009x - 6,113	1,000
894	SAC	224-PC-018	A12701	02/07/2024	1,000	1,500	2,000	1,012x - 1,594	0.999
895	SAC	224-PC-018	A12702	02/07/2024	1,000	1,500	2,000	1,012x - 1,594	0.999
896	SAC	224-PC-018	A12704	02/07/2024	1,000	1,500	2,000	1,005x - 7,656	1,000
897	SAC	224-PC-018	A12755	02/07/2024	1,000	1,500	2,000	0.998x - 1,995	0.999
898	SAC	224-PC-018	A12756	02/07/2024	1,000	1,500	2,000	0.977x - 0,745	0.999

Calibrated by:

Approved by:


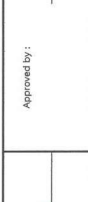
(Mr. Adul Dargham)

(Mr. Peera Deuldom)

Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter		Model : Defender 510-H		S/N : 136164	
Environmental Conditions					
Temperature		25	± 3	°C	
Pressure		1010	± 15	mmbar	

Personal Pump Data			Calibration Data									
No.	Brand	Model	Serial No.	Date	Flow Rate (m/min)			Actual (Q std.)			Value From Calibration Curve	
					Setting							
					1	2	3	1	2	3	Y	R ²
B01	SKC	224-PC084	262101	03/10/2024	1.000	1.500	2.000	1.006	1.505	2.012	1.0138 ~ 17.267	0.999
B02	SKC	224-PC084	626166	03/10/2024	1.000	1.500	2.000	998	1.500	1.995	1.0006 ~ 2.067	1.000
B03	SKC	224-PC084	612948	02/10/2024	1.000	1.500	2.000	1.005	1.494	2.006	0.9986 ~ 4.721	0.999
B04	SKC	224-PC084	602804	03/10/2024	1.000	1.500	2.000	996	1.511	2.007	1.0126 ~ 19.485	0.999
B05	SKC	224-PC084	612693	02/10/2024	1.000	1.500	2.000	1.005	1.504	2.008	1.0084 ~ 6.306	1.000
B06	SKC	224-PC084	626188	02/10/2024	1.000	1.500	2.000	1.013	1.505	2.008	0.9966 ~ 4.748	0.999
B07	SKC	224-PC084	626262	02/10/2024	1.000	1.500	2.000	1.005	1.506	2.010	1.0131 ~ 12.753	1.000
B08	SKC	224-PC084	626100	03/10/2024	1.000	1.500	2.000	1.000	1.498	1.993	0.9956 ~ 5.105	1.000
B09	SKC	224-PC084	626479	02/10/2024	1.000	1.500	2.000	1.005	1.494	2.002	0.9966 ~ 5.969	1.000
B10	SKC	224-PC084	691950	03/10/2024	1.000	1.500	2.000	1.004	1.504	2.008	1.0111 ~ 15.436	1.000
B11	SKC	224-PC084	504315	03/10/2024	1.000	1.500	2.000	1.010	1.497	2.001	0.9938 ~ 10.007	1.000
B12	SKC	224-PC084	034666	04/10/2024	1.000	1.500	2.000	998	1.500	2.007	1.0136 ~ 22.552	0.999
B13	SKC	224-PC084	602073	03/10/2024	1.000	1.500	2.000	1.001	1.494	2.005	0.9986 ~ 1.307	1.000
B14	SKC	224-PC084	626313	03/10/2024	1.000	1.500	2.000	1.014	1.504	2.013	0.9996 ~ 8.699	1.000
B15	SKC	224-PC084	626474	03/10/2024	1.000	1.500	2.000	1.006	1.513	2.008	1.0026 ~ 0.788	0.999
B16	SKC	224-PC084	626477	03/10/2024	1.000	1.500	2.000	1.001	1.514	2.009	1.0099 ~ 11.678	1.000
B17	SKC	224-PC084	626860	02/10/2024	1.000	1.500	2.000	1.018	1.513	2.013	0.9976 ~ 11.094	0.999
B18	SKC	224-PC084	691484	02/10/2024	1.000	1.500	2.000	999	1.498	1.999	1.0006 ~ 0.668	1.000
B19	SKC	224-PC084	691599	03/10/2024	1.000	1.500	2.000	1.000	1.508	2.007	1.0084 ~ 3.954	1.000
B20	SKC	224-PC084	691587	03/10/2024	1.000	1.500	2.000	997	1.514	2.005	1.0106 ~ 12.129	1.000
B21	SKC	224-PC084	691531	04/10/2024	1.000	1.500	2.000	996	1.499	2.000	1.0016 ~ 1.875	1.000
B22	SKC	224-PC084	691634	03/10/2024	1.000	1.500	2.000	999	1.508	2.006	1.0086 ~ 13.641	1.000
B23	SKC	224-PC084	798393	03/10/2024	1.000	1.500	2.000	1.001	1.494	1.995	0.9966 ~ 3.954	1.000
B24	SKC	224-PC084	626563	02/10/2024	1.000	1.500	2.000	999	1.492	2.003	1.0016 ~ 19.941	1.000
B25	SKC	224-PC084	798489	03/10/2024	1.000	1.500	2.000	1.001	1.501	1.995	0.9986 ~ 10.866	1.000
B26	SKC	224-PC084	798479	03/10/2024	1.000	1.500	2.000	996	1.507	2.004	1.0076 ~ 13.888	1.000
B27	SKC	224-PC084	691673	03/10/2024	1.000	1.500	2.000	1.006	1.505	2.009	1.0106 ~ 14.064	0.999
B28	SKC	224-PC084	691570	03/10/2024	1.000	1.500	2.000	996	1.510	2.008	1.0126 ~ 19.941	0.999
B29	SKC	224-PC084	626472	03/10/2024	1.000	1.500	2.000	1.005	1.502	2.005	1.0086 ~ 9.763	1.000
B30	SKC	224-PC084	691489	03/10/2024	1.000	1.500	2.000	1.004	1.501	2.008	1.0096 ~ 13.737	1.000
B31	SKC	224-PC084	691509	03/10/2024	1.000	1.500	2.000	1.012	1.497	1.997	0.9906 ~ 14.932	1.000
B32	SKC	224-PC084	091567	03/10/2024	1.000	1.500	2.000	1.010	1.510	2.008	1.0036 ~ 3.978	0.999
B33	SKC	224-PC084	091756	02/10/2024	1.000	1.500	2.000	998	1.512	2.005	1.0076 ~ 10.478	1.000
B34	SKC	224-PC084	612942	02/10/2024	1.000	1.500	2.000	999	1.504	2.000	1.0016 ~ 0.903	1.000
B35	SKC	224-PC084	602682	02/10/2024	1.000	1.500	2.000	1.004	1.498	2.002	0.9966 ~ 5.901	1.000
B36	SKC	224-PC084	626164	02/10/2024	1.000	1.500	2.000	1.008	1.507	2.004	1.0006 ~ 2.331	1.000
B37	SKC	224-PC084	626256	04/10/2024	1.000	1.500	2.000	1.008	1.505	2.008	1.0026 ~ 2.423	1.000
B38	SKC	224-PC084	626167	04/10/2024	1.000	1.500	2.000	997	1.499	1.998	1.0016 ~ 2.994	1.000
B39	SKC	224-PC084	034637	04/10/2024	1.000	1.500	2.000	998	1.504	1.999	1.0086 ~ 8.999	1.000
B40	SKC	224-PC084	798349	04/10/2024	1.000	1.500	2.000	1.001	1.504	1.994	0.9996 ~ 2.619	1.000

Calibrated by : 	Approved by : 
(Mr. Abdul Daghlan)	(Mr. Piara Detumom)

Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter		Model : Defender 510-H		S/N : 136164	
Environmental Conditions					
Temperature		25	± 3	°C	
Pressure		1010	± 15	mmbar	

Personal Pump Data			Calibration Data				Flow Rate (m/min)			Value From Calibration Curve		
No.	Brand	Model	Serial No.	Date	Setting			Actual (Q std.)			Y	R ²
					1	2	3	1	2	3		
B41	SKC	224-PC084	612669	02/10/2024	1.000	1.500	2.000	1.010	1.497	2.001	0.996 ~ 9.527	1.000
B42	SKC	224-PC084	626041	04/10/2024	1.000	1.500	2.000	998	1.507	2.005	1.0006 ~ 14.416	0.999
B43	SKC	224-PC084	034636	03/10/2024	1.000	1.500	2.000	1.005	1.494	2.001	0.996 ~ 6.369	1.000
B44	SKC	224-PC084	529341	03/10/2024	1.000	1.500	2.000	1.010	1.494	2.000	0.996 ~ 14.704	1.000
B45	SKC	224-PC084	529594	02/10/2024	1.000	1.500	2.000	1.014	1.504	2.010	0.9976 ~ 11.690	1.000
B46	SKC	224-PC084	566743	04/10/2024	1.000	1.500	2.000	1.006	1.514	2.009	1.0026 ~ 1.391	0.999
B47	SKC	224-PC084	566747	02/10/2024	1.000	1.500	2.000	1.000	1.513	2.009	1.0096 ~ 11.714	1.000
B48	SKC	224-PC084	566753	04/10/2024	1.000	1.500	2.000	1.020	1.513	2.012	0.9956 ~ 15.140	0.999
B49	SKC	224-PC084	566780	04/10/2024	1.000	1.500	2.000	999	1.498	2.000	1.0006 ~ 0.144	1.000
B50	SKC	224-PC084	500400	04/10/2024	1.000	1.500	2.000	1.000	1.508	2.006	1.0006 ~ 5.541	1.000
B51	SKC	224-PC084	500363	04/10/2024	1.000	1.500	2.000	996	1.506	2.005	1.0076 ~ 10.382	1.000
B52	SKC	224-PC084	093186	03/10/2024	1.000	1.500	2.000	998	1.509	2.003	1.0006 ~ 10.386	1.000
B53	SKC	224-PC084	707670	03/10/2024	1.000	1.500	2.000	1.000	1.493	1.996	0.9966 ~ 4.777	0.999
B54	SKC	224-PC083	500821	02/10/2024	1.000	1.500	2.000	1.001	1.493	2.008	1.0006 ~ 9.295	1.000
B55	SKC	224-PC083	510710	04/10/2024	1.000	1.500	2.000	999	1.508	2.004	1.0056 ~ 8.519	1.000
B56	SKC	224-PC083	511450	03/10/2024	1.000	1.500	2.000	1.003	1.502	2.012	1.0086 ~ 10.418	1.000
B57	SKC	224-PC083	510798	02/10/2024	1.000	1.500	2.000	997	1.503	2.005	1.0056 ~ 15.859	1.000
B58	SKC	224-PC083	500852	02/10/2024	1.000	1.500	2.000	1.016	1.517	2.008	0.9966 ~ 13.653	0.999
B59	SKC	224-PC083	500862	04/10/2024	1.000	1.500	2.000	999	1.511	2.010	1.0106 ~ 14.512	0.999
B60	SKC	224-PC083	512655	02/10/2024	1.000	1.500	2.000	1.009	1.514	1.996	0.9926 ~ 12.737	0.999
B61	SKC	224-PC083	500915	04/10/2024	1.000	1.500	2.000	1.005	1.503	2.006	1.0116 ~ 15.735	0.999
B62	SKC	224-PC083	502975	03/10/2024	1.000	1.500	2.000	1.006	1.513	2.008	1.0026 ~ 0.788	0.999
B63	SKC	224-PC083	511432	02/10/2024	1.000	1.500	2.000	1.020	1.513	2.013	0.9956 ~ 14.152	0.999
B64	SKC	224-PC083	508302	04/10/2024	1.000	1.500	2.000	1.000	1.508	2.007	1.0006 ~ 5.189	1.000
B65	SKC	224-PC083	508310	02/10/2024	1.000	1.500	2.000	997	1.514	2.005	1.0006 ~ 7.652	1.000
B66	SKC	224-PC083	500861	04/10/2024	1.000	1.500	2.000	996	1.499	2.003	1.0096 ~ 13.421	1.000
B67	SKC	224-PC083	506295	03/10/2024	1.000	1.500	2.000	998	1.510	2.004	1.0106 ~ 17.666	0.999
B68	SKC	224-PC083	508872	03/10/2024	1.000	1.500	2.000	998	1.494	1.997	0.9966 ~ 2.943	1.000
B69	SKC	224-PC083	500375	04/10/2024	1.000	1.500	2.000	996	1.499	2.003	1.0006 ~ 4.961	1.000
B70	SKC	224-PC083	510623	03/10/2024	1.000	1.500	2.000	1.002	1.504	2.000	1.0026 ~ 1.959	1.000
B71	SKC	224-PC083	508567	03/10/2024	1.000	1.500	2.000	996	1.503	1.999	1.0036 ~ 5.913	1.000
B72	SKC	224-PC083	500977	04/10/2024	1.000	1.500	2.000	997	1.499	1.996	0.9986 ~ 0.140	1.000
B73	SKC	224-PC083	512606	02/10/2024	1.000	1.500	2.000	1.005	1.504	2.007	1.0086 ~ 11.262	1.000
B74	SKC	224-PC083	500939	03/10/2024	1.000	1.500	2.000	998	1.504	2.002	1.0006 ~ 10.110	1.000
B75	SKC	224-PC083	509820	02/10/2024	1.000	1.500	2.000	1.004	1.503	2.007	1.0096 ~ 12.679	1.000
B76	SKC	224-PC083	500811	04/10/2024	1.000	1.500	2.000	1.005	1.493	2.000	0.9976 ~ 5.309	1.000
B77	SKC	224-PC083	508501	02/10/2024	1.000	1.500	2.000	998	1.495	2.002	1.0026 ~ 3.698	1.000
B78	SKC	224-PC083	510677	03/10/2024	1.000	1.500	2.000	1.015	1.505	2.010	1.0036 ~ 10.432	0.999
B79	SKC	224-PC083	510920	04/10/2024	1.000	1.500	2.000	999	1.493	2.004	1.0006 ~ 10.332	1.000



QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Laksong, Bangkok 10160
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www.qcalibration.com



CERTIFICATE No : 24M2227
REFERENCE No : 72448-1

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : METTLER TOLEDO
MODEL : XS105DU
SERIAL No : 1126422905
ID No : BA05/50
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.
CALIBRATION DATE : 08-Mar-24

APPROVED BY :
ISSUED DATE :
RECEIVED DATE : 08-Mar-24

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

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ถนนพหลโยธิน 24 แขวงพญาไท เขตพญาไท กรุงเทพมหานคร 10900
Tel: (662) 939-0072 Fax: (662) 313-4221 E-mail: sales@spson.com www.spson.com

Rotameter Calibration Report For Personal Pump High Flow Adjust

Calibration Method : Dry Cal Primary Flowmeter				Model : Defender 510-H				S/N : 136164							
Rotameter Data				Calibration Data											
				No.	Brand	Model	Date	Flow Rate (ml/min)						Value From Calibration Curve	
								Flow Rate (Reading)			Actual (Q std.)				
				1	2	3	1	2	3	1	2	3	Y	R ²	
H-801	Dwyer	VRB-65	02/10/2024	500	1,000	2,000	502.4	998.3	1992.4				0.9986 + 5.889	1.000	
H-802	Dwyer	VRB-65	03/10/2024	500	1,000	2,000	498.5	1001.9	2009.0				0.9974 + 5.707	1.000	
H-803	Dwyer	VRB-65	04/10/2024	500	1,000	2,000	499.2	996.1	2011.4				1.0006 + 11.451	0.999	
H-804	Dwyer	VRB-65	04/10/2024	500	1,000	2,000	504.0	999.2	1995.1				0.9956 + 7.219	1.000	
H-805	Dwyer	VRB-65	03/10/2024	500	1,000	2,000	498.7	1001.8	2007.6				0.9974 + 4.568	1.000	
H-806	Dwyer	VRB-65	03/10/2024	500	1,000	2,000	497.3	999.1	2012.1				1.0006 + 11.101	0.999	
H-807	Dwyer	VRB-65	01/10/2024	500	1,000	2,000	503.0	1004.1	1992.6				0.9986 + 6.074	1.000	
H-808	Dwyer	VRB-65	02/10/2024	500	1,000	2,000	503.7	1000.4	1994.6				0.9926 + 12.996	1.000	
H-809	Dwyer	VRB-65	01/10/2024	500	1,000	2,000	501.3	1001.6	1990.3				0.9994 + 4.046	0.999	
H-810	Dwyer	VRB-65	01/10/2024	500	1,000	2,000	500.3	1002.0	1992.6				0.9956 + 8.990	1.000	

Calibrated by : Abul Daulah (Mr. Abul Daulah)
Approved by : [Signature] (Mr. Peera Detudorn)



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 24M2227

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : METTLER TOLEDO
ID No : BA0550
AIR PRESSURE : 1010mbar ± 1mbar
AMBIENT TEMPERATURE : 25° C ± 1° C
MODEL : XS105DU
S/N : 1126422905
RECEIVED DATE : 08-Mar-24
CALIBRATION DATE : 08-Mar-24
RELATIVE HUMIDITY : 53 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 62019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

2. REFERENCE STANDARD INSTRUMENTS :-

- 1) STANDARD WEIGHT SET
E2
M2302013S
QK-1-151
15843
M2302014S
02-Feb-25
02-Feb-25
- 2) STANDARD WEIGHT
E2
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE 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) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

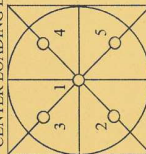
2. TARE FUNCTION : NORMAL

3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g

4. DEPARTURE FROM NOMINAL VALUE / LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000065
0.02	0.02001	-0.00001	0.000065
0.10	0.10002	-0.00002	0.000066
0.20	0.20001	-0.00001	0.000066
0.50	0.50001	-0.00001	0.000065
1.00	1.00003	-0.00003	0.000066
2.00	2.00001	-0.00001	0.000067
5.00	5.00001	-0.00001	0.000068
10.00	9.99994	0.00006	0.000070
20.00	20.00008	-0.00008	0.000078
50.00	50.00000	0.00000	0.00013
100.00	100.00001	-0.00001	0.00019
120.00	120.00001	-0.00001	0.00022

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0000
3	50.0000
4	50.0000
5	50.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA
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

เอกสารที่ 5-4

เอกสารสอบเทียบเครื่องมือการตรวจระดับเสียง

โดยทั่วไปและเสียงในสถานประกอบการ

(Working Area)



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0304 MTC No. EEL. BP. 109/0267

CALIBRATION CERTIFICATE

Submitted by : S.P.S.Consulting Service Co.,Ltd.
Address : 7 Soi Phaholyothin 24, Phaholyothin Road, Jompol, Chatuchak, Bangkok 10900.
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 :
Description : Sound Calibrator
Manufacturer : ACO
Model : 2127
Serial No. : 130006
Standards used :
1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Brüel&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 Keithley 2015-P S/N4106495.
7. Condenser Microphone B&K 4180 S/N 2889871.

Ambient Environment

Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325 ± 1.500) kPa

Calibration Procedure: CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be 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 Feb. 2024
Date of Calibration : 4 Mar. 2024

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.

Head Office 35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang, Changwat Pathumthani 12120, Thailand
Office/Laboratory 196 Phahonyothin Road, Chatuchak, Bangkok 10900, Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpa@tistr.or.th Website:www.tistr.or.th

Office 196 Phahonyothin Road, Chatuchak, Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0304 MTC No. EEL. BP. 109/0267

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 20µPa at 1000 Hz
Acoustic Output in dB re 20µPa, 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 2
1/2 inch Brüel&Kjaer 4180	93.85	-0.15	± 0.10	±0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjaer 4180	999.9	-0.1	± 1.5	±2.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Brüel&Kjaer 4180	1.65	± 0.50	±4.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.
3. The microphone volume correction was not included.

Calibrated by

Approved by

Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 4 Mar. 2024
Date of Issue : 5 Mar. 2024

Ref : 2011267022200795001

End of Certificate

2 / 2

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.

Head Office 35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang, Changwat Pathumthani 12120, Thailand
Office/Laboratory 196 Phahonyothin Road, Chatuchak, Bangkok 10900, Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpa@tistr.or.th Website:www.tistr.or.th

Office 196 Phahonyothin Road, Chatuchak, Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4



ID LINE : IECT17025

Certificate of Calibration

Certificate Number : SPR24050262-1
Customer : S.P.S. CONSULTING SERVICE CO., LTD.
7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Page : 1 of 3

Equipment Name	: Sound Level Meter
Manufacturer	: ACO
Model	: 6236
Serial Number	: 172048
ID. Number	: ACO-B18
Environmental Conditions	
Ambient Temperature	: 23 °C ± 3 °C Received Date : 17 May 2024
Relative Humidity	: 50 % ± 15 % Calibration Date : 20 May 2024
Location of Calibration	: In-Lab Recommend Due Date : 20 May 2025
Calibration Procedure	: SP-CPE-04-01 Date of Issue : 21 May 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul Approved by : _____
Calibration Officer (Mr.Prayobn Topart)
Authorized Signatory



ID LINE : IECT17025

Calibration Report

Certificate Number : SPR24050262-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate Number : SPR24050262-1

Range : 94 to 114 dB Function : @1kHz

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.1	94.1	0.1	0.1	0.15
114	114.1	114.1	0.1	0.1	0.15

Note : The result of calibration was found accurate as show on date and place of calibration only. This Certificate is not certified for any commercial transaction.

Measurement Uncertainty The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor k = 2.00, providing a level of confidence approximately 95%. - End of Certificate -



Certificate of Calibration

Certificate Number : SPR24030285-10 Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900

Equipment Name	: Sound Level Meter
Manufacturer	: ACO
Model	: 6236
Serial Number	: 182011
ID. Number	: ACO-B29
Environmental Conditions	
Ambient Temperature	: 23 °C ± 3 °C Received Date : 19 Mar 2024
Relative Humidity	: 50 % ± 15 % Calibration Date : 23 Mar 2024
Location of Calibration	: In-Lab Recommend Due Date : 23 Mar 2025
Calibration Procedure	: SP-CPE-04-01 Date of Issue : 24 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received.Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs. The calibration certificate shall not be reproduced except in full,without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul Approved by : Calibration Officer

Authorized Signatory

Result of Calibration

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL-BP-140/0167	26 Jan 2025

TISTR - Thailand Institute of Scientific and Technological Research

The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

SP-FM-04-15 REV.0



ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR24050262-2
Customer : S.P.S. CONSULTING SERVICE CO., LTD.
7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Page : 1 of 3

Equipment Name	: Sound Level Meter
Manufacturer	: ACO
Model	: 6236
Serial Number	: 182015
ID. Number	: ACO-B33
Environmental Conditions	
Ambient Temperature	: 23 °C ± 3 °C Received Date : 17 May 2024
Relative Humidity	: 50 % ± 15 % Calibration Date : 20 May 2024
Location of Calibration	: In-Lab Recommend Due Date : 20 May 2025
Calibration Procedure	: SP-CPE-04-01 Date of Issue : 21 May 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul Approved by :
Calibration Officer Authorized Signatory



ID LINE : IEC17025

Calibration Report

Certificate Number : SPR24050262-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due, Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate Number : SPR24050262-2

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.0	94.0	0.0	0.0	0.15
114	114	113.7	113.7	-0.3	-0.3	0.15

Select C	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.1	94.1	0.1	0.1	0.15
114	114	113.7	113.7	-0.3	-0.3	0.15

Select Z	Standard Setting	UUC Reading		Error		Uncertainty (±)
		Fast	Slow	Fast	Slow	
94	94	94.1	94.1	0.1	0.1	0.15
114	114	113.8	113.8	-0.2	-0.2	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.
- End of Certificate -



Certificate of Calibration

Certificate Number : SPR24030285-11

Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900

Equipment Name	: Sound Level Meter
Manufacturer	: ACO
Model	: 6236
Serial Number	: 192027
ID. Number	: ACO-B36
Environmental Conditions	
Ambient Temperature	: $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
Relative Humidity	: $50\% \pm 15\%$
Location of Calibration	: In-Lab
Calibration Procedure	: SP-CPE-04-01
Received Date	: 19 Mar 2024
Calibration Date	: 23 Mar 2024
Recommend Due Date	: 23 Mar 2025
Date of Issue	: 24 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul
Calibration Officer

Approved :
(Mr.Prayoqh Topart)
Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-11

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate Number : SPR24030285-11

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	114.1	114.1	0.1	0.1	0.15

Unit : dB

Select C

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	114.1	113.9	0.1	-0.1	0.15

Unit : dB

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor k = 2.00, providing a level of confidence approximately 95%.
- End of Certificate -



Certificate of Calibration

Certificate Number : SPR24030285-12

Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name : Sound Level Meter

Manufacturer : ACO

Model : 6236

Serial Number : 192032

ID. Number : ACO-B41

Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C

Received Date : 19 Mar 2024

Relative Humidity : 50 % ± 15 %

Calibration Date : 23 Mar 2024

Location of Calibration : In-Lab

Recommend Due Date : 23 Mar 2025

Calibration Procedure : SP-CPE-04-01

Date of Issue : 24 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved by :

Calibration Officer

(Mr.Prayoqn Topart)

Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-12

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR24030285-12

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR24030285-13

Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900

Equipment Name : Sound Level Meter

Manufacturer : ACO

Model : 6236

Serial Number : 192034

ID. Number : ACO-B43

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ Received Date : 19 Mar 2024

Relative Humidity : $50\% \pm 15\%$ Calibration Date : 23 Mar 2024

Location of Calibration : In-Lab Recommend Due Date : 23 Mar 2025

Calibration Procedure : SP-CPE-04-01 Date of Issue : 24 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved by : -

Calibration Officer

Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-13

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP. 140/0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate Number : SPR24030285-13

Page : 3 of 3

Range : 94 to 114 dB Function : @1kHz

Select A

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Unit : dB

Select C

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Unit : dB

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor k = 2.00, providing a level of confidence approximately 95%.

- End of Certificate -

Noise B_349/24

Sound Level Meter Calibration Report

Acoustic Calibrator Data					
Brand	ACO	Number	AC 03/56		
Model	2127	Serial No.	130006		
Calibration Range	94 dB, 1000 Hz	Last Calibration	04 March 2024		
		Due Date	04 March 2025		
Calibration Data					
Sound Level Meter Data			Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading (dB)
ACO-B03	ACO	6236	00222287	02 September 2024	Before Adjustment 94.0 After Adjustment 93.9
ACO-B04	ACO	6236	00222288	02 September 2024	94.0 93.9
ACO-B10	ACO	6236	00222289	02 September 2024	93.9 93.9
ACO-B40	ACO	6236	00192031	02 September 2024	93.9 93.9
ACO-B44	ACO	6236	00222302	02 September 2024	93.9 93.9
ACO-B45	ACO	6236	00222304	02 September 2024	94.0 93.9
ACO-B46	ACO	6236	00222305	02 September 2024	94.1 93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.85 ± 0.10 dB

Calibrated by : Abul Dangkom
(Mr. Abul Dangkom)

Approved by : [Signature]
(Mr. Peera Detukom)

Noise B_348/24

Sound Level Meter Calibration Report

Acoustic Calibrator Data					
Brand	ACO	Number	AC 03/56		
Model	2127	Serial No.	130006		
Calibration Range	94 dB, 1000 Hz	Last Calibration	04 March 2024		
		Due Date	04 March 2025		
Calibration Data					
Sound Level Meter Data			Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading (dB)
ACO-B18	ACO	6236	00172048	04 September 2024	Before Adjustment 94.1 After Adjustment 93.9
ACO-B29	ACO	6236	00182011	04 September 2024	93.9 93.9
ACO-B33	ACO	6236	00182015	04 September 2024	93.9 93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.85 ± 0.10 dB

Calibrated by : Abul Dangkom
(Mr. Abul Dangkom)

Approved by : [Signature]
(Mr. Peera Detukom)

Sound Level Meter Calibration Report									
Acoustic Calibrator Data									
Brand		ACO		Number		AC 03/56			
Model		2127		Serial No.		130006			
Calibration Range		94 dB, 1000 Hz		Last Calibration		04 March 2024			
				Due Date		04 March 2025			
Calibration Data									
Sound Level Meter Data					Calibration Data				
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]				
ACO-B36	ACO	6236	00192027	13 November 2024	Before Adjustment	After Adjustment			
ACO-B41	ACO	6236	00192032	13 November 2024	94.1	93.9			
ACO-B43	ACO	6236	00192034	13 November 2024	93.9	93.9			
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.85 ± 0.10 dB				

Calibrated by : Abul Daulokom (Mr.Abul Daulokom)

Approved by : (Signature) (Mr. Peem Detudom)

เอกสารที่ 5-5

เอกสารสอบเทียบเครื่องมือการตรวจค่าความร้อน
ในสถานประกอบการ (Working Area)



Certificate of Calibration

Certificate Number : SPR24030285-9

Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,

Bangkok 10900

Equipment Name : Area Heat Stress Monitor

Manufacturer : Quest Technologies

Model : QUESTemp 34

Serial Number : TEH060047

ID. Number : B5

Environmental Conditions

Ambient Temperature : 23 °C ± 2 °C

Received Date : 19 Mar 2024

Relative Humidity : 50 % ± 15 %

Calibration Date : 22 Mar 2024

Location of Calibration : In-Lab

Recommend Due Date : 22 Mar 2025

Calibration Procedure : SP-CPT-04-13

Date of Issue : 23 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Navaporn Ungseng

Approved by :

Calibration Officer

Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-9

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR24020149-7	23 Feb 2025
THERMO-HYGROMETER	5020A	A47046	QR24-0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.
Quality Reborn Co., Ltd



Result of Calibration

Certificate No. : SPR24030285-9

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.010	29.8	-0.210	0.20
35.0	35.012	34.8	-0.212	0.20
40.0	40.014	39.7	-0.314	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.010	29.8	-0.210	0.20
35.0	35.012	34.8	-0.212	0.20
40.0	40.014	39.7	-0.314	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Humidity Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.010	29.8	-0.210	0.20
35.0	35.012	34.8	-0.212	0.20
40.0	40.014	39.7	-0.314	0.20

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor k = 2, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Page : 1 of 3

Certificate Number : SPR24030285-5

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name : Area Heat Stress Monitor

Manufacturer : Quest Technologies

Model : QUESTemp 34

Serial Number : TEG040059

ID. Number : B07

Environmental Conditions

Ambient Temperature : 23 °C ± 2 °C Received Date : 19 Mar 2024

Relative Humidity : 50 % ± 15 % Calibration Date : 20 Mar 2024

Location of Calibration : In-Lab Recommend Due Date : 20 Mar 2025

Calibration Procedure : SP-CPT-04-13 Date of Issue : 21 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Navaporn Ungseng

Calibration Officer

Approved by

Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-5

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR24020149-7	23 Feb 2025
THERMO-HYGROMETER	5020A	A47046	QR24-0167	26 Jan 2025

Traceability

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

SP Metrology - SP Metrology system (Thailand) Co.Ltd.

Quality Reborn Co., Ltd



Result of Calibration

Certificate No. : SPR24030285-5

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	29.8	-0.212	0.20
35.0	35.010	34.8	-0.210	0.20
40.0	40.015	39.9	-0.115	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	29.7	-0.312	0.20
35.0	35.010	34.7	-0.310	0.20
40.0	40.015	39.8	-0.215	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Humidity Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	29.8	-0.212	0.20
35.0	35.010	34.8	-0.210	0.20
40.0	40.015	39.9	-0.115	0.20

Note :

The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23110155-2 Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name	: Area Heat Stress Monitor
Manufacturer	: Quest Technologies
Model	: QUESTemp 34
Serial Number	: TEL080034
ID. Number	: B11

Environmental Conditions

Ambient Temperature	: 23 °C ± 2 °C	Received Date	: 10 Nov 2023
Relative Humidity	: 50 % ± 15 %	Calibration Date	: 11 Nov 2023
Location of Calibration	: In-Lab	Recommend Due Date	: 11 Nov 2024
Calibration Procedure	: SP-CPT-04-13	Date of Issue	: 12 Nov 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Navaporn Uengseng

Approved by
Authorized Signatory

Calibration Officer



Calibration Report

Certificate Number : SPR23110155-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR23010480-5	22 Feb 2024
THERMO-HYGROMETER	5020A	A47046	QR23-0176	26 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.
Quality Reborn Co., Ltd



Result of Calibration

Certificate No. : SPR23110155-2

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.011	30.3	0.289	0.20
35.0	35.014	35.3	0.286	0.20
40.0	40.017	40.3	0.283	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.011	30.3	0.289	0.20
35.0	35.014	35.3	0.286	0.20
40.0	40.017	40.3	0.283	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Humidity Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.011	30.5	0.489	0.20
35.0	35.014	35.5	0.486	0.20
40.0	40.017	40.5	0.483	0.20

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

- End of Certificate -

69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 (Thailand) Tel: (662) 193-2220 5 คู่สาย www.สอบเทียบเครื่องมือวัด.com



Certificate of Calibration

Certificate Number

: SPR24090395-5

Page : 1 of 3

Customer

: S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name

: Area Heat Stress Monitor

Manufacturer

: Quest Technologies

Model

: QUESTemp 32

Serial Number

: TPH050047

ID. Number

: B31-TPH050047

Environmental Conditions

Ambient Temperature : 23 °C ± 2 °C Received Date : 20 Sep 2024

Relative Humidity

: 50 % ± 15 % Calibration Date : 23 Sep 2024

Location of Calibration

: In-Lab

Recommend Due Date : 23 Sep 2025

Calibration Procedure

: SP-CPT-04-13

Date of Issue : 24 Sep 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Navaporn Lungseng

Calibration Officer

Authorized Signatory



ID LINE : IEC17025



Calibration Report

Certificate Number : SPR24090395-5

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR24020149-7	23 Feb 2025
THERMO-HYGROMETER	5020A	A47046	QR24-0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.
Quality Reborn Co., Ltd



ID LINE : IEC17025



Result of Calibration

Certificate Number : SPR24090395-5

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.014	30.1	0.086	0.20
35.0	35.012	35.1	0.088	0.20
40.0	40.017	40.1	0.083	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.014	30.3	0.286	0.20
35.0	35.012	35.3	0.288	0.20
40.0	40.017	40.3	0.283	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.014	30.1	0.086	0.20
35.0	35.012	35.1	0.088	0.20
40.0	40.017	40.1	0.083	0.20

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor k = 2, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR24030285-2 Page : 1 of 3

Customer : S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name	: Area Heat Stress Monitor		
Manufacturer	: Quest Technologies		
Model	: QUESTemp 32		
Serial Number	: TPH050015		
ID. Number	: B32		
Environmental Conditions			
Ambient Temperature	: 23 °C ± 2 °C	Received Date	: 19 Mar 2024
Relative Humidity	: 50 % ± 15 %	Calibration Date	: 20 Mar 2024
Location of Calibration	: In-Lab	Recommend Due Date	: 20 Mar 2025
Calibration Procedure	: SP-CPT-04-13	Date of Issue	: 21 Mar 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Navaporn Ungseng

Calibration Officer

Approved by :

Authorized Signatory



Calibration Report

Certificate Number : SPR24030285-2 Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR24020149-7	23 Feb 2025
THERMO-HYGROMETER	5020A	A47046	QR24-0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.
Quality Reborn Co., Ltd



Result of Calibration

Certificate No. : SPR24030285-2

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	30.0	-0.012	0.20
35.0	35.010	35.0	-0.010	0.20
40.0	40.015	40.1	0.085	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	30.0	-0.012	0.20
35.0	35.010	35.0	-0.010	0.20
40.0	40.015	40.1	0.085	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Humidity Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.012	30.0	-0.012	0.20
35.0	35.010	35.0	-0.010	0.20
40.0	40.015	40.1	0.085	0.20

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.
- End of Certificate -



Certificate of Calibration

Certificate Number : SPR24100363-2

Page : 1 of 3

Customer

: S.P.S. CONSULTING SERVICE CO., LTD.

7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak,
Bangkok 10900

Equipment Name

: Area Heat Stress Monitor

Manufacturer

: Quest Technologies

Model

: QUESTemp 32

Serial Number

: TPK120034

ID. Number

: B33

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Received Date : 21 Oct 2024
Relative Humidity : $50\text{ \%} \pm 15\text{ \%}$ Calibration Date : 21 Oct 2024
Location of Calibration : In-Lab Recommend Due Date : 21 Oct 2025
Calibration Procedure : SP-CPT-04-13 Date of Issue : 22 Oct 2024

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chatchai Kittisopha

Approved by

Calibration Officer

Authorized Signatory



Calibration Report

Certificate Number : SPR24100363-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Humidity Chamber	TH-80S	N/A	SPR24020149-7	23 Feb 2025
THERMO-HYGROMETER	5020A	A47046	QR24-0167	26 Jan 2025

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.

Quality Reborn Co., Ltd



Result of Calibration

Certificate Number : SPR24100363-2

Page : 3 of 3

Temperature Accuracy in the Measurement. (WET)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.018	30.3	0.282	0.20
35.0	35.016	35.3	0.284	0.20
40.0	40.020	40.3	0.280	0.20

Temperature Accuracy in the Measurement. (DRY)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.018	30.3	0.282	0.20
35.0	35.016	35.3	0.284	0.20
40.0	40.020	40.3	0.280	0.20

Temperature Accuracy in the Measurement. (GLOBE)

Unit : °C

Temperature Setting	Standard Reading	UUC Reading	Error	Uncertainty (±)
30.0	30.018	30.3	0.282	0.20
35.0	35.016	35.3	0.284	0.20
40.0	40.020	40.3	0.280	0.20

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

– End of Certificate –

Heat B_348_1

Heat Stress WBGT Meter Verification Report									
Verification Data									
Heat Stress WBGT Meter No.	: B05	Verification Date	: 04 September 2024						
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C						
Model	: QUESTemp 34	Barometric Pressure	: 1011 mmbar						
Serial No.	: TEH060047	Relative Humidity	: 49 %						
Verification Module (Electronic Sensor Check) :									
Verification Module No. :	21	WB = 12.5 °C,	DB = 47.1 °C,	G = 69.3 °C					
Result of Verification : Without Adjustment									
Wet Probe Temperature Measurement									
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.6	Correction (°C)	-0.1	Tolerance Limit (°C)		± 0.5	
Dry Probe Temperature Measurement									
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	47.1	Correction (°C)	0.0	Tolerance Limit (°C)		± 0.5	
Globe Probe Temperature Measurement									
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.2	Correction (°C)	0.1	Tolerance Limit (°C)		± 0.5	
UUC* = UNIT UNDER CALIBRATION									

Verified by : Abul Dangklom
(Mr.Abul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)

Heat B_348_2

Heat Stress WBGT Meter Verification Report									
Verification Data									
Heat Stress WBGT Meter No.	: B07	Verification Date	: 04 September 2024						
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C						
Model	: QUESTemp 34	Barometric Pressure	: 1011 mmbar						
Serial No.	: TEG040059	Relative Humidity	: 49 %						
Verification Module (Electronic Sensor Check) :									
Verification Module No. :	21	WB = 12.5 °C,	DB = 47.1 °C,	G = 69.3 °C					
Result of Verification : Without Adjustment									
Wet Probe Temperature Measurement									
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.6	Correction (°C)	-0.1	Tolerance Limit (°C)		± 0.5	
Dry Probe Temperature Measurement									
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	47.0	Correction (°C)	0.1	Tolerance Limit (°C)		± 0.5	
Globe Probe Temperature Measurement									
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.1	Correction (°C)	0.2	Tolerance Limit (°C)		± 0.5	
UUC* = UNIT UNDER CALIBRATION									

Verified by : Abul Dangklom
(Mr.Abul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)

Heat Stress WBGT Meter Verification Report					
Verification Data					
Heat Stress WBGT Meter No.	: B11	Verification Date	: 04 September 2024		
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C		
Model	: QUESTemp 34	Barometric Pressure	: 1011 mmbar		
Serial No.	: TEL080034	Relative Humidity	: 49 %		
Verification Module (Electronic Sensor Check) :					
Verification Module No. :	21	WB = 12.5 °C, DB = 47.1 °C, G = 69.3 °C			
Result of Verification : Without Adjustment					
Wet Probe Temperature Measurement					
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.7	Correction (°C)	-0.2
					Tolerance Limit (°C)
					± 0.5
Dry Probe Temperature Measurement					
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	47.2	Correction (°C)	-0.1
					Tolerance Limit (°C)
					± 0.5
Globe Probe Temperature Measurement					
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.2	Correction (°C)	0.1
					Tolerance Limit (°C)
					± 0.5
UUC* = UNIT UNDER CALIBRATION					

Verified by : Adul Dangklom

(Mr.Adul Dangklom)

Approved by :

Peera Detudom

(Mr. Peera Detudom)

Heat Stress WBGT Meter Verification Report					
Verification Data					
Heat Stress WBGT Meter No.	: B31	Verification Date	: 13 November 2024		
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C		
Model	: QUESTemp 32	Barometric Pressure	: 1011 mmbar		
Serial No.	: TPH050047	Relative Humidity	: 49 %		
Verification Module (Electronic Sensor Check) :					
Verification Module No. :	21	WB = 12.5 °C, DB = 47.1 °C, G = 69.3 °C			
Result of Verification : Without Adjustment					
Wet Probe Temperature Measurement					
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.3	Correction (°C)	0.2
					Tolerance Limit (°C)
					± 0.5
Dry Probe Temperature Measurement					
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	47.2	Correction (°C)	-0.1
					Tolerance Limit (°C)
					± 0.5
Globe Probe Temperature Measurement					
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.2	Correction (°C)	0.1
					Tolerance Limit (°C)
					± 0.5
UUC* = UNIT UNDER CALIBRATION					

Verified by : Adul Dangklom

(Mr.Adul Dangklom)

Approved by :

Peera Detudom

(Mr. Peera Detudom)

Heat B_431_2

Heat Stress WBGT Meter Verification Report						
Verification Data						
Heat Stress WBGT Meter No.	: B32	Verification Date	: 13 November 2024			
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C			
Model	: QUESTemp ^o 32	Barometric Pressure	: 1011 mmbar			
Serial No.	: TPH050015	Relative Humidity	: 49 %			
Verification Module (Electronic Sensor Check) :						
Verification Module No. :	21	WB = 12.5 °C, DB = 47.1 °C, G = 69.3 °C				
Result of Verification : Without Adjustment						
Wet Probe Temperature Measurement						
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.6	Correction (°C)	-0.1	Tolerance Limit (°C)
Dry Probe Temperature Measurement						
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	46.9	Correction (°C)	0.2	Tolerance Limit (°C)
Globe Probe Temperature Measurement						
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.2	Correction (°C)	0.1	Tolerance Limit (°C)
UUC* = UNIT UNDER CALIBRATION						

Verified by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)

Heat B_431_3

Heat Stress WBGT Meter Verification Report						
Verification Data						
Heat Stress WBGT Meter No.	: B33	Verification Date	: 13 November 2024			
Brand	: Quest Technologies	Ambient Temp.	: 24.5 °C			
Model	: QUESTemp 32	Barometric Pressure	: 1011 mmbar			
Serial No.	: TPK120034	Relative Humidity	: 49 %			
Verification Module (Electronic Sensor Check) :						
Verification Module No. :	21	WB = 12.5 °C, DB = 47.1 °C, G = 69.3 °C				
Result of Verification : Without Adjustment						
Wet Probe Temperature Measurement						
Verification Module Reading (°C)	12.5	UUC* Reading (°C)	12.6	Correction (°C)	-0.1	Tolerance Limit (°C)
Dry Probe Temperature Measurement						
Verification Module Reading (°C)	47.1	UUC* Reading (°C)	47.1	Correction (°C)	0.0	Tolerance Limit (°C)
Globe Probe Temperature Measurement						
Verification Module Reading (°C)	69.3	UUC* Reading (°C)	69.5	Correction (°C)	-0.2	Tolerance Limit (°C)
UUC* = UNIT UNDER CALIBRATION						

Verified by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by : Peera Detudom
(Mr. Peera Detudom)