

ภาคผนวก ค

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สำเนาใบรับรองการสอบเทียบเครื่องมือ



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd  
วันที่ : 25 สิงหาคม 2565  
รายชื่ออุปกรณ์ / เครื่องมือ : CO Analyzer  
รุ่นอุปกรณ์ / เครื่องมือ : T300  
บริษัท ผู้ผลิต : Teledyne API  
หมายเลขอุปกรณ์ / เครื่องมือ : 1885

TEST VALUES			
API MODEL T300		BEFORE	AFTER
1	RANGE	1 - 1000 PPM	50.0
2	STABILITY	≤ 1 PPM	0.006
3	CO MEASURE	2500 - 4800 mV	3588.2
4	CO REFERENCE	2000 - 4800 mV	2926.6
5	MR RATION	1.1 ± 1.3	1.234
6	PRESEURE	25 - 35 in - Hg-A	29.2
7	SAMPLE FLOW	800 ± 10% cc/min	828
8	SAMPLE TEMP	48 ± 4 °C	45.0
9	BENCH TEMP	48 ± 2 °C	48.0
10	WHEEL TEMP	68 ± 2 °C	66.0
11	BOX TEMP	AMBIENT ± 5 °C	31.9
12	PHT DRIVE	250 - 4750 mV	3818.7
13	SLOPE	1.0 ± 0.3	0.876
14	OFFSET	0.0 ± 0.3	0.024
15	CO READING (AMBIENT)	PPM	0.126
16	ELECTRICAL TEST	40 ± 2 PPM	39.940
17	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.21 / 12.38 / 15.38 / -15.38
18	ZERO GAS	0.00 PPM	-0.011
19	SPAN GAS	40.0 PPM	40.093

หมายเหตุ

- เปลี่ยน O-ring 2 ชิ้น, Spring 1 ชิ้น, Sintered Filter 1 ชิ้น



ลงนามเจ้าหน้าที่ (Signature)

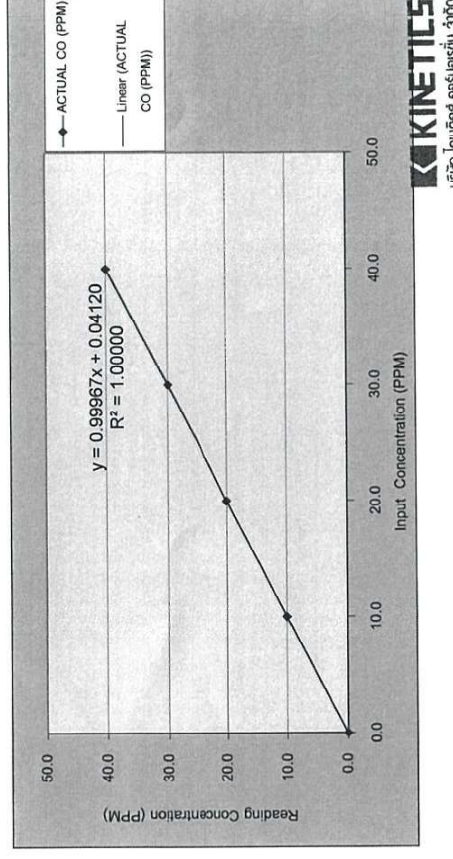
ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ผาดีวนาภิรักษ์ โทรศัพท์ : 0-2515-8987  
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมณฑ เขตจตุจักร กรุงเทพมหานคร 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI-POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd  
EQUIPMENT NAME : CO Analyzer  
MANUFACTURER : Teledyne - API  
MODEL : T300  
SERIAL NO : 1885  
CYLINDER NO : CC745169  
STANDARD GAS CONCENTRATION (PPM) : 4512  
CERTIFIED DATE : Mar 10, 2021  
CYLINDER PRESSURE (psig) : 1750  
EXPIRED DATE : Mar 10, 2029  
CERTIFIED BY : AIRGAS SPECIALTY GASES

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS		
	IDEAL (PPM)	ACTUAL CO (PPM)	% ERROR CO
ZERO	0.00	0.000	0.00
1	10.00	10.077	0.08
2	20.00	20.061	0.06
3	30.00	30.026	0.03
4	40.00	40.009	0.01
AVERAGE (%)			0.29



CALIBRATED BY : คุณพรชัย ผาดีวนาภิรักษ์

DATE : 25 สิงหาคม 2565

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ผาดีวนาภิรักษ์ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมณฑ เขตจตุจักร กรุงเทพมหานคร 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E04NI99E15A0822  
Cylinder Number: 160-402045891-1  
Laboratory: C745189  
PGVP Number: 124 - Plumsteadville - PA  
Gas Code: A12021  
CO, NO, NOX, SO2, BALN  
Valve Outlet: 680  
Certification Date: Mar 10, 2021  
Expiration Date: Mar 10, 2029

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)\* document EPA 600R-12/31, using the assay procedures listed. Analytical Method requires correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant interferences noted. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS			
Component	Requested Concentration	Actual Concentration	Total Relative Uncertainty
NOX	53.00 PPM	53.40 PPM	+/- 1.1% NIST Traceable
NITRIC OXIDE	53.00 PPM	53.40 PPM	+/- 1.1% NIST Traceable
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	+/- 0.9% NIST Traceable
CARBON MONOXIDE	4500 PPM	4512 PPM	+/- 0.6% NIST Traceable
NITROGEN	Balance		

CALIBRATION STANDARDS			
Type	Lot ID	Cylinder No	Concentration
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN
PRM	12386	D866025	9.91 PPM AIR/NITROGEN DIOXIDE
GMIS	12406889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN

The SRM, PRM or RGM noted above is only in reference to the assay and not part of the analysis.

ANALYTICAL EQUIPMENT			
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration	
SIEMENS ULTRAMAT 6 NIKD579	NDIR	Feb 26, 2021	
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021	
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021	
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021	

#### Triad Data Available Upon Request

NOTES:

Gross Weight: 28.1 Kg

Net Weight: 4.6 Kg



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการวัดและเปรียบเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd  
วันที่ : 29 มิถุนายน 2566  
รายชื่ออุปกรณ์ / เครื่องมือ : NOx Analyzer  
รุ่นของอุปกรณ์ / เครื่องมือ : T200  
หมายเลขอุปกรณ์ / เครื่องมือ : 2975

TEST VALUES		
API MODEL	T200	BEFORE
1 RANGE	50 - 20,000 PPB	500.0
2 STABILITY	≤ 1 PPB	0.2
3 SAMPLE FLOW	500 ± 10% cc/min	488
4 OZONE FLOW	80 ± 10% cc/min	78
5 PMT	mV	457.0
6 NORM PMT	mV	510.9
7 A ZERO	-20 To 150 mV	270.7
8 HPVS	400 - 900 V	795
9 RX CELL TEMP	50 ± 1 °C	50.0
10 BOX TEMP	AMBIENT ± 5 °C	34.7
11 PMT TEMP	7 ± 2 °C	7.5
12 MOLT TEMP	315 ± 5 °C	313.9
13 RX CELL PRESSURE	<10 in - Hg-A	9.6
14 SAMPLE PRESSURE	25 - 35 in - Hg-A	28.3
15 NOX SLOPE	1.0 ± 0.3	1.519
16 NOX OFFSET	-50 To 150	260.5
17 NO SLOPE	1.0 ± 0.3	1.320
18 NO OFFSET	-50 To 150	257.0
19 NO SAMPLE READING	PPB	156.0
20 NO2 SAMPLE READING	PPB	47.1
21 NOX SAMPLE READING	PPB	202.4
22 OPTIC TEST	2000 ± 1000 mV	1880.9
23 ELECTRICAL TEST	2000 ± 1000 mV	2096.0
24 VOLTAGE TEST	+5V +12V +15V -15V	5.28 / 12.21 / 15.73 / -15.17
25 ZERO GAS NONOX	0.00/0.00 PPB	34.2 / 153.1
26 SPAN GAS NONOX	400.00/400.00 PPB	652.5 / 739.8

#### หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, O-ring 2 ชิ้น, Spring 1 ชิ้น

- ตรวจเช็คพบว่า A ZERO WARNING ไม่แสดงภาพ ทำการเปลี่ยนหลอด CD PMT 1 หลอด



MULTI POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd

EQUIPMENT NAME : NO<sub>x</sub> Analyzer

MANUFACTURER : Teledyne - API

MODEL : T200

SERIAL NO : 2975

STANDARD GAS CONCENTRATION (PPM) : 53.40

CYLINDER NO : OC745169

CYLINDER PRESSURE (psig) : 1400

CERTIFIED DATE : Mar 10, 2021

CERTIFIED BY : AIRGAS SPECIALTY GASES

EXPIRED DATE : Mar 10, 2029

CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL (PPB)	ACTUAL NO (PPB)	ERROR NO (PPB)	% ERROR NO	ACTUAL NO <sub>x</sub> (PPB)	ERROR NO <sub>x</sub> (PPB)	% ERROR NO <sub>x</sub>
ZERO	0.0	0.1	0.1	-	0.1	0.1	-
1	100.0	100.5	0.5	0.5	100.5	0.5	0.5
2	200.0	204.2	4.2	2.1	206.2	6.2	3.1
3	300.0	304.1	4.1	1.4	304.5	4.6	1.5
4	400.0	399.1	-0.86	-0.1	400.1	0.1	0.0
AVERAGE (%)				1.0			

500.0

400.0

300.0

200.0

100.0

0.0

Reading Concentration (PPB)

0.0

100.0

200.0

300.0

400.0

500.0

Input Concentration (PPB)

—

—

—

—

ACTUAL NO (PPB)

ACTUAL NO<sub>x</sub> (PPB)

Linear (ACTUAL NO (PPB))

Linear (ACTUAL NO<sub>x</sub> (PPB))

$y = 1.004170x + 1.470000$

$R^2 = 0.999690$

CALIBRATED BY : คุณพรชัย นาคิวนนัทช์

DATE : 29 มิถุนายน 2566

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณพรชัย นาคิวนนัทช์ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทรมาน เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-9999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

Customer service report

บริษัท เอส ซี เอส (ประเทศไทย) จำกัด

Manufacturer

Teledyne API

Equipment

NOx Analyzer

SN

2975

Quotation

Q-82-2023-125-SV

● Checking Date●

29/6/2023

- Problem
- ตรวจเช็คพบว่าเครื่องมีการ A ZERO WARNING เนื่องจากหลอด CD PMT เสื่อมสภาพ



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contact us



● Correlation working / Remark

- ทำการเปลี่ยน หลอด CD PMT
- ทำการเปลี่ยนวัสดุเส้นเปลี่ยน Sintered Filter , O-ring , Spring
- จากการทดสอบการลงใช้งานเครื่อง \* เครื่องสามารถทำงานปกติ

● Repair parts ●

Sintered Filter 1 ชิ้น , O-ring 2 ชิ้น , Spring 1 ชิ้น

ASSY, PMT, LOW DARK CURVE/HI GAIN, NOx Ultra / PN:022890000 จำนวน 1 ชิ้น

Technician / Engineer

## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E04N199E15A0622  
Cylinder Number: CC745169  
Laboratory: 124 - Plumsteadville - PA  
PGVP Number: A12021  
Gas Code: CO,NO,NOX,SO2,BALN  
Reference Number: 160-402045691-1  
Cylinder Volume: 144.4 CF  
Cylinder Pressure: 2015 PSIG  
Valve Outlet: 660  
Certification Date: Mar 10, 2021  
Expiration Date: Mar 10, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/051, which states: "This analytical methodology does not require correction for analytical inference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. The measurement is a traceable value to the National Institute of Standards and Technology (NIST)."  
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS				Assay Dates
Component	Requested Concentration	Actual Concentration	Protocol Method	
NOX	53.00 PPM	53.40 PPM	G1	03/03/2021, 03/10/2021
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 1.1% NIST Traceable
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.9% NIST Traceable
NITROGEN	Balance		G1	+/- 0.8% NIST Traceable

CALIBRATION STANDARDS			
Type	Lot ID	Cylinder No	Concentration
NTRM	07080227	E80079116	100.3 PPM NITRIC OXIDE/NITROGEN
PRM	12396	D885025	9.91 PPM AIR/NITROGEN DIOXIDE
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN
NTRM	08012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN

ANALYTICAL EQUIPMENT			
Instrument/Make/Model		Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1K0579		NDIR	Feb 26, 2021
Nicollet IS50 FTIR AUP2010245 NO		FTIR	Feb 11, 2021
Nicollet IS50 FTIR AUP2010245 NO2		FTIR	Feb 22, 2021
Nicollet IS50 FTIR AUP2010245 SO2		FTIR	Feb 18, 2021

#### Triad Data Available Upon Request

NOTES:  
Gross Weight: 28.1 Kg  
Net Weight: 4.6 Kg



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด  
KINETICS CORPORATION LTD.

รายงานผลการชั่งและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ  
ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.  
วันที่ : 24 กุมภาพันธ์ 2566  
รายชื่ออุปกรณ์ / เครื่องมือ : CO Analyzer  
บริษัทผู้ผลิต : Teledyne AP  
หมายเลขอุปกรณ์ / เครื่องมือ : 5881  
รุ่นของอุปกรณ์ / เครื่องมือ : T300

TEST VALUES			
	API	MODEL	T300
1	RANGE	1 - 1000 PPM	50.0
2	STABILITY	≤ 1 PPM	0.01
3	CO MEASURE	2500 - 4800 mV	3909.3
4	CO REFERENCE	2000 - 4800 mV	3376.8
5	MR RATIO	1.1 - 1.3	1.161
6	PRESEETURE	25 - 35 in - Hg-A	28.8
7	SAMPLE FLOW	800 ± 10% cc/min	848
8	SAMPLE TEMP	48 ± 4 °C	48.4
9	BENCH TEMP	48 ± 2 °C	48.0
10	WHEEL TEMP	68 ± 2 °C	68.0
11	BOX TEMP	AMBIENT ± 5 °C	33.4
12	PHT DRIVE	250 - 4750 mV	2541.7
13	CO SLOPE	1.0 ± 0.3	1.056
14	CO OFFSET	0.0 ± 0.3	-0.049
15	CO READINGS (AMBIENT)	PPM	0.283
16	ELECTRICAL TEST	40 ± 2 PPM	40.0
17	VOLTAGE TEST	+5 V +12 V +15 V -15 V	5.18 / 12.16 / 16.29 / 15.20
18	ZERO GAS	0.00 PPM	0.103
19	SPAN GAS	40.0 PPM	42.590

#### หมายเหตุ

- ทำการเปลี่ยน Sintered Filter 1 ชิ้น, Spring 1 ชิ้น, O-ring 2 ชิ้น

ต้องการข้อมูลเพิ่มเติมทางด้านเทคนิค กรุณาติดต่อ : คุณพรชัย ศาวิณนรักษ์ โทรศัพท์ : 0-2515-8987  
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระนอก เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E04N199E15A0622  
Cylinder Number: CC745169  
Laboratory: 124 - Plumsteadville - PA  
PGVP Number: A12021  
Gas Code: CO,NO,NOX,SO2,BALN  
Reference Number: 160-402046691-1  
Cylinder Volume: 144.4 CF  
Valve Pressure: 2015 PSIG  
Valve Outlet: 660  
Certification Date: Mar 10, 2021  
Expiration Date: Mar 10, 2029

Certification performed in accordance with EPA's Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2017) document EPA 600/R-12/531, using the assay procedure listed. This assay procedure does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant interferences that are known to affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NOX	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable
NITRIC OXIDE	53.00 PPM	53.40 PPM	G1	+/- 1.1% NIST Traceable
SULFUR DIOXIDE	53.00 PPM	53.79 PPM	G1	+/- 0.5% NIST Traceable
CARBON MONOXIDE	4500 PPM	4512 PPM	G1	+/- 0.5% NIST Traceable
NITROGEN	Balance			
CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	07060227	EB0079116	100.3 PPM NITRIC OXIDE/NITROGEN	Jul 23, 2023
PRM	12386	D865023	9.91 PPM AIR/NITROGEN DIOXIDE	Feb 20, 2020
GMIS	124206989	CC323707	4.023 PPM NITROGEN DIOXIDE/NITROGEN	Aug 15, 2021
NTRM	16010203	KAL003087	97.69 PPM SULFUR DIOXIDE/NITROGEN	Dec 23, 2021
NTRM	09012341	KAL004716	4857 PPM CARBON MONOXIDE/NITROGEN	Jun 07, 2024
The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.				
ANALYTICAL EQUIPMENT				
Instrument/Make/Model	Last Multipoint Calibration			
SIEMENS ULTRAMAT 6 N1KD579	NDIR	FTIR	FTIR	Feb 26, 2021
Nicolet IS50 FTIR AUP2010245 NO	FTIR	FTIR	FTIR	Feb 11, 2021
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	FTIR	FTIR	Feb 22, 2021
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	FTIR	FTIR	Feb 18, 2021

#### Triad Data Available Upon Request

NOTES:  
Gross Weight: 28.1 Kg  
Net Weight: 4.6 Kg

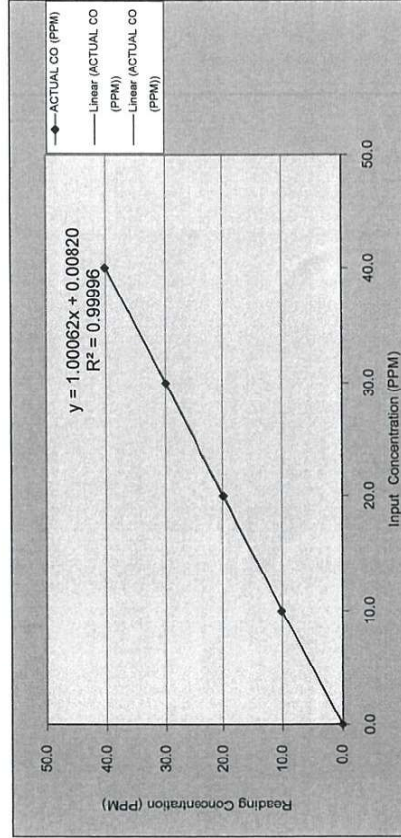


## MULTI-POINT CALIBRATION REPORT

CUSTOMER NAME : SGS (Thailand) Co., Ltd.		SERIAL NO : 5881	
EQUIPMENT NAME : CO Analyzer		CYLINDER NO : CC745169	
MANUFACTURER : Teledyne - API		MODEL : T300	
STANDARD GAS CONCENTRATION (PPM) :		4512	
CYLINDER PRESSURE (psig) :		1550	
CERTIFIED BY : AIRGAS SPECIALTY GASES		CERTIFIED DATE : Mar 10, 2021	
		EXPIRED DATE : Mar 10, 2029	

## CALIBRATION RESULTS

CALIBRATION RESULTS				
POINT NO	IDEAL (PPM)	ACTUAL CO (PPM)	ERROR CO (PPM)	% ERROR CO
ZERO	0.00	0.034	0.034	0.00
1	10.00	10.077	0.077	0.770
2	20.00	19.928	-0.072	-0.360
3	30.00	29.921	-0.079	-0.263
4	40.00	40.143	0.143	0.358
AVERAGE (%)				0.505



CALIBRATED BY : คุณพรชัย ผาติวนักษ์

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : คุณพรชัย ผาติวนักษ์ โทรศัพท์ : 02-515-8987

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระเกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinelectrics.co.th



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการสอบและรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd  
วันที่ : 7 กุมภาพันธ์ 2565  
รายชื่ออุปกรณ์ / เครื่องมือ : CO Analyzer  
บริษัทผู้ผลิต : Teledyne API  
รุ่นของอุปกรณ์ / เครื่องมือ : T300  
หมายเลขอุปกรณ์ / เครื่องมือ : 5881

TEST VALUES			
API MODEL T300		BEFORE	AFTER
1	RANGE 1 - 1000 PPM	50	50
2	STABILITY ≤ 1 PPM	0.15	0.21
3	CO MEASURE 2500 - 4800 mV	4489.4	4601.1
4	CO REFERENCE 2000 - 4800 mV	3873.5	3885.3
5	PRESEURE 25 - 35 in - Hg-A	29.0	28.9
6	SAMPLE FLOW 800 ± 10% cc/min	837	835
7	SAMPLE TEMP 48 ± 4 °C	46.6	46.5
8	BENCH TEMP 48 ± 2 °C	48	48
9	WHEEL TEMP 68 ± 2 °C	66.3	67.9
10	BOX TEMP AMBIENT ± 5 °C	38.8	37.3
11	SLOPE 1.0 ± 0.3	1.065	1.069
12	OFFSET 0.0 ± 0.3	-0.045	0.436
13	CO READING (AMBIENT) PPM	1.339	0.115
14	VOLTAGE TEST +5V +12V +15V -15V	-	-
15	ZERO GAS 0.00 PPM	0.750	0.001
16	SPAN GAS 40.0 PPM	41.574	40.029

หมายเหตุ

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บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด



ลงนามเจ้าหน้าที่ (Signature)

ตั้งทางร้านอยู่เลขที่ 11 ถนนพหลโยธิน กรุงเทพมหานคร 10900 โทรศัพท์ : 0-2515-8987  
โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



Calibration Report

General Information			
Equipment:	NO2 Analyzer	Report No:	AQMC10/2023
Brand / Model:	API-200 (Phillips)	Calibrated Date:	12/05/2023
Principle:	Chemiluminescent	Calibrated by:	Sompong K.
Serial No:	250 (HNO2-1) / 552 (HNO2-2)		

Certified Gas Cylinder			
Manufacturer:	AIRGAS	Certified Concentrations	
Gas Grade:	EPA Potocal	Component:	Concentration
Cylinder No:	LL161665	NO	45.01 ppm
Certified Date:	21/10/2022		
Expired Date:	21/10/2025		

Calibration Result									
Equipment Setting			Standard Gas			Reading		Dif	
Serial No.	Parameter	Meas. Range	Unit	Zero	Span	Zero	Span	Zero	Span
250	NO	500	ppb	0.0	400	0.0	399	0.0	1
	NO2	0	ppb	0.0	0.0	0.0	1	0.0	1
	NOx	500	ppb	0.0	400	0.0	400	0.0	0
552	NO	500	ppb	0.0	400	0.0	400	0.0	0
	NO2	0	ppb	0.0	0.0	0.0	1	0.0	1
	NOx	500	ppb	0.0	400	0.0	401	0.0	1

Authority Signature:



www.enquips.com



## Certificate of Calibration

**Customer**  
Name : SGS (Thailand) Limited.  
Address : 100 Nanglinchee Road, Chongnonsi, Yannawa Bangkok  
10120

Certificate No : 23-ACT-016  
Request No : Req-2023-0110

### Unit Under Calibration Details

Measurement item : Acoustic Calibrator  
Manufacturer : Cirrus  
Model : CR-515  
Serial Number : 80411  
ID : ENSL 17149  
Class : 1  
Range : 94 dB / 1000 Hz  
Instrument Status : Used

### Calibration Environment and Details

Temperature : ( 23 ±2 °C )  
Humidity : ( 50 ± 20 %RH )  
Barometric Pressure : ( 1013 ± 10.0 hPa )  
Received Date : 12 January 2023  
Calibration Date : 26 January 2023  
Location of Calibration : LAB 1 Acoustic  
Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEL	31 May 2023
THD Multimeter	2015	1047765	NIMT	2 February 2023

**Traceability** : This certificate provides traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

### Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k=2$ , providing a level of confidence approximately 95 %.

Calibrated By :

## Certificate No : 23-ACT-016

Request No : Req-2023-0110

Calibration Results : Without Adjustment

Sound pressure level Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty ( ± dB )	Acceptance limit Class 1 ( ± dB )
	Measured	Error	Measured	Error		
94 dB / 1000 Hz	94.01	0.01	-	-	0.13	0.25

### Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty ( ± % )	Acceptance limit Class 1 ( ± % )
	Measured (Hz)	Error (%)	Measured (Hz)	Error (%)		
94 dB / 1000 Hz	1000.00	0.00	-	-	0.10	0.70

### Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty ( ± % )	Acceptance limit Class 1 ( ± % )
	Measured (%)	Error (%)	Measured (%)	Error (%)		
94 dB / 1000 Hz	0.09	-	-	-	0.40	2.5

### Note :

- Acceptance limit was IEC60942:2017 Class 1
- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration



ENSL 18161

## Certificate of Calibration

**Customer**  
Name : SGS (Thailand) Limited.  
Address : 100 Naenglinee Road, Chongnonsi, Yamaava Bangkok 10120

Certificate No : 23-SLM-020  
Request No : Req-2023-0113

### Unit Under Calibration Details

Measurement item : Sound Level Meter  
Manufacturer : Cirrus  
Model : CR:161B  
Serial Number : G080136  
ID : ENSL 18161  
Resolution : 0.1 dB

Microphone Class : 1  
Microphone Model : MK224  
Microphone SN : 210040D  
Preamplifier Model : KM:170  
Preamplifier SN : 0807  
Instrument Status : Used

### Calibration Environment and Details

Temperature : 23 °C ± 2 °C  
Humidity : 50 %RH ± 20 %RH  
Barometric Pressure : 1013 hPa ± 10 hPa  
Received Date : 12 January 2023  
Calibrated Date : 26 January 2023  
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests  
Location of Calibration : Lab Acoustic

### Reference Standard

Instrument	Brand	Model	SN.	Due calibration	Traceability
Standard Microphone	GRAS	40AN	188273	6 October 2023	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EFA000234	29 June 2023	TSI
Audio Generator	SvanteK	Svan401	131	12 October 2023	WK Electric

### Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k = 2$ , providing a level of confidence approximately 95 %.

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

FSI-708-SLM-01 Rev.0 Issue date 01/07/19

Certificate No : 23-SLM-020  
Request No : Req-2023-0113

### 1. Indication at the calibration check frequency

UUC Setting	Nominal Level (dB)	Before Adjust		Adjust		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
		UUC (dB)	ERR (dB)	UUC (dB)	ERR (dB)		
FAST / A / 20-140							
Calibrator Setting							
1000 Hz 94.00 dB	94.01	93.8	-0.21	93.8	-0.21	0.20	0.3

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR515, SN. 80411

### 2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 20-140		
UUC Weighting		
A	16.2	0.10

### 3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 20-140		
UUC Weighting		
A	-	0.10
C	14.3	0.10
Z	28.9	0.10

### 4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve				UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	A	C	Z			
FAST / 20-140						
STD Setting						
125 Hz	0.3	0.1	0.1	0.50	1.0	
1000 Hz	0.0	0.0	0.0	0.60	0.7	
4000 Hz	-0.5	-0.4	-0.2	0.60	1.0	
8000 Hz	-0.8	-0.7	-0.5	0.70	+1.5 -2.5	

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd

FSI-708-SLM-01 Rev.0 Issue date 01/07/19

Certificate No : 23-SLM-020  
 Request No : Req-2023-0113

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency				UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	A (dB)	C (dB)	Z (dB)	Weighting Response curve		
FAST / 20-140						
STD Setting						
63 Hz	0.3	0.1	0.1			1.0
125 Hz	0.3	0.1	0.1			1.0
250 Hz	0.2	0.1	0.0			1.0
500 Hz	0.1	0.1	0.0			1.0
1000 Hz	0.0	0.0	0.0			0.7
2000 Hz	-0.1	0.0	0.0		0.2	1.0
4000 Hz	-0.3	-0.2	0.0			1.0
8000 Hz	-0.5	-0.3	-0.1			+1.5, -2.5
16000 Hz	0.1	0.2	-0.3			-2.5, -16.0

6. Frequency and time weightings at 1kHz

UUC Setting	Measured			UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	STD REF (dB)	UUC (dB)	ERR (dB)		
FAST / 20-140					
UUC Weighting					
A	114.00	114.0	0.0		0.2
C	114.00	114.0	0.0	0.2	0.2
Z	114.00	114.0	0.0		0.2

UUC Setting	Measured			UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	STD REF (dB)	UUC (dB)	ERR (dB)		
20-140 / A					
UUC Time Response					
Fast	114.00	114.0	0.0		0.1
Slow	114.00	114.0	0.0	0.2	0.1
Leq	114.00	114.0	0.0		0.1

Certificate No : 23-SLM-020  
 Request No : Req-2023-0113

7. Long Term Stability

UUC Setting	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	FAST / A / 20-140	UUC (dB)		
STD Setting				
Initial		114.0		
Final		114.0		
Deviated		0.0	0.1	0.1

8. Level linearity on the reference level range

UUC Setting	Anticipated		Deviation		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	FAST / A / 20-140	REF (dB)	UUC (dB)	ERR (dB)		
STD dB						
139.00		139	139.0	0.0		0.8
134.00		134	134.1	0.1		0.8
129.00		129	129.1	0.1		0.8
124.00		124	124.1	0.1		0.8
119.00		119	119.0	0.0		0.8
114.00		114	114.0	0.0		0.8
109.00		109	109.0	0.0		0.8
104.00		104	104.0	0.0		0.8
99.00		99	99.0	0.0		0.8
94.00		94	94.0	0.0		0.8
89.00		89	89.0	0.0		0.8
84.00		84	84.0	0.0		0.8
79.00		79	79.1	0.1	0.3	0.8
74.00		74	74.1	0.1		0.8
69.00		69	69.1	0.1		0.8
64.00		64	64.1	0.1		0.8
59.00		59	59.1	0.1		0.8
54.00		54	54.0	0.0		0.8
49.00		49	49.0	0.0		0.8
44.00		44	44.0	0.0		0.8
39.00		39	39.1	0.1		0.8
34.00		34	34.1	0.1		0.8
29.00		29	29.2	0.2		0.8
24.00		24	24.2	0.2		0.8



Certificate No : 23-SLM-020  
Request No : Req-2023-0113

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
FAST / A / 20-140	UUC (dB)	(± dB)	(± dB)
STD Setting			
Positive one-half cycle	142.9		
Negative one-half cycle	142.9		
Deviated	0.0	0.2	1.5

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
FAST / A / 20-140	UUC (dB)	(± dB)	(± dB)
STD Setting			
Initial	139.0		
Final	139.0		
Deviated	0.0	0.1	0.1

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.  
FM-708-SLM-01 Rev.0 Issue date 01/07/19

Certificate No : 23-SLM-020  
Request No : Req-2023-0113

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance Limit
FAST / A	REF (dB)	UUC (dB)	(± dB)	(± dB)
UUC Range				
20-140	27.9	28.1	0.2	0.8
	114	114.0	0.0	0.8

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
A / 20-140	Toneburst (ms)	Ref (dB)	UUC (dB)	(± dB)	(± dB)
UUC Time Response			ERR (dB)		
Fast	200	136.0	135.9	-0.1	0.5
	2	119.0	118.9	-0.1	+1.0, -1.5
	0.25	110.0	109.8	-0.2	+1.0, -3.0
Slow	200	129.6	129.5	-0.1	0.5
	2	110.0	109.9	-0.1	+1.0, -3.0
	200	130.0	130.0	0.0	0.5
SEL	2	110.0	109.9	-0.1	+1.0, -1.5
	0.25	101.0	100.9	-0.1	+1.0, -3.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
FAST / C / 20-140	REF (dB)	UUC (dB)	(± dB)	(± dB)
STD Setting				
Complete cycle	135.4	135.5	+0.10	2.0
Positive half cycle	134.4	134.3	-0.10	1.0
Negative half cycle	134.4	134.3	-0.10	1.0

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.  
FM-708-SLM-01 Rev.0 Issue date 01/07/19

### Certificate of Calibration

**Customer**  
 Name : SGS (Thailand) Limited,  
 Address : 100 Naangluee Road, Chongnonsi, Yanawa Bangkok 10120

Certificate No : 23-SLM-042

Request No : Req-2023-0296

#### Unit Under Calibration Details

Measurement item : Sound Level Meter  
 Manufacturer : Cirrus  
 Model : CR161B  
 Serial Number : G080132  
 ID : ENSL 18165  
 Resolution : 0.1 dB  
 Microphone Class : 1  
 Microphone Model : MK224  
 Microphone SN : 205135A  
 Pre-amplifier Model : KM170  
 Pre-amplifier SN : 0921  
 Instrument Status : Used

#### Calibration Environment and Details

Temperature : 23 °C ± 2 °C  
 Humidity : 50 %RH ± 20 %RH  
 Barometric Pressure : 1013 hPa ± 10 hPa  
 Received Date : 2 February 2023  
 Calibrated Date : 9 February 2023  
 Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests  
 Location of Calibration : Lab Acoustic

#### Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	188273	6 October 2023	GRAS
Multifrequency Calibrator	Quest	Quest-cal	EFA000234	29 June 2023	TSI
Audio Generator	Svanick	Svan401	131	12 October 2023	WK Electric

#### Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k = 2$ , providing a level of confidence approximately 95 %.

Calibrate

Certificate No : 23-SLM-042

Request No : Req-2023-0296

#### 1. Indication at the calibration check frequency

UUC Setting	Nominal Level (dB)	Before Adjust UUC (dB)	Before Adjust ERR (dB)	Adjust UUC (dB)	Adjust ERR (dB)	UNCERTAINTY (± dB)	Acceptance Limit (± dB)
FAST / A / 20-140							
Calibrator Setting							
1000 Hz 94.00 dB	93.81	94.2	+0.39	93.8	-0.01	0.20	0.3

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN. 58079

#### 2. Self-generated noise, Microphone installed

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-140		
UUC Weighting		
A	17.1	0.10

#### 3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured (dB)	UNCERTAINTY (± dB)
FAST / 20-140		
UUC Weighting		
A	-	0.10
C	-	0.10
Z	26.6	0.10

#### 4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve	UNCERTAINTY (± dB)	Acceptance Limit (± dB)
FAST / 20-140	A		
STD Setting	C		
125 Hz	0.5	0.5	0.50
1000 Hz	0.0	0.0	0.60
4000 Hz	-1.0	-0.8	0.60
8000 Hz	0.0	0.2	0.5
		0.70	+1.5 -2.5



Certificate No : 23-SLM-042  
Request No : Req-2023-0296

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

DUC Setting	Deviation from various Frequency				UNCERTAINTY ( ± dB)	Acceptance Limit ( ± dB)	
	FAST / 20-140	Weighting Response curve					
		STD Setting	A (dB)	C (dB)			Z (dB)
		63 Hz	0.3	0.1	0.1	0.2	1.0
		125 Hz	0.3	0.1	0.1		1.0
		250 Hz	0.2	0.1	0.0		1.0
		500 Hz	0.1	0.1	0.0		1.0
		1000 Hz	0.0	0.0	0.0		0.7
		2000 Hz	-0.1	0.0	0.0		1.0
		4000 Hz	-0.3	-0.2	0.0		1.0
		8000 Hz	-0.5	-0.3	-0.1		+1.5, -2.5
	16000 Hz		0.2	0.3	-0.2	+2.5, -16.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD REF (dB)	Measured		UNCERTAINTY ( ± dB)	Acceptance Limit ( ± dB)
		UUC (dB)	ERR (dB)		
		FAST / 20-140			
UUC Weighting					
A	114.00	114.0	0.0	0.2	0.2
C	114.00	114.0	0.0		0.2
Z	114.00	114.0	0.0		0.2

UUC Setting	STD REF (dB)	Measured		UNCERTAINTY ( ± dB)	Acceptance Limit ( ± dB)
		UUC (dB)	ERR (dB)		
20-140 / A					
UUC Time Response					
Fast	114.00	114.0	0.0	0.2	0.1
Slow	114.00	114.0	0.0		0.1
Leq	114.00	114.0	0.0		0.1

Certificate No : 23-SLM-042  
Request No : Req-2023-0296

7. Long Term Stability

UUC Setting	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	FAST / A / 20-140	UUC (dB)		
STD Setting	Initial	114.0	0.1	0.1
	Final	114.0		
Deviated		0.0	0.1	0.1

8. Level linearity on the reference level range

UUC Setting	Anticipated		Deviation		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	FAST / A / 20-140	REF (dB)	UUC	ERR		
	STD dB	(dB)	(dB)	(dB)		
FAST / A / 20-140	139.00	139	139.0	0.0	0.3	0.8
	134.00	134	134.0	0.0		0.8
	129.00	129	129.0	0.0		0.8
	124.00	124	124.0	0.0		0.8
119.00	119.00	119	119.0	0.0		0.8
	114.00	114	114.0	0.0		0.8
	109.00	109	109.0	0.0		0.8
	104.00	104	104.0	0.0		0.8
99.00	99.00	99	99.0	0.0		0.8
	94.00	94	94.0	0.0		0.8
	89.00	89	89.0	0.0		0.8
	84.00	84	84.0	0.0		0.8
79.00	79.00	79	79.1	0.1		0.8
	74.00	74	74.1	0.1		0.8
	69.00	69	69.1	0.1		0.8
	64.00	64	64.1	0.1		0.8
59.00	59.00	59	59.1	0.1		0.8
	54.00	54	54.1	0.1		0.8
	49.00	49	49.1	0.1		0.8
	44.00	44	44.1	0.1		0.8
39.00	39.00	39	39.1	0.1		0.8
	34.00	34	34.1	0.1		0.8
	29.00	29	29.1	0.1		0.8
	24.00	24	24.3	0.3		0.8

Certificate No : 23-SLM-042  
 Request No : Req-2023-0296

#### 12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
FAST / A / 20-140	UUC	(± dB)	(± dB)
STD Setting	(dB)		
Positive one-half cycle	143.5		
Negative one-half cycle	143.5		
Deviated	0.0	0.2	1.5

#### 13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
FAST / A / 20-140	UUC	(± dB)	(± dB)
STD Setting	(dB)		
Initial	139.0		
Final	139.0		
Deviated	0.0	0.1	0.1

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd  
 FM-706-SLM-01 Rev.0 Issue date 01/07/19

Certificate No : 23-SLM-042  
 Request No : Req-2023-0296

#### 9. Level linearity including the level range control

UUC Setting	STD	REF	UUC	ERR	UNCERTAINTY	Acceptance Limit
FAST / A					(± dB)	(± dB)
UUC Range						
20-140	25.1	114.0	25.1	0.0	0.3	0.8

#### 10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
A / 20-140	Toneburst	Ref	UUC	ERR	(± dB)
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	136.0	136.0	0.0	0.5
	2	119.0	118.8	-0.2	+1.0, -1.5
	0.25	110.0	109.9	-0.1	+1.0, -3.0
Slow	200	129.6	129.5	-0.1	0.5
	2	110.0	109.9	-0.1	+1.0, -3.0
	200	130.0	130.0	0.0	0.5
	2	110.0	110.0	0.0	+1.0, -1.5
SEL	0.25	101.0	100.9	-0.1	+1.0, -3.0

#### 11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
FAST / C / 20-140	REF	UUC	ERR	(± dB)
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	135.4	135.6	+0.20	2.0
Positive half cycle	134.4	134.2	-0.20	1.0
Negative half cycle	134.4	134.2	-0.20	1.0

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd  
 FM-706-SLM-01 Rev.0 Issue date 01/07/19



## CERTIFICATE OF CALIBRATION

Certificate No.: C0-0408006/22

Page 1 of total 2 pages

**Customer**  
SGS (THAILAND) LIMITED  
100 Nanglinchee Road, Chongnonsee,  
Yannawa, Bangkok 10120 Thailand

**Equipment**  
**Manufacturer** HANNA  
**Model** HI98195  
**Serial No.** 04160034101  
**ID No.** ENWA19105  
**Description** Range : 0 - 14 pH, Resolution : 0.01 pH

**Environmental Conditions**  
**Ambient Temperature:** (20 ± 2) °C  
**Relative Humidity:** (50 ± 10) %  
**Atmospheric Pressure:**

**Calibration Location**  
**Received Date** 4 August 2022  
**Calibration Date** 5 August 2022

**Date of Iss**

**Checked by**

Act as Technical Manager

Representative of Managing Director

( Dr. Ekachai Puttitwong )

( ) ( Krisyos K. ) ( ) ( Sakda Y. )  
( ) ( Patiphan K. ) ( ) ( Onnapa P. )  
( ) ( Pongsak H. ) ( ) ( Nitiphong K. )  
( ) ( Kanung C. ) ( ) ( Nonthachai K. )  
( ) ( Pramong P. ) ( ) ( Noppol P. )

**VERIFIED**

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REV.02.02/24/21

Certificate No.: C0-0408006/22

Page 2 of total 2 pages

**Reference Method:**

- The calibration method used was CP-178 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units)

**Reference Standard:**

Type	pH Value	Lot No.	Due Date	Traceability
pH Standard Solution	4.01	081020	Jan. 22, 2023	NIMT
	7.01	020221	Jan. 18, 2023	
	10.00	091020	Dec. 24, 2022	

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Digital Thermometer with Sensor	1523 / 5622	1709138 / 4605984-005	I0-1006004/22	Jun. 9, 2023	THC

**Remark:** This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

**Measurement Results:**

Calibration of pH Electrode (Serial No.: K3409432)

pH Standard Solution (pH)	Measured Value		Uncertainty (± pH)
	(pH)	(mV)	
4.01	4.00	167.3	0.013
7.01	7.01	-9.2	0.013
10.00	10.01	-181.7	0.013

**Note :** Adjust Curve to Buffer Solution pH (4.7,10)  
Temperature stability of micro bath : 25 ± 0.2°C

The above 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 -

Calibrated by

Kitipong

REV.02.02/24/21

FE-169

## CERTIFICATE OF CALIBRATION

Certificate No.: T0-0408014/22 Page 1 of total 2 pages

**Customer**  
SGS (THAILAND) LIMITED  
100 Nanglinchee Road, Chongnonsee,  
Yannawa, Bangkok 10120 Thailand

**Equipment**  
Digital Thermometer with Probe  
**Manufacturer** HANNA **Model** H198195  
**Serial No.** 04160034101 **ID No.** ENWA19105  
**Description** Temperature range : 20 °C to 50 °C, Resolution of UUC : 0.01 °C

**Environmental Conditions**  
**Ambient Temperature:** (23 ± 3) °C  
**Relative Humidity:** (50 ± 15) %  
**Atmospheric Pressure:** -

**Calibration Location**  
**Received Date** 4 August 2022  
**Calibration Date** 4 August 2022  
**Date of Issue** 8 August 2022

**Checked by**  
Act as Technical Manager  
( ) (Krisyosl K.) ( ) (Sakda Y.)  
( ) (Patiphan K.) ( ) (Onnapa P.)  
( ) (Pongsak H.) ( ) (Nitiiphong K.)  
( ) (Kanung C.) ( ) (Nonthachai K.)  
( ) (Pramong P.) ( ) (Noppol P.)  
( ) (Dr. Ekachai Puttitwong )

VERIFIED

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: T0-0408014/22 Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Cert. No.	Due Date	Traceability
Thermometer Readout	1529-R	B7C853	10-1011001/21	Nov. 10, 2022	THC
Platinum Resistance Thermometer	5626	4854	C0A30047	Oct. 22, 2023	FLUKE
Liquid Bath	XORTS-40A	XO111019	10-0306002/21	Jun. 3, 2023	THC

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- FLUKE, Fluke Corporation, U.S.A.
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

( X ) Without Adjustment  
Dimension of probe : Diameter 3 mm. Sensor Type : RTD (PT100)

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
75	20.001	20.02	-0.019	0.015
75	30.001	30.02	-0.019	0.015
75	50.001	50.03	-0.029	0.015

UUC : Unit Under Calibration

The above 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 -