

ภาคผนวกที่ 5-2

เอกสารผลการสอบเทียบเครื่องมือตรวจวัด
สถานีรถไฟฟ้าชองนนทบุรี (อาคารโดมอันทาวเวอร์)
และสถานีรถไฟฟ้าศาลาแดง (สถานีอาคารหอแว่น)
ครั้งที่ 1/2568
วันที่ตรวจวัด วันที่ 3-8 ตุลาคม 2568

TSP High Volume Sampler Calibration

Verification Report No.
 SO2500250-E001 - TSP 01

☐ PM ☒ Onsite

Site: ตาม BTS ทั่วพื้นที่
 UTM : N 1518197 E 665842
 Sampler : ETSP#35
 Recorder : ECRAN000031070

Date: 3 Oct 25
 Technical: XXXXXXXXXX
 Approval: XXXXXXXXXX

CONDITIONS

Barometric Press. (hPa): 1007.5
 Temperature (deg C): 32.0
 Average Press. (hPa): 1013.0
 Average Temp. (deg C): 30.0

Corrected Pressure (mm Hg): 755.7
 Temperature (deg K): 305.0
 Corrected Avg. Press. (mm Hg): 759.8
 Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc
 Model: TE-5025A
 Serial#: 2057

Orst Slope: 2.05933
 Orst Intercept: -0.02815
 Date Certified: 4 Mar 25
 Due Date : 03-Mar-26

CALIBRATIONS

Plate or Test #	H ₂ O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	10.10	1.527	54.0	53.23
2	8.50	1.402	50.0	49.28
3	6.20	1.200	44.0	43.37
4	4.30	1.001	34.0	33.51
5	2.40	0.752	22.0	21.66

LINEAR REGRESSION

 Slope = 40.7713
 Intercept = -7.7493
 Corr. coeff = 0.9937

of Observations: 5
 Range of Chart at 1.1 - 1.7 m3/min: 38
62

Calibrated by: XXXXXXXXXX
 3 October 2025
 Approved by: XXXXXXXXXX
 3 October 2025

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ปีงบประมาณ ๒๕๖๘

FM-SVM-05-14 Rev 00

PM10 High Volume Sampler Calibration

Verification Report No. SQ2500250-E001 - PM 01

L. PM ☒ Onsite
 Site: สถานี BTS ศาลาแดง
 UTM : N 1518197 E 665842
 Sampler: EPM10#14
 Recorder: NCRT1500904855

Date: 3 Oct 25
 Technical: XXXXXXXXXX
 Approva: XXXXXXXXXX

CONDITIONS

Barometric Press. (hPa): 1007.5
 Temperature (deg C): 32.0
 Average Press. (hPa): 1013.0
 Average Temp. (deg C): 30.0

Corrected Pressure (mm Hg): 7557
 Temperature (deg K): 305.0
 Corrected Avg Press. (mm Hg): 759.8
 Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc
 Model: TE-5025A
 Serial#: 2067

Slope: 1.29578
 Intercept: -0.01772
 Date Certified: 4 Mar 25
 Due Date: 3 Mar 26

CALIBRATIONS

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)
1	11.00	1.840	55.0	34.94
2	8.40	1.435	52.0	33.04
3	6.20	1.234	40.0	25.41
4	3.20	0.891	24.0	15.25
5	2.40	0.773	18.0	11.44

**LINEAR
REGRESSION**

 Slope = 28.5426
 Intercept = -10.0821
 Corr. coeff. = 0.9905
 SFR = 1.000
 SSP = 29.06
 # of Observations: 5
 Range of Chart
 at SFR ±10%: 25
 33

Calibrated by : XXXXXXXXXX
 3 October 2025

Approved by : XXXXXXXXXX
 3 October 2025

ປາກກາດໃຫຍ່ 01.09.2016

TSP High Volume Sampler Calibration

Verification Report No.
SO2500250-E001 -TSP 02

☐ PM ☒ Onsite

Site: สถานี BTS สถานี

UTM : N 1517744 E 665358

Sampler: ETSPW40

Recorder: ECRDS016339509

Date: 3 Oct 25

Technical: [Redacted]

Approval: [Redacted]

CONDITIONS

Barometric Press. (hPa): 1007.4	Corrected Pressure (mm Hg): 755.6
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc	Qstd Slope: 2.06933
Model: TE-5025A	Qstd Intercept: -0.02815
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date: 03-Mar-26

CALIBRATIONS				
Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	12.20	1.677	56.0	55.19
2	9.60	1.489	52.0	51.25
3	6.40	1.219	44.0	43.37
4	4.30	1.001	34.0	33.51
5	2.20	0.720	24.0	23.65

LINEAR REGRESSION

Slope = 33.7515

Intercept = 0.1752

Corr. coeff = 0.9937

of Observations: 5

Range of Chart at 1.1 - 1.7 m3/min: 38

Calibrated by: [Redacted]

3 October 2025

Approved by: [Redacted]

3 October 2025

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ประกาศใช้ 01/08/2568

PM10 High Volume Sampler Calibration

Verification Report No.
SO2500250-E001 -PM 02

☐ PM ☒ Onsite

Site: สถานี BTS สถานี

UTM : N 1517744 E 665358

Sampler: EPM10M40

Recorder: NCRDS014261033

Date: 3 Oct 25

Technical: [Redacted]

Approval: [Redacted]

CONDITIONS

Barometric Press. (hPa): 1007.4	Corrected Pressure (mm Hg): 755.6
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc	Slope: 1.29578
Model: TE-5025A	Intercept: -0.01772
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date: 3 Mar 26

CALIBRATIONS				
Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)
1	12.80	1.768	56.0	35.58
2	10.40	1.595	54.0	34.31
3	7.30	1.338	43.0	27.32
4	4.40	1.042	32.0	20.33
5	2.70	0.819	20.0	12.71

LINEAR REGRESSION

Slope = 24.5513

Intercept = 6.1756

Corr. coeff = 0.9902

SFR = 1.000

SSP = 28.92

of Observations: 5

Range of Chart at SFR ±10%: 26

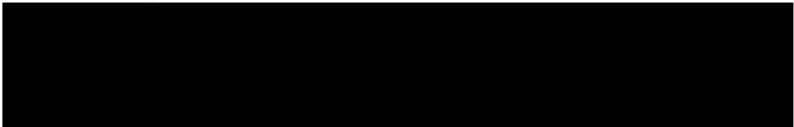
Calibrated by: [Redacted]

3 October 2025

Approved by: [Redacted]

3 October 2025

ประกาศใช้ 01/08/2568



Verification Test Report

Report No.: SO2500250-E001 / 001

Verification Date : 03 October 2025

Operate Information

☐ PM ☒ Onsite

Site : สถานี BTS ศาลาแดง

GPS coordinates : 47Q N 1518195 E 665853

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1799

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition

Temperature 32.60 °C

Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Reference Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.87	94.03	0.16	±1.0

* UUR = Unit Under Reference flow

Acceptant Criteria : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

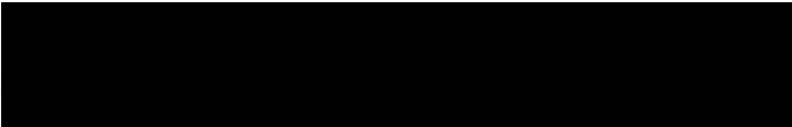
Approve By:

Date : 03 October 2025

Date : 03 October 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated

This Calibration Certificate cannot be reproduced



Verification Test Report

Report No.: SO2500250-E001 / 001

Verification Date : 03 October 2025

Operate Information

☐ PM ☒ Onsite

Site : สถานี BTS ชองนันทรี

GPS coordinates : 47Q N 1517747 E 665362

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1973

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition

Temperature 32.60 °C

Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Reference Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	0	93.93	93.27	93.09	-0.18	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

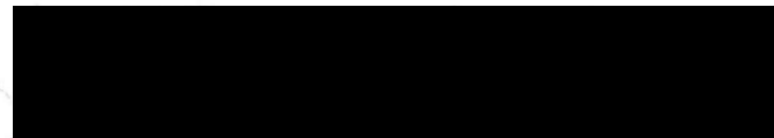
Approve By:

Date : 03 October 2025

Date : 03 October 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated

This Calibration Certificate cannot be reproduced



Certificate of Calibration

Calibration Certification Information			
Cal. Date:	March 4, 2025	Rootsmer S/N:	438320
Operator:	Jim Tisch	Ta:	294 °K
Calibration Model #:	TE-5025A	Pa:	746.0 mm Hg
		Calibrator S/N:	2067

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4220	3.2	2.00
2	3	4	1	1.0090	6.4	4.00
3	5	6	1	0.9030	8.0	5.00
4	7	8	1	0.8610	8.8	5.50
5	9	10	1	0.7090	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9907	0.6967	1.4106	0.9957	0.7002	0.8878
0.9864	0.9776	1.9949	0.9914	0.9826	1.2556
0.9843	1.0900	2.2304	0.9893	1.0955	1.4038
0.9832	1.1419	2.3393	0.9882	1.1477	1.4723
0.9779	1.3792	2.8212	0.9828	1.3862	1.7756
QSTD		m= 2.06933	QA		m= 1.29578
		b= -0.02815			b= -0.01772
		r= 0.99997			r= 0.99997

Calculations			
$Vstd = \Delta Vol ((Pa - \Delta P) / Pstd) (Tstd / Ta)$		$Va = \Delta Vol ((Pa - \Delta P) / Pa)$	
$Qstd = Vstd / \Delta Time$		$Qa = Va / \Delta Time$	
For subsequent flow rate calculations:			
$Qstd = 1/m \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$		$Qa = 1/m \left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} - b \right)$	

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmer manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION	
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30	

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
63-7611
67-900



Certificate of Calibration

Certificate No. : 68-200034-1

Page : 1 of 2

Submitted by :

Equipment :

Electronic Balance

Manufacturer : Sartorius

Model : SECURA224-IS

Serial No. : 0034803270

ID No. : ELABBALANCEN04

Capacity : 220 g

Resolution : 0.0001 g

Environment :

Relative Humidity : (41.9 to 42.9) %

Air Pressure : 1014.0 mbar

Date of Received : 28 January 2025

Date of Calibration : 28 January 2025

Date of Issue : 30 January 2025

Calibrated by :

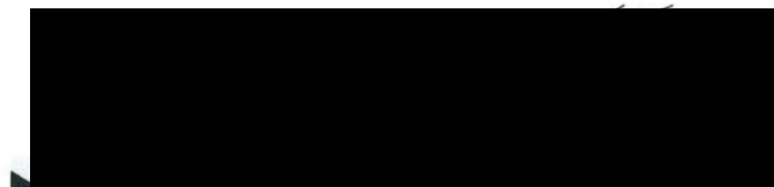
Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref: LAB 14

Edition 7 - November 2022

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02242009	07 Nov 2025	National Institute of Metrology (Thailand), (NIMT)



CAL-F0031-03

Certificate of Calibration

Certificate No. : 68-200034-1

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Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty ± (g)
0.01	0.0000	0.00012
0.1	0.0001	0.00012
1	0.0000	0.00013
2	0.0001	0.00013
5	0.0000	0.00013
10	0.0000	0.00013
20	-0.0001	0.00014
50	-0.0001	0.00015
100	-0.0001	0.00020
200	-0.0001	0.00038

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.06$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E

0.0004 0.0004 0.0005 0.0004 0.0000 g

Repeatability

Load test : 200 g

Sidev. : 0.00005 g

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CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD

Part Number: E04N199E15A00V3

Cylinder Number: E0170003

Laboratory: 124 - Plumsteadville - PA

PGVP Number: A12024

Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-403162930-1

Cylinder Volume: 144.0 CF

Cylinder Pressure: 2015 PSIG

Valve Outlet: 660

Certification Date: Oct 23, 2024

Expiration Date: Oct 23, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800R-12631, using the assay procedures listed. Analytical Methodology 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 impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items listed. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.30 PPM	G1	+/- 1.0% NIST Traceable	10/16/2024, 10/23/2024
NITRIC OXIDE	45.00 PPM	45.30 PPM	G1	+/- 0.9% NIST Traceable	10/16/2024, 10/23/2024
SULFUR DIOXIDE	45.00 PPM	45.05 PPM	G1	+/- 0.7% NIST Traceable	10/16/2024, 10/23/2024
CARBON MONOXIDE	4500 PPM	4528 PPM	G1	+/- 0.6% NIST Traceable	10/15/2024
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMS	DC1201202235	CC750377	49.05 PPM NITRIC OXIDE/NITROGEN	+/- 0.5%	May 03, 2026
PRM	12404	APEX 1324257	50.04 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Dec 22, 2023
GMS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
PRM	C2382001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMS	0712202310	CC494279	49.92 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 18, 2027
SRM	1893a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 27, 2023
CARBON MONOXIDE	090123	KAL04712	4657 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Feb 20, 2030

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

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1M9050	NDIR	Oct 09, 2024
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Oct 17, 2024
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Oct 03, 2024
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Sep 26, 2024



SO2 Analyzer Verification Test Report

Page:1/2

Calibration Report No.: API-6810001

Calibrated Date: 1-Oct-68

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: SO2 Analyzer Model: T100	Manufacturer API S/N: 2032
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Calibration System

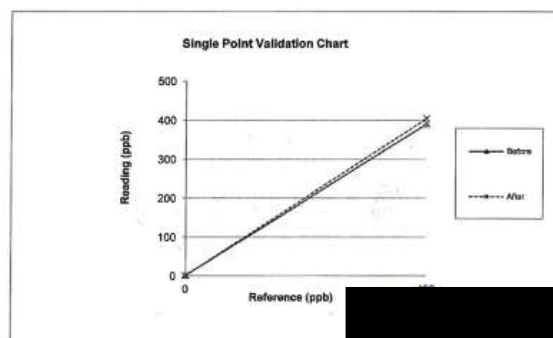
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.1 °C

Humidity: 59 %RH

Validation Report

Status	Zero			Span		
	Reference (ppb)	Reading (ppb)	Drift (ppb)	Reference (ppb)	Reading (ppb)	Drift%
Before	0.0	1.2	1.2	400.0	391.0	-1.1
After	0.0	0.8	0.8	400.0	405.0	0.6



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Calibration Report No.: API-6810001

Calibrated Date: 1-Oct-68

☒ PM ☐ Onsite

Test Function Value	Nominal range	Unit	Before	After	Note
Date	1-Oct-68				
Time	8:30				
Range	50 - 20000	PPB	500	500	
Stability (Zero Gas)	< 0.2	PPB	0.4	0.2	
Sample Flow	850 (+/- 50)	cfm	666	662	
PMT Detector	0 - 5000	mV	24.3	28.2	
Norm PMT Detector	0 - 5000	mV	31.4	34.3	
HVPS	400-900 constant	V	725	725	
DCPS	2500 (+/- 200)	mV	-	-	
RCCELL TEMP	50 (+/- 1)	Degree C	50	50	
BOX TEMP	20-40	Degree C	32.6	36.1	
PMT TEMP	7 (+/-1)	Degree C	8.3	8.3	
UV lamp	1000-4900	mV	3251	3251	
Lamp Ratio	30-120	%	87.4	87.4	
STR. Light (Zero Gas)	<100	PPB	36.5	36.5	
Dark PMT	(-50) - (+200)	mV	27.6	27.6	
Dark lamp	(-50) - (+200)	mV	3.6	3.6	
SAMP PRES	20-30 contant	IN-Hg-A	26.9	27.3	
Electric Test/Optic Test					
PMT Volts	2000 (+/- 500)	mV	2010	2008	
SO2 Conc	1000 (+/- 250)	PPB	1005	1003	
SO2 Slope	1 (+/- 0.3)	-	1.054	1.053	
SO2 Offset	< 250	mV	94.7	90.4	
Stability at Zero	< 0.2	PPB	0.1	0.1	
Stability at Span	< 2 ppb @ 400 ppb	PPB	0.4	0.2	
Gas Test Response					
Zero Gas (0.00 PPB)	0	ppb	1.2	0.8	
Span Gas (400 PPB)	400	ppb	391.0	405.0	± 5% of Range

Calibrate By :

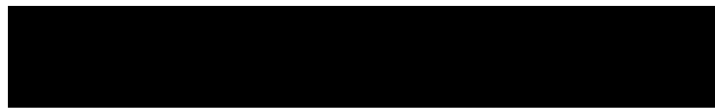
Date: 1-Oct-68

Approve By :

Date: 1-Oct-68

neediss
Neediss Supply Instrument Co.,Ltd

ประกาศใช้ 01/08/2568



SO2 Analyzer Verification Test Report

Page:1/2

Calibration Report No.: API-6810002

Calibrated Date: 1-Oct-68

☐ PM ☐ Onsite

Instruments Information

Analyzer Type: SO2 Analyzer Model: T100	Manufacturer API S/N: 2033
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Calibration System

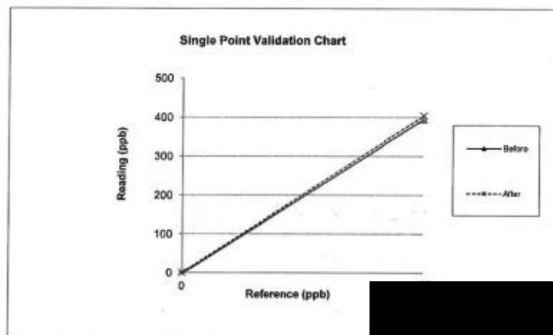
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.1 °C

Humidity 59 %RH

Validation Report

Status	Zero			Span		
	Reference (ppb)	Reading (ppb)	Drift (ppb)	Reference (ppb)	Reading (ppb)	Drift%
Before	0.0	-2.4	-2.4	400.0	395.2	-0.6
After	0.0	0.5	0.5	400.0	404.3	0.5



ประกาศใช้ 01/08/2568



Page:2/2

Calibration Report No.: API-6810002

Calibrated Date: 1-Oct-68

☒ PM ☐ Onsite

Test Function Value	Nominal range	Unit	Before	After	Note
Date	1-Oct-68				
Time	8:30				
Range	50 - 2000	PPB	500	500	
Stability (Zero Gas)	< 0.2	PPB	0.4	0.2	
Sample Flow	650 (+/- 50)	cc/min	666	662	
PMT Detector	0 - 5000	mV	24.3	28.2	
Norm PMT Detector	0 - 5000	mV	31.4	34.3	
RVPS	400-900 constant	V	725	725	
DCPS	2500 (+/- 200)	mV	-	-	
RCCELL TEMP	50 (+/- 1)	Degree C	50	50	
BOX TEMP	20-40	Degree C	32.6	35.1	
PMT TEMP	7 (+/- 1)	Degree C	8.3	8.3	
UV lamp	1000-4900	mV	3251	3251	
Lamp Ratio	30-120	%	87.4	87.4	
STR. Light (Zero Gas)	<100	PPB	38.5	38.5	
Dark PMT	(-50) - (+200)	mV	27.6	27.6	
Dark lamp	(-50) - (+200)	mV	3.6	3.6	
SAMP PRES	20-30 constant	IN-Hg-A	26.9	27.3	
Electric Test/Optic Test					
PMT Volta	2000 (+/- 500)	mV	2010	2008	
SO2 Conc	1000 (+/- 250)	PPB	1005	1003	
SO2 Slope	1 (+/- 0.3)	-	1.054	1.053	
SO2 Offset	< 250	mV	94.7	90.4	
Stability at Zero	< 0.2	PPB	0.1	0.1	
Stability at Span	< 2 ppb @ 400 ppb	PPB	0.4	0.2	
Gas Test Response					
Zero Gas (0.00 PPB)	0	ppb	-2.4	0.5	
Span Gas (400 PPB)	400	ppb	395.2	404.3	± 5% of Range

Calibrate By: [Redacted]

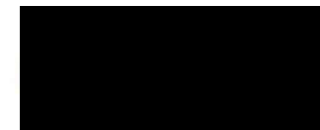
Date: [Redacted]

Approve By: [Redacted]

Date: 1-Oct-68

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ประกาศใช้ 01/08/2568



CO Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6810002

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: CO Analyzer Model: 300T	Manufacturer API S/N: 98
---	-----------------------------

Calibration System

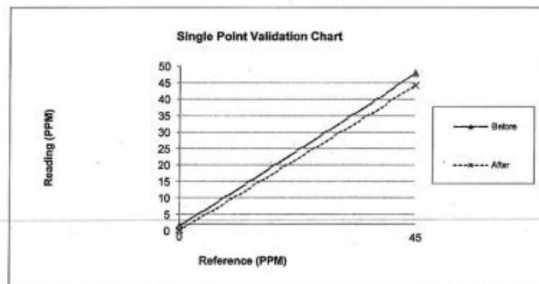
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.9 °C

Humidity: 60 %RH

Validation Report

Status	Zero			Span		
	Reference (PPM)	Reading (PPM)	Drift (PPM)	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	1.50	1.5	45.0	47.9	3.1
After	0.0	0.17	0.2	45.0	44.2	-0.9



ประกาศใช้ 01/08/2568

Page:2/2

Validation Report No.: API-6810002

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Detail	Range	Unit	Before	After	Note
Date	1-Oct-25				
Time	11:00				
Range	0.1-1000 PPM	PPM	50	50	
Stability	(0.1-2PPB)	ppb	0.73	1.11	
CO Measure	2500 - 4800 MV.	mV	2913.3	2923.5	
CO Reference	2500 - 4800 MV.	mV	2444.3	2421.4	
MR Ratio	1.2 +/- 0.5		1.18	1.21	
Sample Pressure	26 - 30 in-Hg-A	in-Hg-A	29.1	29	
Sample Flow	720 - 880 cc/min	cc/min	890	886	
Sample Temp	44 - 52 deg.C	deg.C	50.3	50.4	
Bench Temp	47 - 49 deg.C	deg.C	48	48	
Wheel Temp	66 - 70 deg.C	deg.C	68.3	68.4	
Box Temp	27 - 50 deg.C	deg.C	35.2	35.1	
PHI drive	250 - 4750 mv.	mV	3323.4	3353.6	
Slope	0.800 - 1.200		1.051	1.112	
Offset	0.05 +/- 0.2		0.088	0.088	
Gas Test Response					
Zero Gas	0	PPM	1.5	0.2	
Span Gas	45	PPM	47.9	44.2	± 5% of Range

Validation By : [Redacted]

Approve By : [Redacted]

Date: 1-Oct-25

Date: 1-Oct-25

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ประกาศใช้ 01/08/2568

CO Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6810003

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: CO Analyzer Model: 300T	Manufacturer API S/N: 99
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Calibration System

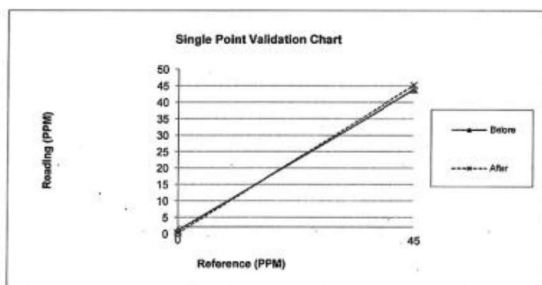
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.9 °C

Humidity: 60 %RH

Validation Report

Status	Zero			Span		
	Reference (PPM)	Reading (PPM)	Drift (PPM)	Reference (PPM)	Reading (PPM)	Drift%
Before	0.0	0.98	1.0	45.0	43.9	-1.2
After	0.0	0.22	0.2	45.0	45.2	0.2



ประกาศใช้ 01/08/2568

FN-SVM-05-10 Rev.03

Page:2/2

Validation Report No.: API-6810003

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Detail	Range	Unit	Before	After	Note
Date	1-Oct-25				
Time	11:00				
Range	0.1-1000 PPM	PPM	50	50	
Stability	(0.1-2PPB)	ppb	0.73	1.11	
CO Measure	2500 - 4800 MV.	mV	2913.3	2923.5	
CO Reference	2500 - 4800 MV.	mV	2444.3	2421.4	
MR Ratio	1.2 +/- 0.5		1.18	1.21	
Sample Pressure	26 - 30 in-Hg-A	in-Hg-A	29.1	29	
Sample Flow	720 - 880 cc/min	cc/min	890	886	
Sample Temp	44 - 52 deg.C	deg.C	50.3	50.4	
Bench Temp	47 - 49 deg.C	deg.C	48	48	
Wheel Temp	66 - 70 deg.C	deg.C	68.3	68.4	
Box Temp	27 - 50 deg.C	deg.C	35.2	35.1	
PHT drive	250 - 4750 mv.	mV	3323.4	3353.6	
Slope	0.800 - 1.200		1.051	1.112	
Offset	0.05 +/- 0.2		0.088	0.088	
Gas Test Response					
Zero Gas	0	PPM	1.0	0.2	
Span Gas	45	PPM	43.9	45.2	± 5% of Range

Validation By : [Redacted]

Approve By : [Redacted]

Date: 1-Oct-25

Date: 1-Oct-25

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ประกาศใช้ 01/08/2568



NOx Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6810003

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: T200	Manufacturer API S/N: 2469
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Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792	NOx Conc 45.30 PPM
ZERO AIR Generator ZAG7001 S/N: 644	NO Conc 45.30 PPM
	SO2 Conc 45.05 PPM
	CO Conc 4528 PPM
	Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 24.9 °C

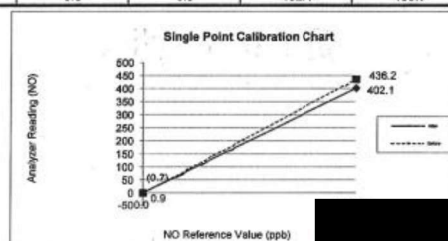
Humidity: 60 %RH

Validation Check (Before adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	-0.95	0.0	-1.0	436.1	400.0	4.3
NO ₂	-0.22	0.0	-0.2	0.1	0.0	0.0
NOx	-0.73	0.0	-0.7	436.2	400.0	4.3

Validation Check (After adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.42	0.0	0.4	400.0	400.0	0.0
NO ₂	0.49	0.0	0.5	2.1	0.0	0.3
NOx	0.91	0.0	0.9	402.1	400.0	0.3



ประกาศใช้ 01/08/2568



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Validation Report No.: API-6810003

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Analyzer Signal Values					
Date	1-Oct-25	Time	14:14		
Power Supplies					
Option	-13.52	mV	+5 V Sensor	4.99	V
+3.3 V	3.3	V	+24 V	23.96	V
+12 V	11.88	V	+5 V	4.99	V
+4 V	3974.3	mV	+24V	2.4	A
I O3	82.74	mA			
Optical Bench					
Dark PM sig.	0.0	mV	PM NO sig.	84.28	mV
PM Nox sig.	107.0	mV	PM Ny sig.	86.71	mV
Sample					
Chamber T	60	deg.C	Internal Temp.	33.33	deg.C
Chamber P	1720.8	hPa	PM T.	1.46	deg.C
Flow	47.21	NI/h	Sample Pr.	993.2	hPa

Validation By: [Redacted]

Date: 1-Oct-25

Approve By: [Redacted]

Date: 1-Oct-25

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NOx Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6810005

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: T200	Manufacturer: API S/N: 2470
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Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4526 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 24.9 °C

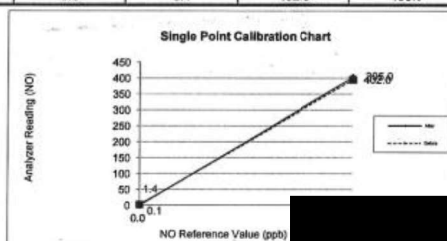
Humidity: 60 %RH

Validation Check (Before adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0	0.0	0.0	395.0	400.0	-0.6
NO ₂	1.4	0.0	1.4	0.0	0.0	0.0
NOx	1.4	0.0	1.4	395.0	400.0	-0.6

Validation Check (After adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.3	0.0	0.3	403.0	400.0	0.4
NO ₂	0.2	0.0	0.2	1.0	0.0	-0.1
NOx	0.1	0.0	0.1	402.0	400.0	0.2



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Page:2/2

Validation Report No.: API-6810005

Validation Date: 1-Oct-25

☒ PM ☐ Onsite

Analyzer Signal Values					
Date	1-Oct-25	Time	14:14		
Power Supplies					
Option	-13.52	mV	+5 V Sensor	4.99	V
+3.3 V	3.3	V	+24 V	23.96	V
+12 V	11.88	V	+5 V	4.99	V
+4 V	3974.3	mV	+ 24V	2.4	A
I O3	62.74	mA			
Optical Bench					
Dark PM sig.	0.0	mV	PM NO sig.	84.28	mV
PM Nox sig.	107.0	mV	PM Ny sig.	86.71	mV
Sample					
Chamber T	60	deg.C	Internal Temp.	33.33	deg.C
Chamber P	1720.6	hPa	PM T.	1.46	deg.C
Flow	47.21	Nl/h	Sample Pr.	993.2	hPa

Validation By :

Approve By :

Date:

Date:

1-Oct-25

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Neediss Supply Instrument Co.,Ltd.

ประกาศใช้ 01/08/2568

The Result of Calibration

Sensor model EWSNV110WS2506

Certification No. 332/25

8 July, 2025

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1011.60	1012.52	-0.92
1011.24	1012.05	-0.81
1010.86	1011.64	-0.78
1010.21	1011.03	-0.82
1009.82	1010.64	-0.82
1009.45	1010.25	-0.80
1009.06	1010.02	-0.96
1008.83	1009.61	-0.78
1008.43	1009.12	-0.69
1008.22	1009.14	-0.92
1007.75	1008.61	-0.86
1007.37	1008.15	-0.77
1007.17	1008.15	-0.98
1006.84	1007.79	-0.95
1010.63	1011.61	-0.98
1010.08	1010.86	-0.78
1009.77	1010.63	-0.86
1008.97	1009.88	-0.91
1008.24	1009.13	-0.89
1007.23	1008.06	-0.83

Average



The Result of Calibration

Sensor model EWSNV110WS2506

Certification No. 332/25

8 July, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.7	46.0	-0.3
30.4	30.5	-0.1
15.6	15.7	-0.1



The Result of Calibration

Sensor model EWSNV110WS2506 Certification No. 332/25
8 July, 2025 Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
87.5	83	4.5
63.2	61	2.2
45.1	44	1.1



Date of Issue 8 July, 2025

Certification No. 332/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้รับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING
BUCKET Product No. [REDACTED] ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)

ลงชื่อ

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 8 July, 2025

Certification No. 333/25

Page : 1 of 6

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : Novalynx

Type : Data Logger 110-WS-25DL-D

Serial No. : EWSNV110WS2507

Customer :

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1007.2 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Serial No. 02646057

The Result of Calibration

Sensor model EWSNV110WS2507

Certification No. 333/25

8 July, 2025

Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425		TESTED ANEMOMETER		
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.01	-	-	-	11.1	-0.09
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.2	-0.19
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.2	-0.18

Vane Angel Bench Stand Model 18112

Young Meteorological Instruments

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	

The Result of Calibration

Sensor model EWSNV110WS2507

Certification No. 333/25

8 July, 2025

Page : 3 of 6

Standard Barometer Pressure	Tested Barometer Pressure	Correction
1011.60	1011.28	0.32
1011.24	1010.86	0.38
1010.86	1010.52	0.34
1010.21	1009.85	0.36
1009.82	1009.45	0.37
1009.45	1009.12	0.33
1009.06	1008.71	0.35
1008.83	1008.48	0.35
1008.43	1008.03	0.40
1008.22	1007.86	0.36
1007.75	1007.42	0.33
1007.37	1006.96	0.39
1007.17	1006.73	0.44
1006.84	1006.51	0.33
1010.63	1010.32	0.31
1010.08	1009.62	0.46
1009.77	1009.43	0.34
1008.97	1008.56	0.41
1008.24	1007.97	0.27
1007.23	1006.86	0.37

Average

The Result of Calibration

Sensor model EWSNV110WS2507

Certification No. 333/25

8 July, 2025

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.7	45.9	-0.2
30.4	30.5	-0.1
15.6	15.8	-0.2

The Result of Calibration

Sensor model EWSNV110WS2507 Certification No. 333/25
8 July, 2025 Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
87.5	92	-4.5
63.2	67	-3.8
45.1	47	-1.9



Date of Issue 8 July, 2025

Certification No. 333/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้รับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING
BUCKET Product No. [REDACTED] ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm/TIP)



วิศวกรชำนาญการ

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 **MTC No.** EEL. BP. 65/0168

CALIBRATION CERTIFICATE

Submitted by : [REDACTED]
Address : [REDACTED]
Calibrated at : [REDACTED]

Instrument Calibrated :
 Description : Acoustic Calibrator
 Manufacturer : Pulsar
 Model : 103
 Serial No. : 98971

Ambient Environment
 Temperature : $(23 \pm 3) ^\circ\text{C}$
 Relative Humidity : $(50 \pm 15) \%$
 Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used :

- Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
- Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
- Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
- Digital Multimeter Agilent 34401A S/N MY44005560.
- Pressure Transmitter Vaisala PTB202AD S/N T0650001.
- Audio Analyzer Panasonic VP-7722A S/N 041477D122.
- Condenser Microphone B&K 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942:2003. The sound pressure level of instrument was 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 : 10 Jan. 2025
Date of Calibration : 17 Jan. 2025

1/3

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.

FM.BLMTC.002 Rev.5

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 **MTC No.** EEL. BP. 65/0168

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 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0 $^\circ$ 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 1
1/2 inch Bruel&Kjaer 4180	93.93	-0.07	± 0.10	$\pm 0.40 \text{ dB}$

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.4	0.4	± 1.5	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.40	± 0.50	$\pm 3.0\%$

Note :

- No adjustment.
- The calibrator pressure correction was not included.
- The microphone volume correction was not included.

Date of Calibration : 17 Jan. 2025

2/3

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.

FM.BLMTC.002 Rev.5

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 (66) 08 3219 9460
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 Bangkok 10900, Thailand
 Tel. (66) 0 2577 9036
 Fax. (66) 0 2577 9009

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 MTC No. EEL. BP. 65/0168

Nominal Output of Unit Under Test = 114 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 1
1/2 inch Bruel&Kjaer 4180	114.01	0.01	± 0.10	±0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.3	0.3	± 1.5	±3.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	2.05	± 0.50	±3.0%

Note : 1. No adjustment.
2. The calibrator pressure correction was not included.
3. The microphone volume correction was not included.

Calibrated by : [Redacted] Ap [Redacted]

Date of Calibration : 17 Jan. 2025
Date of Issue : 20 Jan. 2025 Ref : 2011268011000116001

End of Certificate 3 / 3

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.

FM.BL.MTC.002 Rev.5

เอกสารผลการสอบเทียบเครื่องมือตรวจวัด
สถานีรถไฟฟ้าชองนนทบุรี (อาคารโดมอันทาวเวอร์)
สถานีรถไฟฟ้าศาลาแดง (สถานีอาคารหอแว่น)
ครั้งที่ 2/2568
วันที่ตรวจวัด วันที่ 3-8 ธันวาคม 2568

TSP High Volume Sampler Calibration

Verification Report No.
SO2500304-E001 -TSP_01

☐ PM ☒ Onsite
 Site: สถานี BTS ศาลาแดง
 UTM: N 1518175 E 665848
 Sampler: ETS937
 Recorder: ECRAN00031072

Date: 3 Dec 25
 Technical:
 Approval:

CONDITIONS

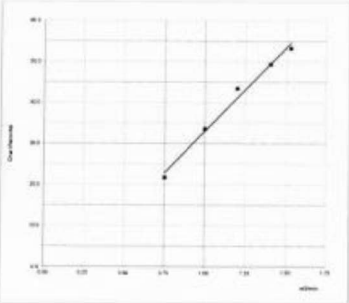
Barometric Press. (hPa): 1007.5	Corrected Pressure (mm Hg): 755.7
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc.	Orifice Slope: 2.06933
Model: TE-5025A	Orifice Intercept: -0.02815
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date: 03-Mar-26

Plate or Test #	H ₂ O (in)	Q _{std} (m ³ /min)	I (chart)	IC (corrected)
1	10.10	1.527	54.0	53.23
2	8.50	1.402	50.0	49.28
3	6.20	1.200	44.0	43.37
4	4.30	1.001	34.0	33.51
5	2.40	0.752	22.0	21.68

LINEAR REGRESSION
 Slope = 40.7713
 Intercept = -7.7493
 Corr. coeff = 0.9937
 # of Observations: 5
 Range of Chart at 1.1 - 1.7 m³/min: 38
 62



Calibrated by:
 3 December 2025
 Approved by:
 3 December 2025

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ประกอบวันที่ 01/08/2568

TSP High Volume Sampler Calibration

Verification Report No.
SO2500304-E001 -TSP_02

☐ PM ☒ Onsite
 Site: สถานี BTS ศาลาแดง
 UTM: N 1517744 E 665365
 Sampler: ETS932
 Recorder: ECRDS016339507

Date: 3 Dec 25
 Technical:
 Approval:

CONDITIONS

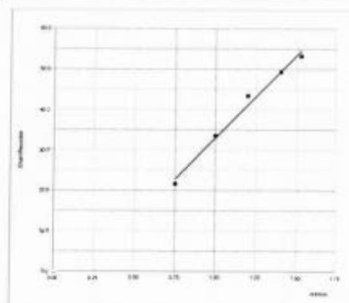
Barometric Press. (hPa): 1007.4	Corrected Pressure (mm Hg): 755.6
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc.	Orifice Slope: 2.06933
Model: TE-5025A	Orifice Intercept: -0.02815
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date: 03-Mar-26

Plate or Test #	H ₂ O (in)	Q _{std} (m ³ /min)	I (chart)	IC (corrected)
1	12.20	1.677	56.0	55.19
2	9.50	1.469	52.0	51.25
3	6.40	1.219	44.0	43.37
4	4.30	1.001	34.0	33.51
5	2.20	0.720	24.0	23.65

LINEAR REGRESSION
 Slope = 33.7515
 Intercept = 0.1752
 Corr. coeff = 0.9937
 # of Observations: 5
 Range of Chart at 1.1 - 1.7 m³/min: 38
 58



Calibrated by:
 3 December 2025
 Approved by:
 3 December 2025

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ประกอบวันที่ 01/08/2568

PM10 High Volume Sampler Calibration

Verification Report No.
SQ2500304-E001-PM 01

L PM ☐ Onsite
 Site: สถานี BTS สถานเอกอัครราชทูต
 UTM : N 1518175 E 665848
 Sampler: EPM10#40
 Recorder: ECRDS019075270
 Date: 3 Dec 25
 Technical:
 Approval:

CONDITIONS

Barometric Press. (hPa): 1007.5 Corrected Pressure (mm Hg): 755.7
 Temperature (deg C): 32.0 Temperature (deg K): 305.0
 Average Press. (hPa): 1013.0 Corrected Avg Press. (mm Hg): 759.8
 Average Temp. (deg C): 30.0 Average Temp. (deg K): 303.0

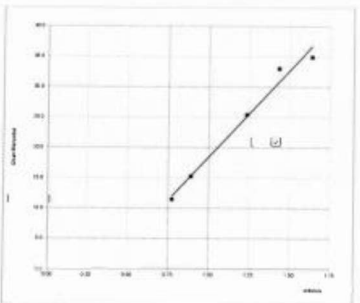
CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc Slope: 1.29578
 Model: TE-5025A Intercept: -0.01772
 Serial#: 2057 Date Certified: 4 Mar 25
 Due Date: 3 Mar 26

CALIBRATIONS

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)
1	11.00	1.640	55.0	34.94
2	8.40	1.435	52.0	33.04
3	6.20	1.234	40.0	25.41
4	3.20	0.891	24.0	15.25
5	2.40	0.773	18.0	11.44

LINEAR REGRESSION
 Slope = 28.5429
 Intercept = -10.0820
 Corr. coeff = 0.9905
 SFR = 1.000
 SSP = 29.06
 # of Observations: 5
 Range of Chart at SFR ±10%: 25
 33



Calibrated by:
 3 December 2025
 Approved by:
 3 December 2025

วันที่พิมพ์ 01/08/2568

PM10 High Volume Sampler Calibration

Verification Report No.
SQ2500304-E001-PM 02

L PM ☐ Onsite
 Site: สถานี BTS สถานเอกอัครราชทูต
 UTM : N 1517744 E 665365
 Sampler: EPM10#11
 Recorder: ECRANG10507165
 Date: 3 Dec 25
 Technical:
 Approval:

CONDITIONS

Barometric Press. (hPa): 1007.4 Corrected Pressure (mm Hg): 755.6
 Temperature (deg C): 32.0 Temperature (deg K): 305.0
 Average Press. (hPa): 1013.0 Corrected Avg Press. (mm Hg): 759.8
 Average Temp. (deg C): 30.0 Average Temp. (deg K): 303.0

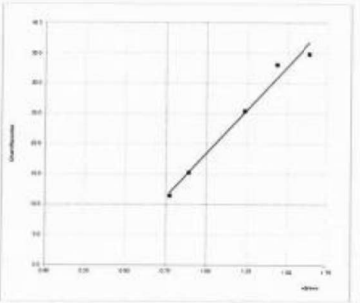
CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc Slope: 1.29578
 Model: TE-5025A Intercept: -0.01772
 Serial#: 2057 Date Certified: 4 Mar 25
 Due Date: 3 Mar 26

CALIBRATIONS

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)
1	12.80	1.768	56.0	35.58
2	10.40	1.595	54.0	34.31
3	7.30	1.338	43.0	27.32
4	4.40	1.042	32.0	20.33
5	2.70	0.819	20.0	12.71

LINEAR REGRESSION
 Slope = 24.5513
 Intercept = -6.1756
 Corr. coeff = 0.9902
 SFR = 1.000
 SSP = 28.92
 # of Observations: 5
 Range of Chart at SFR ±10%: 26
 32



Calibrated by:
 3 December 2025
 Approved by:
 3 December 2025

วันที่พิมพ์ 01/08/2568

Rev: 00

Verification Test Report

Report No.: SO2500304-E001 / 001

Verification Date : 03 December 2025

Operate Information ☐ PM ☒ Onsite

Site : สถานี BTS ศาลาแดง

GPS coordinates : 47P N 1518175 E 665848

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1977

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EELBP.65/D168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Reference Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.87	94.03	0.16	±1.0

* UUR = Unit Under Reference flow

Acceptant Criteria : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

Approve By:

Date : 03 December 2025

Date : 03 December 2025

The Results shown in this verification report refer only to the equipment used in this test.

This Calibration Certificate cannot be reproduced, except in full.

ประกาศใช้ 01/08/2568

Verification Test Report

Report No.: SO2500304-E001 / 001

Verification Date : 03 December 2025

Operate Information ☐ PM ☒ Onsite

Site : สถานี BTS ช่องนนทรี

GPS coordinates : 47P N 1517744 E 665365

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 2205

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EELBP.65/D168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Reference Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	0	93.93	93.27	93.09	-0.18	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

Approve By:

Date : 03 December 2025

Date : 03 December 2025

The Results shown in this verification report refer only to the equipment used in this test.

This Calibration Certificate cannot be reproduced, except in full.

ประกาศใช้ 01/08/2568

Certificate of Calibration

Calibration Certification Information						
Cal. Date: March 4, 2025	Roots meter S/N: 438320	Ta: 294	°K			
Operator: Jim Tisch		Pa: 746.0	mm Hg			
Calibration Model #: TE-5025A	Calibrator S/N: 2067					

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	3	2	1	1.4220	3.2	2.00
2	3	4	1	1.0090	6.4	4.00
3	5	6	1	0.9030	8.0	5.00
4	7	8	1	0.8610	8.8	5.50
5	9	10	1	0.7090	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9907	0.6967	1.4106	0.9957	0.7002	0.8878
0.9864	0.9776	1.9949	0.9914	0.9826	1.2556
0.9843	1.0900	2.2304	0.9893	1.0955	1.4038
0.9832	1.1419	2.3393	0.9882	1.1477	1.4723
0.9779	1.3792	2.8212	0.9828	1.3862	1.7756
QSTD		m= 2.06933	QA		m= 1.29578
		b= -0.02815			b= -0.01772
		r= 0.99997			r= 0.99997

Calculations	
Vstd= ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va= ΔVol((Pa-ΔP)/Pa)
Qstd= Vstd/ΔTime	Qa= Va/ΔTime

For subsequent flow rate calculations:

$Qstd = 1/m \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$	$Qa = 1/m \left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} - b \right)$
---	--

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key

ΔH: calibrator manometer reading (in H2O)
 ΔP: rootsmeter manometer reading (mm Hg)
 Ta: actual absolute temperature (°K)
 Pa: actual barometric pressure (mm Hg)
 b: intercept
 m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
 145 South Miami Avenue
 Village of Cleves, OH 45002

www.tisch-env.com
 TOLL FREE: (877)263-71
 FAX: (513)467-9

Certificate of Calibration

Certificate No. : 68-200034-1 Page : 1 of 2

Submitted by : [REDACTED]

Equipment : Electronic Balance

Manufacturer : Sartorius Model : SECURA224-1S

Serial No. : 0034803270 ID No. : ELABBALANCEN04

Capacity : 220 g Resolution : 0.0001 g

Environment : On site calibration was carried out at the Balance Room, Envilab Co., Ltd.

Ambient Temperature : (20.4 to 21.0) °C

Relative Humidity : (41.9 to 42.9) %

Air Pressure : 1014.0 mbar

Date of Received : 28 January 2025

Date of Calibration : 28 January 2025

Date of Issue : 30 January 2025

Calibrated by : [REDACTED]

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref: LAB 14

Edition 7 - November 2022

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

Standard Weights	ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02242009	07 Nov 2025	National Institute of Metrology (Thailand), (NIMT)	

The Uncertainties are for a confidence probability of approximately 95%

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CAL-P0031-03

Certificate of Calibration

Certificate No. : 68-200034-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty ± (g)
0.01	0.0000	0.00012
0.1	0.0001	0.00012
1	0.0000	0.00013
2	0.0001	0.00013
5	0.0000	0.00013
10	0.0000	0.00013
20	-0.0001	0.00014
50	-0.0001	0.00015
100	-0.0001	0.00020
200	-0.0001	0.00038

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.05$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E

0.0004 0.0004 0.0005 0.0004 0.0000 g

C

B E D

A

Repeatability

Load test : 200 g

Sidev. : 0.00005 g

- o0o -

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE
(THAILAND) LTD'
Part Number: E04N199E15A00V3
Cylinder Number: EB0170003
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12024
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-403162930-1
Cylinder Volume: 144.0 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 860
Certification Date: Oct 23, 2024
Expiration Date: Oct 23, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600R-12/01, using the assay procedures listed. Analytical methodology does not require correction for analyst interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 6.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.30 PPM	G1	±1.10% NIST Traceable	10/18/2024, 10/23/2024
NITRIC OXIDE	45.00 PPM	45.30 PPM	G1	±1.09% NIST Traceable	10/18/2024, 10/23/2024
SULFUR DIOXIDE	45.00 PPM	45.05 PPM	G1	±1.07% NIST Traceable	10/18/2024, 10/23/2024
CARBON MONOXIDE	4500 PPM	4525 PPM	G1	±1.08% NIST Traceable	10/15/2024
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	DC11201202235	CC700377	49.05 PPM NITRIC OXIDE/NITROGEN	±1.0%	May 01, 2026
PRM	12404	APEX 1324257	50.04 PPM NITRIC OXIDE/NITROGEN	±1.04%	Dec 22, 2023
GMIS	1242068899128	CC3232077	4.239 PPM NITROGEN DIOXIDE/NITROGEN	±1.25%	Jan 04, 2027
PRM	C2392001.1	D163445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	±1.25%	Nov 22, 2024
GMIS	0712202310	CC494279	49.82 PPM SULFUR DIOXIDE/NITROGEN	±1.0%	Jun 16, 2027
SRM	1893a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	±1.0%	Jun 27, 2027
CARBON MONOXIDE	080123	KAL004712	4857 PPM CARBON MONOXIDE/NITROGEN	±1.0%	Feb 20, 2030

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1M9050	NDIR	Oct 09, 2024
Nicolet 650 FTIR AUP2010245 NO	FTIR	Oct 17, 2024
Nicolet 650 FTIR AUP2010245 NO2	FTIR	Oct 03, 2024
Nicolet 650 FTIR AUP2010245 SO2	FTIR	Sep 26, 2024

Verification/Calibration Test Report

Report No.: API-6812006

Verification Date : 01 December 2025

Page : 1/2

Operate information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47P N 1514454 E 654233

Instrument Information

Equipment : CO Analyzer

Manufacturer : ESA

Model : CO12e

Serial No : 1204

Reference Standard

Standard Gas		Calibrator Unit	
Cylinder No :	EB0170003	ZERO AIR Generator	Model : ZAG7001
Certificate No :	2015 FO,G		S/N : 644
Date Due :	OCT 23,2027	Dilutor	Model : ESA MGC101
Traceability :	Air Liquide		S/N : 792

Ambient Condition : Temperature 25.00 °C Relative humidity 56.30 %

Atmospheric pressure 1011.0 hpa

Measurement Data

Calibration Gas Level	Zero Conc. (Indicate Unit)	Level 1 Conc. (Indicate Unit)	Level 2 Conc. (Indicate Unit)	Level 3 Conc. (Indicate Unit)	Level 4 Conc. (Indicate Unit)
	<input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	<input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	<input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	<input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	<input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm
Calibrator Value (X)	0.00	15.00	25.00	35.00	45.00
Instrument Value (Y)	0.15	15.11	25.14	35.12	45.55
	0.14	14.97	25.14	35.09	45.55
	0.13	14.97	25.14	34.99	45.55
	0.13	14.97	25.10	35.12	44.99
	0.15	14.99	25.14	35.12	44.99
Ins.Value Average	0.14	15.00	25.13	35.09	45.33
Best Fit Concentration (Y=mx+b)		15.10	25.14	35.18	45.22
Point Difference(Best Fit - Average)		0.10	0.01	0.09	-0.11
Percent difference (Best fit vs Ins.(Y) Value		-0.67%	-0.04%	-0.26%	0.24%
Result Status (Pass/Fail)		Pass	Pass	Pass	Pass

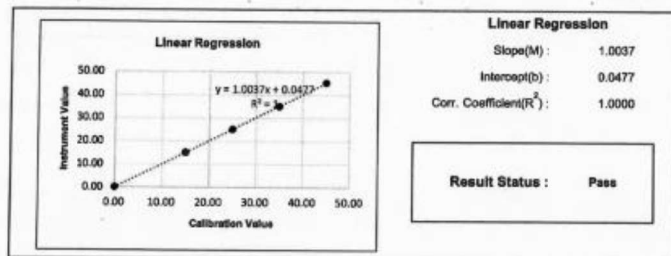
Note :

1. Calibrator Value(X) is concentration points were evenly spaced across that range, with the highest test concentration generated approximately 80% full scale.
2. Instrument Value(Y) is Concentration values from instrument. The worksheet also

เอกสารนี้ 01/08/2568



Page : 2/2



Acceptance Criteria

For the gaseous pollutants, the calibration (including the multi-point verification) is considered acceptable if all test concentrations fall within 2%, or an absolute difference of 1.5 ppb for O₃, SO₂ and NO₂ and 0.03 ppm for CO, of the calibration scale, best-fit straight line Which acceptance criteria (percent or absolute difference) is used depends on the concentration of the calibration points. It is also recommended that the slope is within 1±.05. See QA Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring Program

Calibrated By

Date : 01 December 2025

Date : 01 December 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated
This Calibration Certificate cannot be reproduced, except in full, without permission of company.

**** End Verification/Calibration Test Report ****

ประกาศใช้ 01/08/2568

Verification/Calibration Test Report

Report No.: API-6812007

Verification Date : 01 December 2025

Page : 1/2

Operate Information ☒ PM ☐ Onsite

Site : Envlab Co.,Ltd.

GPS coordinates : 47P N 1514454 E 654233

Instrument Information

Equipment : CO Analyzer

Manufacturer : ESA

Model : CO12e

Serial No : 1205

Reference Standard

Standard Gas	Calibrator Unit
Cylinder No : EB0170003	Model : ZAG7001
Certificate No : 2015 FO.G	S/N : 644
Date Due : OCT 23,2027	Model : ESA MGC101
Traceability : Air Liquide	S/N : 792

Ambient Condition : Temperature 25.00 °C Relative humidity 56.36 %

Atmospheric pressure 1011.0 hpa

Measurement Data

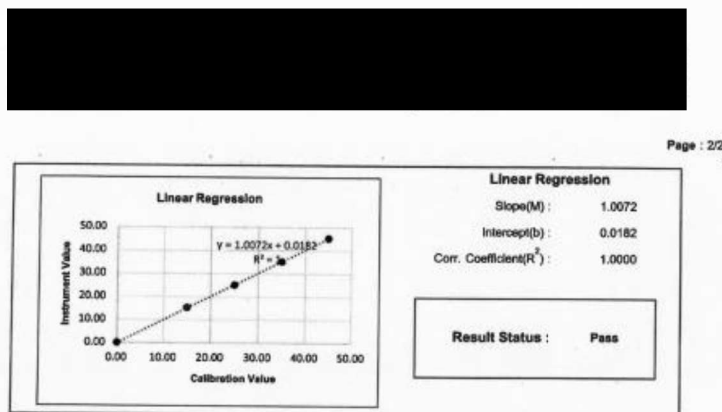
Calibration Gas Level	Zero Conc. (Indicate Unit) <input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	Level 1 Conc. (Indicate Unit) <input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	Level 2 Conc. (Indicate Unit) <input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	Level 3 Conc. (Indicate Unit) <input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm	Level 4 Conc. (Indicate Unit) <input type="checkbox"/> ppb <input checked="" type="checkbox"/> ppm
Calibrator Value (X)	0.00	15.00	25.00	35.00	45.00
Instrument Value (Y)	0.15	15.11	25.14	35.42	45.55
	0.14	14.97	25.14	35.42	45.55
	0.13	14.97	25.14	34.94	45.54
	0.13	14.97	25.10	35.12	45.55
	0.11	14.98	25.14	35.42	44.94
Ins.Value Average	0.13	15.00	25.13	35.26	45.43
Best Fit Concentration (Y=Mx+b)		15.13	25.20	35.27	45.34
Point Difference(Best Fit - Average)		0.12	0.07	0.01	-0.08
Percent difference (Best fit vs Ins.(Y) Value		-0.82%	-0.26%	-0.02%	0.18%
Result Status (Pass/Fail)		Pass	Pass	Pass	Pass

Note :

1.Calibrator Value(X) is concentration points were evenly spaced across that range, with the highest test concentration generated approximately 80% full scale.

2.Instrument Value(Y) is Concentration values from instrument.The works

ประกาศใช้ 01/08/2568



Acceptance Criteria

For the gaseous pollutants, the calibration (including the multi-point verification) is considered acceptable if all test concentrations fall within 2%, or an absolute difference of 1.5 ppb for O₃, SO₂ and NO₂ and 0.03 ppm for CO, of the calibration scale, best-fit straight line. Which acceptance criteria (percent or absolute difference) is used depends on the concentration of the calibration points. It is also recommended that the slope is within ± 0.05 . See QA Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring Program



Calibrated By: [Signature]
Date: [Blank]
neediss Supply Instrument Co., Ltd.
Approve By: [Signature]
Date: 01 December 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated
This Calibration Certificate cannot be reproduced, except in full, without permission of company.

**** End Verification/Calibration Test Report ****

ประกาศใช้ 01/08/2568

Verification/Calibration Test Report

Report No.: ESA-6612004

Verification Date : 01 December 2025

Page : 1/2

Operate Information ☒ PM ☐ Onsite

Site : [Blank]

GPS coordinates : 47P N 1514454 E 654233

Instrument Information

Equipment : NO₂ Analyzer

Manufacturer : ESA

Model : AC32e

Serial No : 2401

Reference Standard

Standard Gas		Calibrator Unit	
Cylinder No :	EB0170003	ZERO AIR Generator	Model : ZAG7001
Certificate No :	2015 FO,G		S/N : 644
Date Due :	OCT 23,2027	Dilutor	Model : ESA MGC101
Traceability :	Air Liquide		S/N : 792

Ambient Condition : Temperature 25.00 °C Relative humidity 56.30 %

Atmospheric pressure 1011.0 hpa

Measurement Data

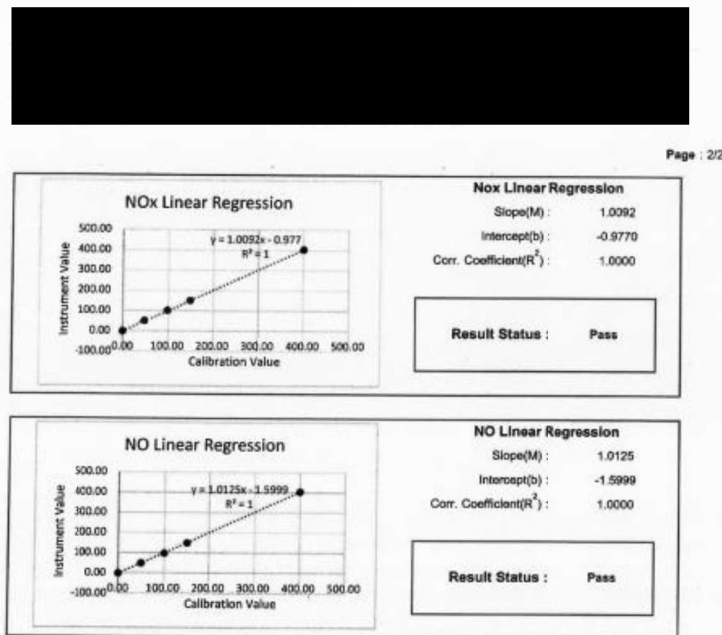
Calibration Gas Level	Zero Conc. (Indicate Unit)		Level 1 Conc. (Indicate Unit)		Level 2 Conc. (Indicate Unit)		Level 3 Conc. (Indicate Unit)		Level 4 Conc. (Indicate Unit)	
	<input type="checkbox"/> ppb <input type="checkbox"/> ppm	<input type="checkbox"/> ppb <input type="checkbox"/> ppm	<input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	<input type="checkbox"/> ppb <input type="checkbox"/> ppm	<input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	<input type="checkbox"/> ppb <input type="checkbox"/> ppm	<input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	<input type="checkbox"/> ppb <input type="checkbox"/> ppm	<input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	<input type="checkbox"/> ppb <input type="checkbox"/> ppm
Calibrator Value (X)	Nox	NO	Nox	NO	Nox	NO	Nox	NO	Nox	NO
	0.00	0.00	50.00	50.00	100.00	100.00	150.00	150.00	400.00	400.00
Instrument Value (Y)	0.11	-0.15	49.64	49.30	100.19	98.29	148.89	148.16	402.73	402.40
	0.12	-1.13	49.72	49.03	100.47	99.37	148.25	150.56	405.20	405.20
	0.13	-1.13	49.51	48.26	98.82	98.66	147.43	149.42	403.1	403.1
	0.13	-1.13	49.11	48.57	100.39	98.08	147.61	152.44	402.50	402.40
	0.14	-0.47	50.45	50.32	98.42	99.19	151.27	147.07	403.10	405.20
Ins.Value Average	0.13	-0.80	49.69	49.30	99.66	98.72	148.69	149.73	403.38	403.80
Best Fit Concentration (Y=Mx+b)	49.48	49.02	99.94	99.85	150.40	150.27	402.70	403.40		
Point Difference(Best Fit - Average)	-0.20	-0.28	0.28	0.53	1.71	0.54	-0.69	-0.40		
Percent difference (Best fit vs Ins.(Y) Value	0.41%	0.56%	-0.28%	-0.93%	-1.14%	-0.36%	0.17%	0.10%		
Result Status (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass		

Note :

1. Calibrator Value(X) is concentration points were evenly spaced across that range generated approximately 80% full scale.

2. Instrument Value(Y) is Concentration values from instrument. The worksheet also

ประกาศใช้ 01/08/2568



Acceptance Criteria

For the gaseous pollutants, the calibration (including the multi-point verification) is considered acceptable if all test concentrations fall within 2%, or an absolute difference of 1.5 ppb for O_3 , SO_2 and NO_2 and 0.03 ppm for CO , of the calibration scale, best-fit straight line. Which acceptance criteria (percent or absolute difference) is used depends on the concentration of the calibration points. It is also recommended that the slope is within 1 ± 0.5 . See QA Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring Program

Calibrated By: **neediss** Supply Instrument Co., Ltd.

Date : 01 December 2025

Approve By: **neediss** Supply Instrument Co., Ltd.

Date : 01 December 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated

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** End Verification/Calibration Test Report

ประกาศใช้ 01/08/2568



Verification/Calibration Test Report

Report No.: ESA-8812006

Verification Date : 06 December 2025

Page : 1/2

Operate Information ☒ PM ☐ Onsite

Site:

GPS coordinates : 47P N 1514454 E 654233

Instrument Information

Equipment : NO2 Analyzer

Manufacturer : ESA

Model : AC32e

Serial No : 2403

Reference Standard

Standard Gas		Calibrator Unit	
Cylinder No :	EB0170003	ZERO AIR Generator	Model : ZAG7001
Certificate No :	2015 FO,G		S/N : 644
Date Due :	OCT 23,2027	Dilutor	Model : ESA MGC101
Traceability :	Air Liquide		S/N : 782

Ambient Condition : Temperature 25.00 °C

Relative humidity 56.30 %

Atmospheric pressure 1011.0 hpa

Measurement Data

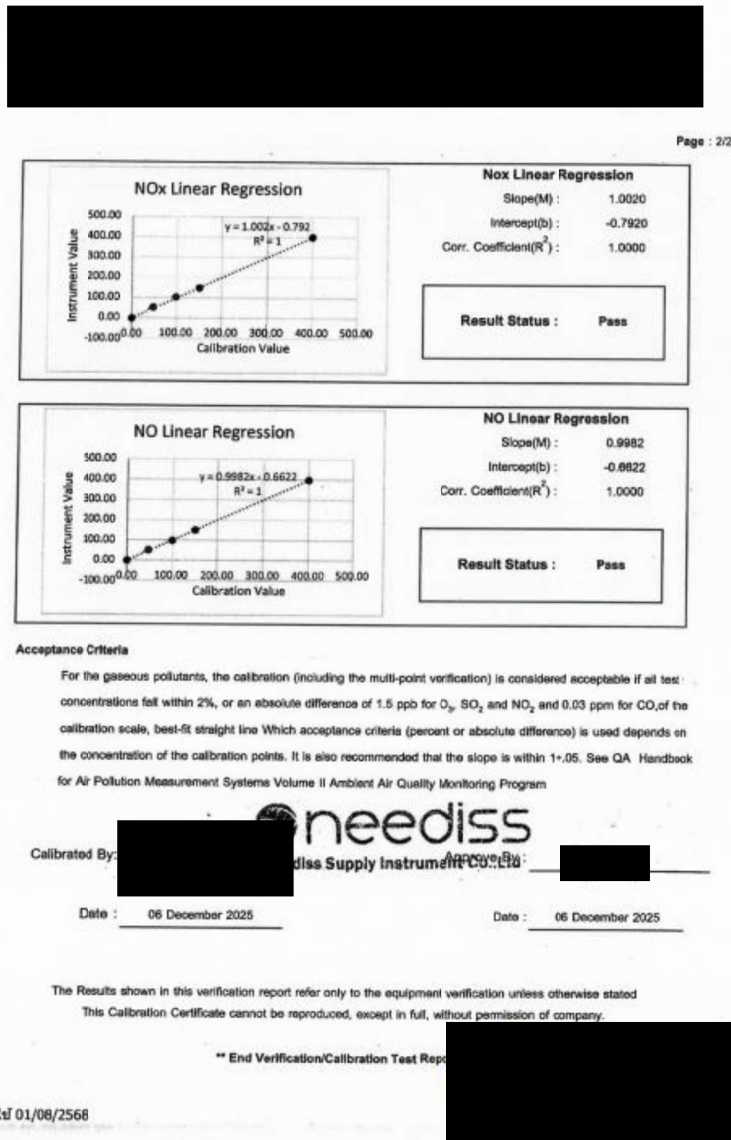
Calibration Gas Level	Zero Conc. (Indicate Unit)		Level 1 Conc. (Indicate Unit)		Level 2 Conc. (Indicate Unit)		Level 3 Conc. (Indicate Unit)		Level 4 Conc. (Indicate Unit)	
	ppb	ppm	ppb	ppm	ppb	ppm	ppb	ppm	ppb	ppm
Calibrator Value (X)	0.00	0.00	50.00	50.00	100.00	100.00	150.00	150.00	400.00	400.00
Instrument Value (Y)	-0.15	-0.15	49.64	49.30	100.19	99.29	149.89	149.16	402.73	397.31
	-1.13	-1.13	49.72	49.03	100.47	99.37	149.25	150.56	399.76	397.31
	-1.13	-1.13	49.51	48.28	99.82	98.66	147.43	149.42	398.27	398.05
	-1.15	-1.13	48.11	48.57	100.39	98.08	147.61	152.44	399.78	399.79
	-0.47	-0.47	50.46	50.32	98.42	99.19	151.27	147.07	400.45	399.79
Ins.Value Average	-0.80	-0.80	49.89	49.30	99.66	98.72	148.69	149.73	400.20	398.45
Best Fit Concentration (Y=Mx+b)			49.31	49.25	99.41	99.15	149.51	149.06	400.00	398.60
Point Difference(Best Fit - Average)	-0.38	-0.05	-0.25	0.44	0.82	-0.67	-0.20	0.15		
Percent difference (Best fit vs Ins.(Y) Value	0.77%	0.11%	0.25%	-0.44%	-0.55%	0.45%	0.05%	-0.04%		
Result Status (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Note :

1. Calibrator Value(X) is concentration points were evenly spaced across that range generated approximately 80% full scale.

2. Instrument Value(Y) is Concentration values from instrument. The worksheet also

ประกาศใช้ 01/08/2568



Verification/Calibration Test Report

Report No.: API-6812002
 Verification Date : 01 December 2025
 Page : 1/2

Operate Information ☒ PM ☐ Onsite

Site:

GPS coordinates : 47P N 1514454 E 654233

Instrument Information
 Equipment : SO2 Analyzer Manufacturer : API
 Model : T100 Series No : 2033

Reference Standard

Standard Gas		Calibrator Unit	
Cylinder No :	EB0170003	ZERO AIR Generator	Model : ZAG7001
Certificate No :	2015 FO.G		S/N : 644
Date Due :	OCT 23,2027	Dilutor	Model : ESA MGC101
Traceability :	Air Liquide		S/N : 792

Ambient Condition : Temperature 25.00 °C Relative humidity 56.30 %
 Atmospheric pressure 1011.0 hpa

Measurement Data

Calibration Gas Level	Zero Conc.	Level 1 Conc.	Level 2 Conc.	Level 3 Conc.	Level 4 Conc.
	(Indicate Unit) <input type="checkbox"/> ppb <input type="checkbox"/> ppm	(Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	(Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	(Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	(Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm
Calibrator Value (X)	0.00	50.00	100.00	150.00	400.00
Instrument Value (Y)	1.10	49.15	97.13	147.87	398.40
	1.30	47.98	95.19	146.32	399.50
	1.20	49.98	99.19	149.32	397.10
	1.20	47.98	95.19	146.32	398.40
	1.20	48.92	99.12	149.11	398.40
Ins.Value Average	1.20	48.80	98.36	148.55	398.36
Best Fit Concentration (Y=Mx+b)		49.46	99.23	149.01	397.89
Point Difference(Best Fit - Average)		0.66	0.87	0.46	-0.47
Percent difference (Best fit vs Ins.(Y) Value		-1.33%	-0.88%	-0.31%	0.12%
Result Status (Pass/Fail)		Pass	Pass	Pass	Pass

Note :

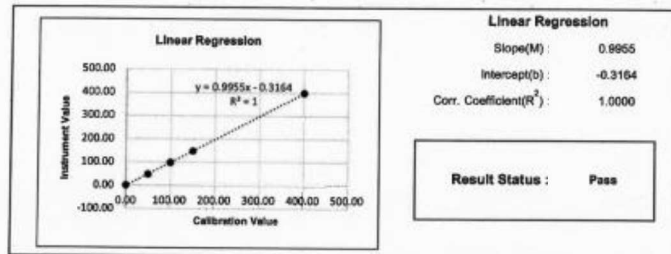
1. Calibrator Value(X) is concentration points were evenly spaced across that range, generated approximately 80% full scale.

2. Instrument Value(Y) is Concentration values from instrument. The worksheet allow

ประกาศใช้ 01/08/2568



Page : 2/2



Acceptance Criteria

For the gaseous pollutants, the calibration (including the multi-point verification) is considered acceptable if all test concentrations fall within 2%, or an absolute difference of 1.5 ppb for O₃, SO₂ and NO₂ and 0.03 ppm for CO, of the calibration scale, best-fit straight line. Which acceptance criteria (percent or absolute difference) is used depends on the concentration of the calibration points. It is also recommended that the slope is within ± 0.05 . See QA Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring Program

Calibrated By:  **neediss** Supply Instrument Co., Ltd.
 Approve By: 
 Date: 01 December 2025 Date: 01 December 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated
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** End Verification/Calibration Test Report **

ประกาศใช้ 01/08/2568



Verification/Calibration Test Report

Report No.: API-6811005

Verification Date: 01 November 2025

Page : 1/2

Operate Information ☒ PM ☐ Onsite

Site : Envlab Co., Ltd.

GPS coordinates : 47P N 1514454 E 654233

Instrument Information

Equipment : SO₂ Analyzer

Manufacturer : ESA

Model : AF220

Serial No : 2485

Reference Standard

Standard Gas		Calibrator Unit	
Cylinder No :	EB0170003	ZERO AIR Generator	Model : ZAG7001
Certificate No :	2015 FO.G		S/N : 644
Date Due :	OCT 23,2027	Dilutor	Model : ESA MGC101
Traceability :	Air Liquide		S/N : 792

Ambient Condition : Temperature 25.00 °C Relative humidity 56.30 %

Atmospheric pressure 1011.0 hpa

Measurement Data

Calibration Gas Level	Zero Conc. (Indicate Unit) <input type="checkbox"/> ppb <input type="checkbox"/> ppm	Level 1 Conc. (Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	Level 2 Conc. (Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	Level 3 Conc. (Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm	Level 4 Conc. (Indicate Unit) <input checked="" type="checkbox"/> ppb <input type="checkbox"/> ppm
Calibrator Value (X)	0.00	50.00	100.00	150.00	400.00
Instrument Value (Y)	-0.15	49.15	97.13	147.67	398.40
	-1.13	47.96	96.19	146.32	399.50
	-1.13	49.98	99.19	149.32	397.10
	-1.13	47.98	96.19	146.32	397.10
Ins. Value Average	-0.80	48.80	98.36	148.55	397.84
Best Fit Concentration (Y=Mx+b)		48.82	98.67	148.52	397.77
Point Difference (Best Fit - Average)		0.02	0.31	-0.03	-0.07
Percent difference (Best fit vs Ins.(Y) Value)		-0.04%	-0.31%	0.02%	0.02%
Result Status (Pass/Fail)		Pass	Pass	Pass	Pass

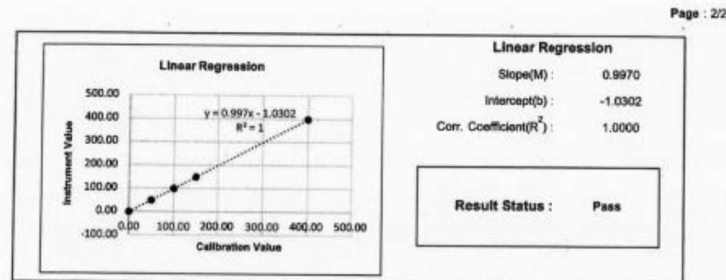
Note :

1. Calibrator Value(X) is concentration points were evenly spaced across that range, with the highest test concentration generated approximately 80% full scale.

2. Instrument Value(Y) is Concentration values from instrument. The worksheet is

ประกาศใช้ 01/08/2568





Acceptance Criteria

For the gaseous pollutants, the calibration (including the multi-point verification) is considered acceptable if all test concentrations fall within 2%, or an absolute difference of 1.5 ppb for O₃, SO₂ and NO₂ and 0.03 ppm for CO, of the calibration scale, best-fit straight line. Which acceptance criteria (percent or absolute difference) is used depends on the concentration of the calibration points. It is also recommended that the slope is within 1±.05. See QA Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring Program

Calibrated By: **neediss**
Date : 01 November 2025

Date : 01 November 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated
This Calibration Certificate cannot be reproduced, except in full, without permission of company.

** End Verification/Calibration Test Report **

ประกาศใช้ 01/08/2568

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 MTC No. EEL. BP. 65/0168

CALIBRATION CERTIFICATE

Submitted by : Envilab Co., Ltd.
Address : 540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkok, Bangkok 10160 Thailand.
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 : Acoustic Calibrator
Manufacturer : Pulsar
Model : 103
Serial No. : 98971

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

Standards used :

1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&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 Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone B&K 4180 S/N 2889871.

Calibration Procedure : CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was 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 : 10 Jan. 2025
Date of Calibration : 17 Jan. 2025

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.

1 / 3



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 **MTC No.** EEL BP. 65/0168

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 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, 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 1
1/2 inch Bruel&Kjaer 4180	93.93	-0.07	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.4	0.4	± 1.5	$\pm 1.0\%$

3. Total distortion


Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.40	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.
2. The calibrator pressure correction was not included.
3. The microphone volume correction was not included.

Date of Calibration : 17 Jan. 2025

2 / 3

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.



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152 **MTC No.** EEL BP. 65/0168

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, 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 1
1/2 inch Bruel&Kjaer 4180	114.01	0.01	± 0.10	± 0.40 dB



2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.3	0.3	± 1.5	$\pm 3.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	2.05	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.
2. The calibrator pressure correction was not included.
3. The microphone volume correction was not included.

Calibrated by :  **As** 

Date of Calibration : 17 Jan. 2025
Date of Issue : 20 Jan. 2025

End of Certificate 3 / 3

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.

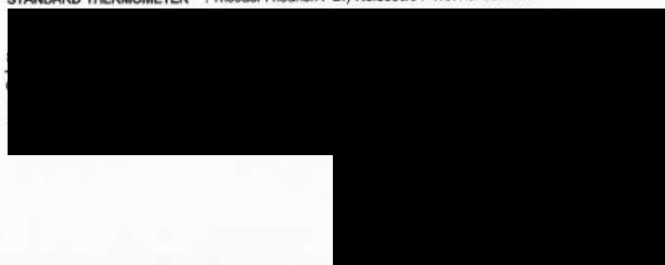


Issued by : Calibration & Test Section : Meteorological Instruments Bureau
Date of Issue 23 June, 2025 Certification No. 300/25
Page : 1 of 6

Object : เครื่องมือตรวจวัดอุณหภูมิตามอากาศ
Manufacturer : NovaLynx
Type : Data Logger 110-WS-25DL-D
Serial No. : EWSNV110WS2501
Customer : [Redacted]

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1006.1 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec
STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94



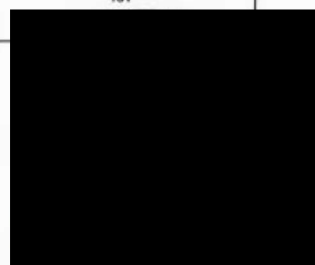
The Result of Calibration

Sensor model EWSNV110WS2501 Certification No. 300/25
23 June, 2025 Page : 2 of 6

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H ₂ O	inches H ₂ O	m/sec	m/sec	m/sec
1.00	-	-	-	0.3	0.70
3.02	-	-	-	2.4	0.62
5.00	-	-	-	4.8	0.20
7.04	-	-	-	6.9	0.14
9.02	-	-	-	8.8	0.22
11.01	-	-	-	10.8	0.21
13.01	-	-	-	12.8	0.21
15.01	-	-	-	15.0	0.01
17.02	-	-	-	16.8	0.22
20.02	-	-	-	20.0	0.02

Vane Angel Bench Stand Model 18112	
Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	92
180	181
270	

Calibration



The Result of Calibration

Sensor model EWSNV110WS2501

Certification No. 300/25

23 June, 2025

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
1006.54	1006.70	-0.16
1006.75	1006.83	-0.08
1006.96	1007.12	-0.14
1007.24	1007.35	-0.11
1007.64	1007.72	-0.08
1007.82	1007.91	-0.09
1008.01	1008.11	-0.10
1008.28	1008.30	-0.02
1008.68	1008.74	-0.06
1008.93	1009.00	-0.07
1005.42	1005.51	-0.09
1005.64	1005.94	-0.10
1006.32	1006.41	-0.09
1006.87	1006.91	-0.04
1007.65	1007.73	-0.08
1007.94	1008.02	-0.08
1008.51	1008.64	-0.13
1008.92	1009.05	-0.13
1009.22	1009.32	-0.10
1009.85	1009.91	-0.06

Average

The Result of Calibration

Sensor model EWSNV110WS2501

Certification No. 300/25

23 June, 2025

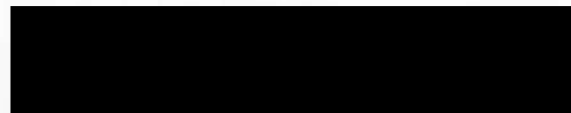
Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.6	-0.4
30.4	30.6	-0.2
15.6	15.7	-0.1

The Result of Calibration		
Sensor model EWSNV110WS2501 Certification No. 300/25		
23 June, 2025 Page : 5 of 6		
Standard Humidity % R.H.	Relative Humidity Sensor Reading Reading % R.H.	Correction % R.H.
86.4	93.3	-6.9
65.3	69.4	-4.1
42.2	44.6	-2.4

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING BUCKET Product No. [REDACTED] ทำการสอบเทียบกับแก้ววัดฝน แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)



Issued by : Calibration & Test Section : Meteorological Instruments Bureau
Date of Issue 23 June, 2025 Certification No. 301/25
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Object : เครื่องมือวัดความเร็วลม

Manufacturer : NovaLynx

Type : Data Logger 110-WS-25DL-D

Serial No. : EWSNV110WS2503

Customer :

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1006.6 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94
: Thermoschneider No.9188 : testo, testo 645 Serial No. 02948057



The Result of Calibration

Sensor model EWSNV110WS2503 Certification No. 301/25
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Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H ₂ O	inches H ₂ O	m/sec	m/sec	m/sec
1.00	-	-	-	0.3	0.70
3.02	-	-	-	2.4	0.62
5.00	-	-	-	4.3	0.70
7.04	-	-	-	6.8	0.24
9.02	-	-	-	8.8	0.22
11.01	-	-	-	11.1	-0.09
13.01	-	-	-	12.8	0.21
15.01	-	-	-	15.1	-0.09
17.02	-	-	-	16.8	0.22
20.02	-	-	-	20.1	-0.08

Vane Angel Bench Stand Model 18112	
Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	92
180	181
270	



The Result of Calibration

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Standard Barometer Pressure	Tested Barometer Pressure	Correction
1006.54	1006.94	-0.40
1006.75	1007.21	-0.46
1006.98	1007.57	-0.59
1007.24	1007.65	-0.41
1007.64	1008.13	-0.49
1007.82	1008.51	-0.69
1008.01	1008.51	-0.50
1008.26	1008.83	-0.55
1008.68	1009.02	-0.34
1008.93	1009.38	-0.45
1009.42	1009.87	-0.45
1009.84	1009.32	-0.48
1009.32	1009.74	-0.42
1009.87	1007.24	-0.37
1007.65	1008.03	-0.38
1007.94	1008.36	-0.42
1008.51	1008.96	-0.45
1008.92	1009.35	-0.43
1009.22	1009.64	-0.42
1009.85	1010.21	-0.36

Average

Calibration

The Result of Calibration

Sensor model

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Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.2	45.5	-0.3
30.4	30.6	-0.2
15.6	15.5	0.1



The Result of Calibration		
Sensor model EWSNV110WS2503 Certification No. 301/25		
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Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
95.4	95.2	-0.8
65.3	71.2	-5.9
42.2	45.5	-3.3

Calibrate

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ชื่อ Davis Instruments แบบ TIPPING BUCKET Product No. ทำการสอบเทียบกับแก้ววัดฝน แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)

ลง

วิศวกรชำนาญการ