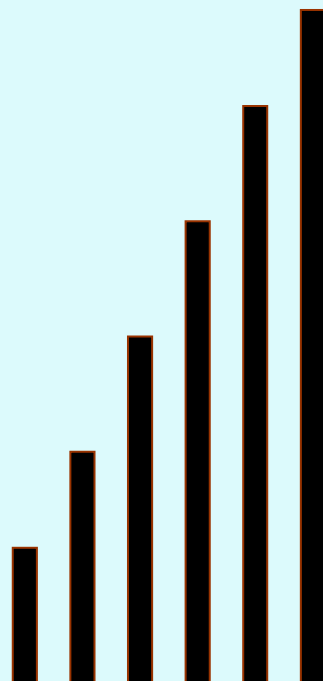




ภาคผนวก จ

ใบรับรองการสอบเทียบเครื่องมือ



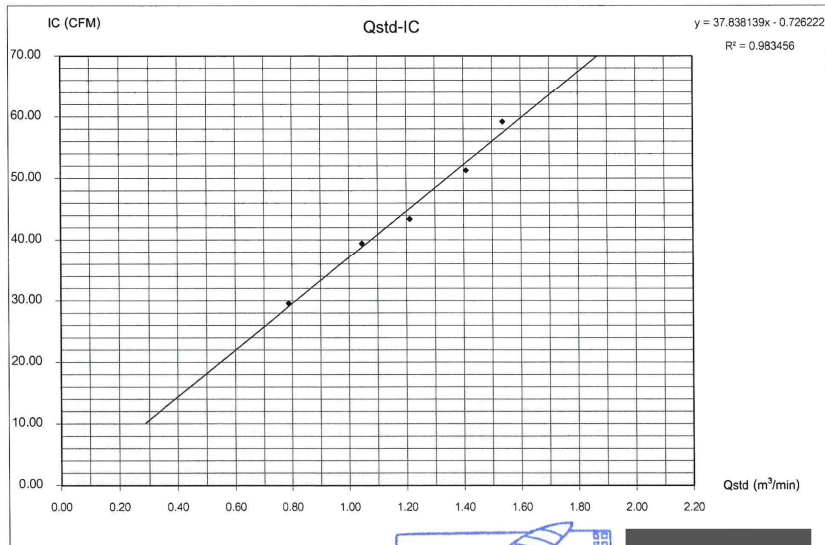
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-00516	Date	March 17, 2026
Sampler Location	กรุงเทพมหานคร 3	Start Time	12:00 PM
Sampler Number	PM-10 No.20	Transfer Standard Type	Office
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A
Motor Serial Number		Calibrator Serial Number	2715
Recorder Serial Number		Calibrated By	Mr.Nigul Phokhamia

Plate No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (mmHg)	$[\Delta H_2O(Pa/P_{std})(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$	Sample Flow Rate Indicator	$IC = [(Pa/P_{std})(T_{std}/T_a)]^{1/2}$	(°K = °C+273)	(mmHg)	Meter	Meter
	Positive Negative ΔH_2O		(m³/min)	(ft³/min)					
5	1.3 1.3 2.6	1.59123	0.78779	30.0	29.61	306.0	760.0		
7	2.3 2.3 4.6	2.11654	1.04498	40.0	39.47	306.0	760.0		
10	3.1 3.1 6.2	2.45722	1.21177	44.0	43.42	306.0	760.0		
13	4.2 4.2 8.4	2.86014	1.40904	52.0	51.32	306.0	760.0		
18	5.0 5.0 10.0	3.12067	1.53660	60.0	59.21	306.0	760.0		
Linear Regression Y ON X: Y = mX + b						Average	306.0	760.0	
1	Slope (m)	2.04250	Linear Equation			r²	0.983456	Pstd(mmHg)	760.0
2	Intercept (b)	-0.01783	Set Point Flow Rate (X) (m³/min)		1.133	r	0.9916935	Tstp	298.0
3	Correlation Coefficient (r)	0.99980	Final Set Flow Rate = (I)		0	(Pa/Pstd)(Tstd/Ta)		0.973856209	
Result						C=(Pa/Pstd)(Tstd/Ta)*0.5		0.986841532	

COMMENT

Andersen Instruments, Inc.



Checked By

Technician

Approved By

Environmental Scientist

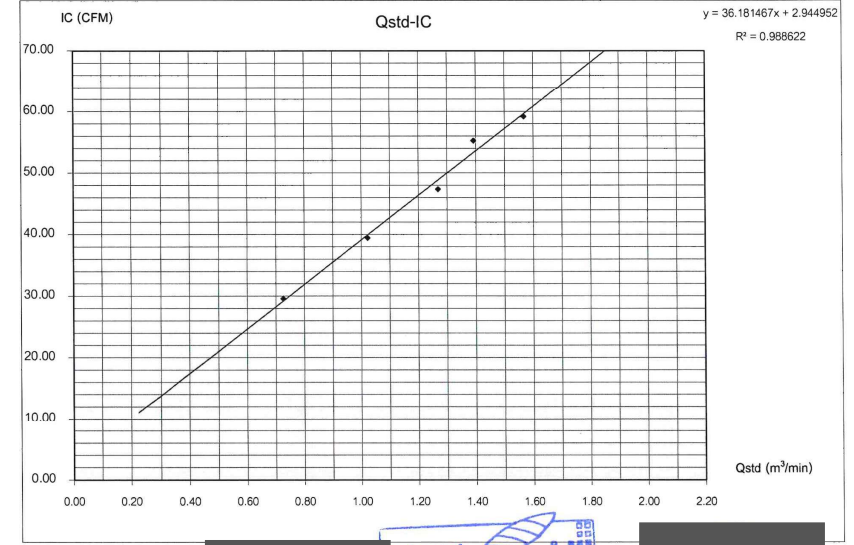
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-00516	Date	March 17, 2026
Sampler Location	กรุงเทพมหานคร 3	Start Time	12:10 PM
Sampler Number	TSP No.A9	Transfer Standard Type	Office
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A
Motor Serial Number	16110	Calibrator Serial Number	2715
Recorder Serial Number	102910701	Calibrated By	Mr.Nigul Phokhamia

Plate No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (mmHg)	$[\Delta H_2O(Pa/P_{std})(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$	Sample Flow Rate Indicator	$IC = [(Pa/P_{std})(T_{std}/T_a)]^{1/2}$	(°K = °C+273)	(mmHg)	Meter	Meter
	Positive Negative ΔH_2O		(m³/min)	(ft³/min)					
5	1.1 1.1 2.2	1.46372	0.72536	30.0	29.61	306.0	760.0		
7	2.2 2.2 4.4	2.07002	1.02220	40.0	39.47	306.0	760.0		
10	3.4 3.4 6.8	2.57337	1.26854	48.0	47.37	306.0	760.0		
13	4.1 4.1 8.2	2.82508	1.39227	56.0	55.20	306.0	760.0		
18	5.2 5.2 10.4	3.18247	1.56685	60.0	59.21	306.0	760.0		
Linear Regression Y ON X: Y = mX + b						Average	306.0	760.0	
1	Slope (m)	2.04250	Linear Equation			r²	0.988622	Pstd(mmHg)	760.0
2	Intercept (b)	-0.01783	Set Point Flow Rate (X) (m³/min)		1.133	r	0.9942947	Tstp	298.0
3	Correlation Coefficient (r)	0.99980	Final Set Flow Rate = (I)		0	(Pa/Pstd)(Tstd/Ta)		0.973856209	
Result						C=(Pa/Pstd)(Tstd/Ta)*0.5		0.986841532	

COMMENT

Andersen Instruments, Inc.



Checked By

Technician

Approved By

Environmental Scientist

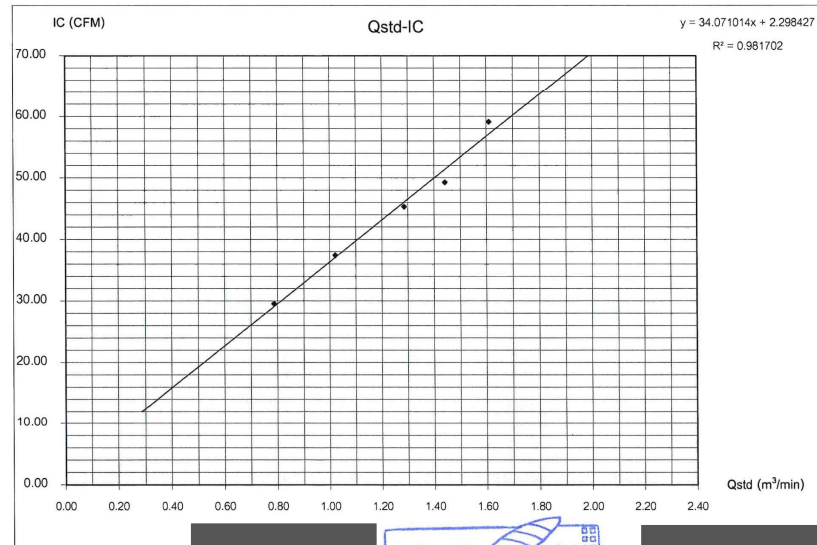
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-00516	Date	March 17, 2026
Sampler Location	บ้านมอญ ม.3 (เขตหลักสี่ กรุงเทพฯ)	Start Time	10:30 AM
Sampler Number	PM-10 No.28	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A
Motor Serial Number	2206	Calibrator Serial Number	2715
Recorder Serial Number	7281	Calibrated By	Mr.Nigul Phokhamla

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Meter	Stop Meter	
	Pressure Drop Across Orifice (mmH ₂ O)			$[\Delta H_0(Pa/P_{atm})(T_{std}/Ta)]^{1/2}$	Qstd = (1/m)[(A-b)] (m ³ /min)	Sample Flow Rate Indicator (ft ³ /min)	IC = [(Pa/Pstd)(T _{std} /Ta)] ^{1/2}	(*K = °C+273)	(mmHg)			
	Positive	Negative	ΔH ₂ O									
5	1.3	1.3	2.6	1.58914	0.78677	30.0	29.57	306.0	758.0			
7	2.2	2.2	4.4	2.06729	1.02087	38.0	37.45	306.0	758.0			
10	3.5	3.5	7.0	2.60750	1.28535	46.0	45.33	306.0	758.0			
13	4.4	4.4	8.8	2.92359	1.44911	50.0	49.28	306.0	758.0			
18	5.5	5.5	11.0	3.26867	1.60906	60.0	59.13	306.0	758.0			
Linear Regression Y ON X: Y= mX + b							Average	306.0	758.0			
1	Slope (m)			2.04250	Linear Equation			r ²	0.981702	Pstd(mmHg)	760.0	
2	Intercept (b)			-0.01783	Set Point Flow Rate (X) (m ³ /min)		1.133	r	0.9908088	T _{ntp}	298.0	
3	Correlation Coefficient (r)			0.99980	Final Set Flow Rate = (I)			0	(Pa/Pstd)(Tstd/Ta)		0.97129343	
Result								C=(Pa/Pstd)(Tstd/Ta)*0.5				0.985542201

COMMENT

Andersen Instruments, Inc.



Checked By

Technician

Approved By

Environmental Scientist

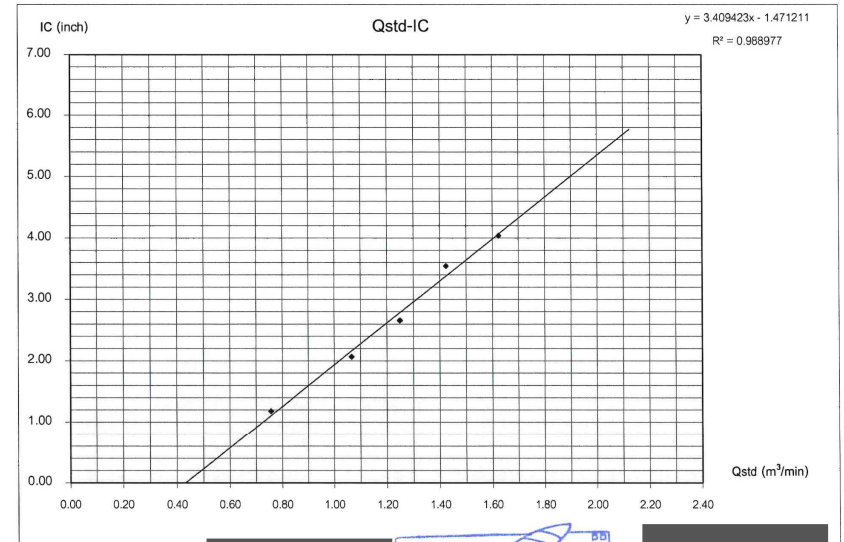
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2026-00516	Date	March 17, 2026
Sampler Location	บ้านมอญ ม.3 (เขตหลักสี่ กรุงเทพฯ)	Start Time	10:40 AM
Sampler Number	TSP No.A14	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A
Motor Serial Number	102930701	Calibrator Serial Number	2715
Recorder Serial Number	610-650	Calibrated By	Mr.Nigul Phokhamla

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
No.	Pressure Drop Across Orifice (mmHg)			$[\Delta H_0C/PaP_{std}(T_{std}/T_a)]^{1/2}$	$Q_{std} = (1/m)[(A-b)]$ (m ³ /min)	Sample Flow Rate Indicator (inch)	$IC = [(Pa/P_{std})(T_{std}/T_a)]^{1/2}$	(*K = °C+273)	Pressure (mmHg)	Meter	Meter
	Positive	Negative	ΔH ₀								
5	1.2	1.2	2.4	1.52680	0.75624	1.2	1.18	306.0	758.0		
7	2.4	2.4	4.8	2.15921	1.06587	2.1	2.07	306.0	758.0		
10	3.3	3.3	6.6	2.53190	1.24834	2.7	2.66	306.0	758.0		
13	4.3	4.3	8.6	2.89018	1.42375	3.6	3.55	306.0	758.0		
18	5.6	5.6	11.2	3.29826	1.62354	4.1	4.04	306.0	758.0		
Linear Regression Y ON X : Y= mX + b								Average	306.0	758.0	
1	Slope (m)			2.04250	Linear Equation			r ²	0.988977	Pstd(mmHg)	760.0
2	Intercept (b)			-0.01783	Set Point Flow Rate (X) (m ³ /min)		1.133	r	0.9944732	T _{ntp}	298.0
3	Correlation Coefficient (r)			0.99980	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.97129343	
Result								C=-(Pa/Pstd)*(Tstd/Ta)*0.5		0.985542201	

COMMENT

Andersen Instruments, Inc.



Checked By

Technician

Approved By

Environmental Scientist

CERTIFICATE OF CALIBRATION

Certificate No. : COF-012-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 2715
ID NUMBER : -
CONDITION AS-RECEIVED : Used item
CUSTOMER : Environment Research & Technology Co., Ltd.
25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

RECEIVED DATE : 19 Mar 2025
MEASUREMENT DATE : 04 Apr 2025
ISSUE DATE : 04 Apr 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

CALIBRATION CONDITION:

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are 22.8 °C and 48.0 %RH.

Calibration procedure:

The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G6S/IMC/W2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:

This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0016-25.

Uncertainty of Measurement:

The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$. Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

NOTED: The certificate is valid only to the item calibrated on date and place of calibration.

TABULATION OF RESULTS:

The table on next page give the measured values.

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_s] m^3/min
1	0.703	763.408	22.80	21.70	55.036	1.767	1.337	0.663
2	1.002	763.415	22.80	21.93	59.943	3.539	1.892	0.937
3	1.121	763.490	22.81	22.09	41.674	4.696	2.180	1.075
4	1.167	763.535	22.86	22.28	31.148	5.234	2.301	1.135
5	1.411	763.550	23.07	22.56	30.042	7.678	2.786	1.373

Slope (m): 2.04250
Intercept (b): -0.01783
Correlation coefficient (r): 0.99980
Uncertainty ($k=2$): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_a] m^3/min
1	0.703	763.408	22.80	21.70	55.036	1.767	0.828	0.655
2	1.002	763.415	22.80	21.93	59.943	3.539	1.171	0.926
3	1.121	763.490	22.81	22.09	41.674	4.696	1.349	1.062
4	1.167	763.535	22.86	22.28	31.148	5.234	1.424	1.122
5	1.411	763.550	23.07	22.56	30.042	7.678	1.726	1.358

Slope (m): 1.27928
Intercept (b): -0.01102
Correlation coefficient (r): 0.99980
Uncertainty ($k=2$): 0.015 m^3/min

End of Certificate of Calibration

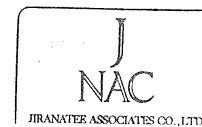
Calibrated by:

☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol



Approved signatory: _____

Calibration Department Manager



Mettler-Toledo (Thailand) Limited
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong
City: Laksi **Contact:** Ramita Taengthai
Zip / Postal: 10210
State / Province: Bangkok
Order Number: 

Weighing Device

Manufacturer: Mettler Toledo **Terminal Model:** N/A
Model: AB204-S **Terminal Serial No.:** N/A
Serial No.: 1123103723 **Terminal Asset No.:** N/A
Instrument Type: Weighing Instrument **Building:** N/A
Asset Number: ERTC-L-IN-0048 **Floor:** 4
Room: 406

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature	Humidity
As Found	Start: 25.0 °C End: 24.9 °C	Start: 39.7 % End: 40.8 %

As Found Calibration Date: 26-Jan-2026
As Left Calibration Date: N/A
Issue Date: 27-Jan-2026

Calibrator:

Approved Signatory:

Technical Manager / Head of Calibration Center

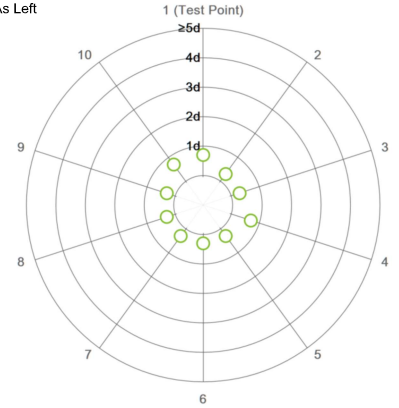
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
6	99.9999 g	N/A
7	99.9999 g	N/A
8	99.9999 g	N/A
9	99.9999 g	N/A
10	100.0000 g	N/A

● As Found
◆ As Left



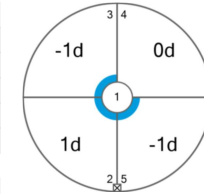
The "d" in the graph represents the readability of the range/interval in which the test was performed.

The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A

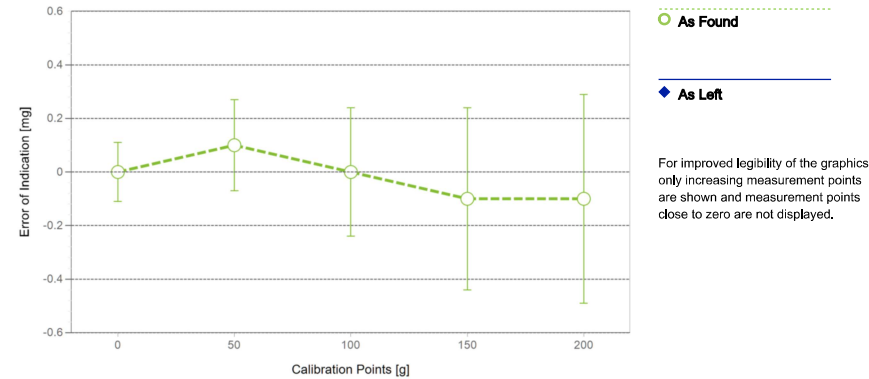


As Found

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found					
	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.11 mg	2
2	0.0500 g	0.0499 g	-0.0001 g	0.13 mg	2
3	0.1000 g	0.0999 g	-0.0001 g	0.13 mg	2
4	0.5000 g	0.4999 g	-0.0001 g	0.13 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.13 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.13 mg	2
7	10.0000 g	9.9999 g	-0.0001 g	0.14 mg	2
8	50.0000 g	50.0001 g	0.0001 g	0.17 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.24 mg	2
10	150.0001 g	150.0000 g	-0.0001 g	0.34 mg	2
11	200.0001 g	200.0000 g	-0.0001 g	0.39 mg	2



The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS105	Date of Issue:	14-Apr-2025
Certificate Number:	C515828262	Calibration Due Date:	02-Oct-2026

Thermo Hygrometer

Equipment No.:	IN305	Date of Issue:	17-Oct-2025
Certificate Number:	SG-H-00885/68	Calibration Due Date:	14-Oct-2026

Remarks

FACT adjustment functionality activated
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory
Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

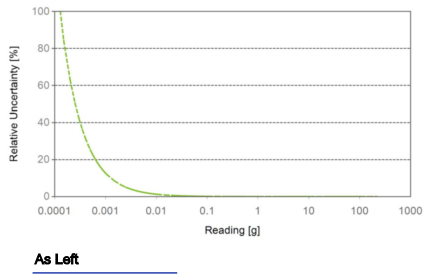
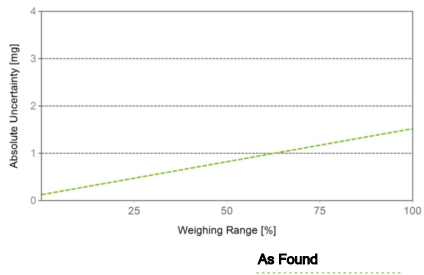
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.13 \text{ mg} + 0.00634 \text{ mg/g} \cdot R$	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.13 mg	0.59%	N/A	N/A
0.2200 g	0.13 mg	0.060%	N/A	N/A
2.2000 g	0.14 mg	0.0065%	N/A	N/A
22.0000 g	0.27 mg	0.0012%	N/A	N/A
220.0000 g	1.5 mg	0.00069%	N/A	N/A



GWP™ Certificate

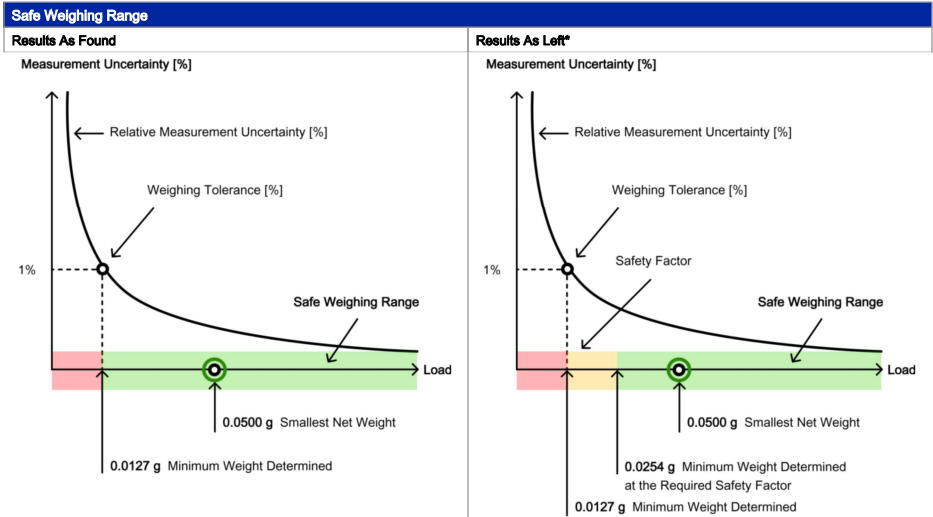
Process Requirements	
Weighing Tolerance	1%
Smallest Net Weight	0.0500 g
Safety Factor	As found = 1; As left = 2

Results As Found	
Minimum Weight Determined	0.0127 g
Measurement Uncertainty at the Smallest Net Weight	0.25%

The instrument meets the process requirements.

Results As Left*	
Minimum Weight Determined at the Safety Factor	0.0254 g
Minimum Weight Determined	0.0127 g
Measurement Uncertainty at the Smallest Net Weight	0.25%

The instrument meets the process requirements.



* No adjustments/modifications made. As Left results correspond to As Found.

Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
www.mt.com/ACC-Cert-Info

Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:
www.mt.com/GWP-Cert-Info

Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors					
Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1273 g	0.2563 g	0.3869 g	0.6532 g	1.3506 g
0.2%	0.0635 g	0.1273 g	0.1916 g	0.3214 g	0.6532 g
0.5%	0.0254 g	0.0508 g	0.0762 g	0.1273 g	0.2563 g
1%	0.0127 g	0.0254 g	0.0381 g	0.0635 g	0.1273 g
2%	0.0064 g	0.0127 g	0.0190 g	0.0317 g	0.0635 g
5%	0.0026 g	0.0051 g	0.0076 g	0.0127 g	0.0254 g

Result



Pass

The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors					
Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.1273 g	0.2563 g	0.3869 g	0.6532 g	1.3506 g
0.2%	0.0635 g	0.1273 g	0.1916 g	0.3214 g	0.6532 g
0.5%	0.0254 g	0.0508 g	0.0762 g	0.1273 g	0.2563 g
1%	0.0127 g	0.0254 g	0.0381 g	0.0635 g	0.1273 g
2%	0.0064 g	0.0127 g	0.0190 g	0.0317 g	0.0635 g
5%	0.0026 g	0.0051 g	0.0076 g	0.0127 g	0.0254 g

Result



Pass

The instrument meets the process requirements.

No adjustments or modifications were made and thus As Left results correspond to As Found.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors.

At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Calibration Data of NOx Analyzer

Analyzer Performance Test

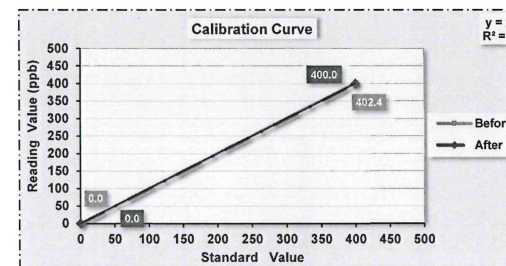
Equipment	Gas Analyzer (NOx)	Customer Name	เอสซีเอส (ประเทศไทย)
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2026-00516
Serial No.	NT2CRTL2	Calibration Date	March 16, 2026
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO ₂ = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO _x (ppb)		NO (ppb)		NO ₂ (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	-0.1	0.0	0.0	0.0	-0.1	0.0	-	-	-
Span	400	403.3	400.0	402.4	400.0	0.9	0.0	-	-	0.6



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	1.0	0.8	Voltage of the measured NO value
Signal NOx	mV	1.8	1.9	Voltage of the measured NOx value
Detector	°C	40.6	40.6	43 °C ± 5 °C
Ambient	kPa	100.9	100.9	Current atmospheric pressure
DC 24V	V	23.8	23.8	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	1.65024	1.59960	0.50000 - 2.0000
NOx Slope	-	1.59450	1.59710	0.50000 - 2.0000

Calibrate By :

March 16, 2026

Checked By :

March 16, 2026

Calibration Data of NOx Analyzer

Analyzer Performance Test

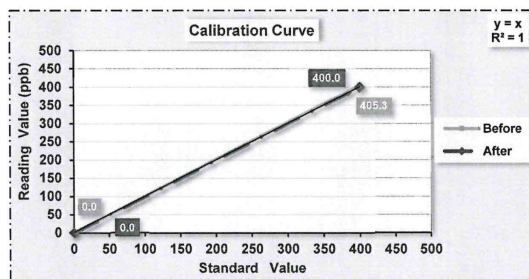
Equipment	Gas Analyzer (NOx)	Customer Name	เอสซีเอส (ประเทศไทย)
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2026-00516
Serial No.	NGABK9F2	Calibration Date	March 16, 2026
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO ₂ = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO _x (ppb)		NO (ppb)		NO ₂ (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
Span	400	406.9	400.0	405.3	400.0	1.6	0.0	-	-	1.3



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	1.0	1.0	Voltage of the measured NO value
Signal NOx	mV	8.5	8.8	Voltage of the measured NOx value
Detector	°C	39.5	39.5	43 °C ± 5 °C
Ambient	kPa	100.8	100.5	Current atmospheric pressure
DC 24V	V	23.7	23.7	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	1.40240	1.39840	0.50000 - 2.0000
NOx Slope	-	1.37140	1.36890	0.50000 - 2.0000

Calibrate By :

March 16, 2026

Checked By :

March 16, 2026

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

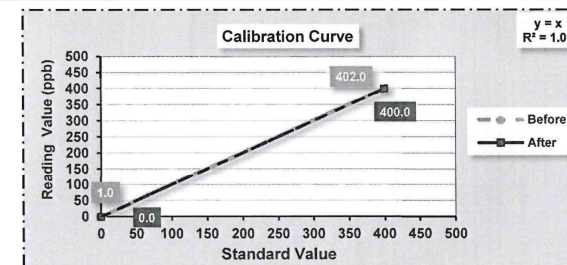
Equipment	Gas Analyzer (SO ₂)	Customer Name	เอสซีเอส (ประเทศไทย)
Manufacture	Thermo	Location	Envi Research
Model	43i-BNSAA	Quotation	2026-00516
Serial No.	CM25217014	Calibration Date	March 16, 2026
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO ₂ = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	1.0	0.0	-	-	-
Span	400	402.0	400.0	-	-	0.5



STATUS TEST AND VALIDATION OF SO₂ ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°C	34.5	34.4	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°C	44.8	44.8	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	728.5	728.5	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.522	0.522	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	92	92	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	815	815	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	2.7	1.7	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By :

March 16, 2026

Checked By :

March 16, 2026

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

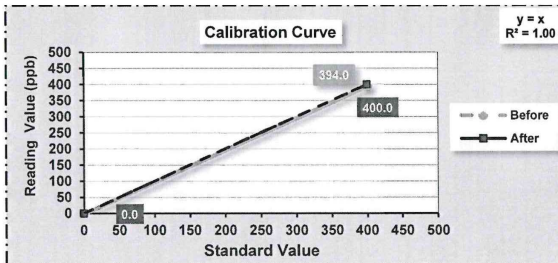
Equipment	Gas Analyzer (SO ₂)	Customer Name	เลขที่เอกสาร (ประเทศไทย)
Manufacture	Thermo	Location	Envi Research
Model	43i-BNSAA	Quotation	2026-00516
Serial No.	CM25217015	Calibration Date	March 16, 2026
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO ₂ = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	-1.0	0.0	-	-	-
Span	400	394.0	400.0	-	-	1.5



STATUS TEST AND VALIDATION OF SO₂ ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°C	35.2	35.1	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°C	45.0	44.9	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	751	751.0	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.356	0.356	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	91	91	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	801	801	500 to 1200
SO ₂ Concentration	SO ₂ CONCENTRATION	ppb	2.4	0.9	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By :

March 16, 2026



Checked By :

March 16, 2026

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15A0292
Cylinder Number: EB0123013
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12019
Gas Code: CO,NO,NOX,SO₂,BALN

Reference Number: 160-401604495-1
Cylinder Volume: 144.4 Cubic Feet
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
Certification Date: Oct 22, 2019

Expiration Date: Oct 22, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 volume/volume basis unless otherwise noted.

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	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
NITRIC OXIDE	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
SULFUR DIOXIDE	55.00 PPM	54.93 PPM	G1	+/- 0.9% NIST Traceable	10/14/2019, 10/22/2019
CARBON MONOXIDE	4500 PPM	4516 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13010429	KAL004123	97.6 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	13010429	KAL004123	97.6 PPM NOx/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012318	KAL004620	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR - CO - 000928781	FTIR	Sep 26, 2019
MKS FTIR - NO - 000928781	FTIR	Oct 18, 2019
MKS FTIR - NOx - 000928781	FTIR	Oct 18, 2019
MKS FTIR - SO ₂ - 000928781	FTIR	Oct 03, 2019

Triad Data Available Upon Request

NOTES: Gross Weight: 28.0 Kg, Net Weight: 4.6 Kg.



Sound Level Meter Calibration Report

Support Equipment Type	:	Sound Level Calibrator
Manufacture	:	Larson Davis
Model	:	CAL200
Serial No.	:	23394
Range of Calibrator		
- Support Equipment Type	:	93.5
- Frequency	:	1,000 Hz.
Calibrated By	:	Mr.Apichat Pulphon
Calibration Date	:	March 20, 2026
Customer Name	:	SGS (Thailand) Limited : Glow SPP 11 Plant 2

[illegible]

Checked By [REDACTED]
Technician



Approved By
Environmental Scientist

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0132

MTC No. EEL. BP. 4/0169

CALIBRATION CERTIFICATE

Submitted by	: Environment Research & Technology Co.,Ltd.		
Address	: 25/114 Moo6, Soi Chinaket1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210, 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 :		Ambient Environment	
Description	: Precision Acoustic Calibrator	Temperature	: (23 ± 3) °C
Manufacturer	: Larson Davis	Relative Humidity	: (50 ± 15) %
Model	: CAL200	Ambient Pressure	: (101.325 ± 1.500) kPa
Serial No.	: 23394		

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 : 5 Jan. 2026

Date of Calibration : 14 Jan. 2026

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.BL.MTC.002 Rev.5

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Fax. (66) 0 2577 9009

Office/Laboratory
668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan,
Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office
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Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

Request No. 21-69/0132

MTC No. EEL. BP. 4/0169

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz

Acoustic Output in dB re 20μPa , Corrected to Reference Conditions : 101.325 kPa , 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	93.54	-0.46	± 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&Kjaer4180	1000.4	0.4	± 1.5	±1.0%

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	1.60	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Date of Calibration : 14 Jan. 2026

2 / 3

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FM.BL.MTC.002 Rev.5

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Office
196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

Request No. 21-69/0132

MTC No. EEL. BP. 4/0169

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	113.60	-0.40	± 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	±1.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	0.36	± 0.50	±3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Calibrated by :

Approved by :

Date of Calibration : 14 Jan. 2026

Date of Issue : 15 Jan. 2026

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref : 201126901050007004

End of Certificate

3 / 3

The results relate only to the items tested/calibrated or value assigned.

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FM.BL.MTC.002 Rev.5

Head Office
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Office
196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-225
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-1548
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 1
Manufacturer : RION Microphone Model : UC-59
Model : NL-53 Microphone S/N : 25582
Serial Number : 00541052 Preamplifier Model : NH-25
ID : ENSL 24105 Preamplifier S/N : 34005
Resolution : 0.1 dB 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 : 7 July 2025
Calibrated Date : 17 July 2025
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
Multifunction Acoustic Calibrator	Brüel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	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 %.

Calibrated By :



Service Calibration Engineer

Approved By :



Calibration Engineer Supervisor

Issue Date : 17 July 2025

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.06 Issue date 17/2/25

Certificate No : 25-SLM-225
Request No : Req-2025-1548

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 94 dB	93.98	94.2	0.22	94.0	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88373

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
UUC Weighting		
A	14.9	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
UUC Weighting		
A	11.3	0.10
C	13.3	0.10
Z	17.0	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 30-130	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.3	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	0.0	0.0	0.60
8000 Hz	-0.4	-0.4	-0.4	0.70

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.06 Issue date 17/2/25

Certificate No : 25-SLM-225
Request No : Req-2025-1548

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	-0.1	
16000 Hz	-0.9	-0.9	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY
30-130 / A	REF	UUC	ERR	
UUC Time Respose	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 30-130	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 30-130	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
138.00	138	138.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.0	0.0	
34.00	34	34.0	0.0	
29.00	29	29.0	0.0	
24.00	24	23.9	-0.1	

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-181
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Request No : Req-2025-1170
Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000470
Serial Number : 820708 Preamplifier Model : -
ID : ENSL 22180 Preamplifier S/N : -
Resolution : 0.1 dB 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 : 26 May 2025
Calibrated Date : 30 May 2025
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	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	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 %.

Calibrated By 
Service Calibration Engineer

Approved By : 
Calibration Engineer Supervisor
Issue Date : 30 May 2025

Certificate No : 25-SLM-181
Request No : Req-2025-1170

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.7	-0.07	93.8	+0.03	0.20

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	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.4	0.10

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

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.0	0.10
C	28.5	0.10
Z	33.6	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.3	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.2	0.2	0.0	0.60
8000 Hz	0.9	1.0	1.2	0.70

Certificate No : 25-SLM-181
Request No : Req-2025-1170

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 34-144	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	0.0	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.1	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
FAST / 34-144	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	(± dB)
A	114.00	114.0	0.0	0.20
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY
34-144 / A	REF	UUC	ERR	
UUC Time Response	(dB)	(dB)	(dB)	(± dB)
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-181
Request No : Req-2025-1170

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
FAST / A / 34-144	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	(± dB)
141.00	141	140.9	-0.1	0.30
140.00	140	140.0	0.0	
139.00	139	139.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	43.9	-0.1	
40.00	40	39.7	-0.3	

Certificate No : 25-SLM-181
 Request No : Req-2025-1170

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
34-144	45.20	45.2	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)
A / 34-144	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	140.0	140.1	+0.1	0.20
	2	123.0	122.9	-0.1	
	0.25	114.0	113.9	-0.1	
Slow	200	133.6	133.7	+0.1	
	2	114.0	114.1	+0.1	
SEL	200	134.0	134.1	+0.1	
	2	114.0	114.1	+0.1	
	0.25	105.0	105.0	0.0	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)
FAST / C / 34-144	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	139.4	139.1	-0.30	0.20
Positive half cycle	138.4	138.2	-0.20	
Negative half cycle	138.4	138.2	-0.20	

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.06 Issue date 17/2/25

Certificate No : 25-SLM-181
 Request No : Req-2025-1170

12. Overload indication

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Positive one-half cycle	143.8	
Negative one-half cycle	144.1	
Deviated	-0.3	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Initial	143.0	
Final	143.0	
Deviated	0.0	0.10

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.06 Issue date 17/2/25

Certificate No : 25-SLM-225
Request No : Req-2025-1548

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
30-130	29.60	29.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 30-130	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	126.0	126.1	+0.1	0.20
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	
Slow	200	119.6	119.6	0.0	
	2	100.0	100.0	0.0	
SEL	200	120.0	120.0	0.0	
	2	100.0	100.0	0.0	
	0.25	91.0	90.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	136.4	135.5	-0.90	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.4	
Negative one-half cycle	139.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-225
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, **Request No :** Req-2025-1548
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 1
Manufacturer : RION Microphone Model : UC-39
Model : NL-53 Microphone S/N : 25582
Serial Number : 00541052 Preamplifier Model : NH-25
ID : ENSL 24105 Preamplifier S/N : 34005
Resolution : 0.1 dB 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 : 7 July 2025
Calibrated Date : 17 July 2025
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
Multifunction Acoustic Calibrator	Bruel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	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 %.

Calibrated By :



Service Calibration Engineer

Approved By :



Calibration Engineer Supervisor

Issue Date : 17 July 2025

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.06 Issue date 17/2/25

Certificate No : 25-SLM-225
Request No : Req-2025-1548

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 94 dB	93.98	94.2	0.22	94.0	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88373

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
UUC Weighting		
A	14.9	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
UUC Weighting		
A	11.3	0.10
C	13.3	0.10
Z	17.0	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
FAST / 30-130	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.3	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	0.0	0.0	0.60
8000 Hz	-0.4	-0.4	-0.4	0.70

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.06 Issue date 17/2/25

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	-0.1	
16000 Hz	-0.9	-0.9	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
30-130 / A	REF	UUC	ERR	
UUC Time Respose	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (± dB)
FAST / A / 30-130	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
138.00	138	138.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.0	0.0	
34.00	34	34.0	0.0	
29.00	29	29.0	0.0	
24.00	24	23.9	-0.1	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
30-130	29.60	29.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 30-130	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	126.0	126.1	+0.1	0.20
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	
Slow	200	119.6	119.6	0.0	
	2	100.0	100.0	0.0	
SEL	200	120.0	120.0	0.0	
	2	100.0	100.0	0.0	
	0.25	91.0	90.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	136.4	135.5	-0.90	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.4	
Negative one-half cycle	139.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-ACT-092
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-1224
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Acoustic Calibrator Class : 1
Manufacturer : Cirrus Range : 94 dB / 1000 Hz
Model : CR:515 Instrument Status : Used
Serial Number : 88336
ID : ENSL 19173

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 30 May 2025
Calibration Date : 10 June 2025
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	12 June 2025
THD Multimeter	2015	1047765	NIMT	4 February 2026

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 :

Service Calibration Engineer

Approved By :

Calibration Engineer Supervisor

Issue Date : 10 June 2025

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-ACT-02 Rev.04 Issue date 17/2/25

Certificate No : 25-ACT-092

Request No : Req-2025-1224

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	94.00	0.00	-	-	0.12

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	
94 dB / 1000 Hz	1000.0	0.00	-	-	0.01

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

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)
	Measured (%)	Measured (%)	
94 dB / 1000 Hz	2.20	-	0.17

Note :

- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration

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-ACT-02 Rev.04 Issue date 17/2/25

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-SLM-181
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Chong Request No : Req-2025-1170
Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 2
Manufacturer : SCARLET Microphone Model : AWA14421
Model : ST-21D Microphone S/N : A-000470
Serial Number : 820708 Preamplifier Model : -
ID : ENSL 22180 Preamplifier S/N : -
Resolution : 0.1 dB 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 : 26 May 2025
Calibrated Date : 30 May 2025
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	Bruel&Kjaer	4192	2294985	25 June 2025	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	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 %.

Calibrated By :



Service Calibration Engineer

Approved By :



Calibration Engineer Supervisor

Issue Date : 30 May 2025

Certificate No : 25-SLM-181
Request No : Req-2025-1170

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY (± dB)
FAST / A / 34-144	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	
1000 Hz 94 dB	93.77	93.7	-0.07	93.8	+0.03	0.20

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	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.4	0.10

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

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / 34-144		
UUC Weighting	(dB)	(± dB)
A	28.0	0.10
C	28.5	0.10
Z	33.6	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)
	A	C	Z	
STD Setting	(dB)	(dB)	(dB)	
125 Hz	0.1	0.3	0.1	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.2	0.2	0.0	0.60
8000 Hz	0.9	1.0	1.2	0.70

Certificate No : 25-SLM-181
Request No : Req-2025-1170

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 34-144	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	-0.1	0.0	0.20
125 Hz	-0.2	-0.1	-0.1	
250 Hz	-0.1	-0.1	-0.1	
500 Hz	-0.1	-0.1	-0.1	
1000 Hz	0.0	-0.1	-0.1	
2000 Hz	0.1	0.0	-0.1	
4000 Hz	0.2	0.1	-0.1	
8000 Hz	-0.2	-0.2	-0.1	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY
		UUC	ERR	
FAST / 34-144	REF			(± dB)
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	
C	114.00	113.9	-0.1	
Z	114.00	113.9	-0.1	

UUC Setting	STD	Measured		UNCERTAINTY
		UUC	ERR	
34-144 / A	REF			(± dB)
UUC Time Response	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

Certificate No : 25-SLM-181
Request No : Req-2025-1170

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY
FAST / A / 34-144	UUC	
STD Setting	(dB)	(± dB)
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY
		UUC	ERR	
FAST / A / 34-144	REF	(dB)	(dB)	(± dB)
STD dB	(dB)	(dB)	(dB)	0.30
141.00	141	140.9	-0.1	
140.00	140	140.0	0.0	
139.00	139	139.0	0.0	
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	43.9	-0.1	
40.00	40	39.7	-0.3	

Certificate No : 25-SLM-181
 Request No : Req-2025-1170

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY ($\pm$ dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
34-144	45.20	45.2	0.0	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)
A / 34-144	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	140.0	140.1	+0.1	0.20
	2	123.0	122.9	-0.1	
	0.25	114.0	113.9	-0.1	
Slow	200	133.6	133.7	+0.1	
	2	114.0	114.1	+0.1	
SEL	200	134.0	134.1	+0.1	
	2	114.0	114.1	+0.1	
	0.25	105.0	105.0	0.0	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY ($\pm$ dB)
FAST / C / 34-144	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	139.4	139.1	-0.30	0.20
Positive half cycle	138.4	138.2	-0.20	
Negative half cycle	138.4	138.2	-0.20	

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.06 Issue date 17/2/25

Certificate No : 25-SLM-181
 Request No : Req-2025-1170

12. Overload indication

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Positive one-half cycle	143.8	
Negative one-half cycle	144.1	
Deviated	-0.3	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY ($\pm$ dB)
FAST / A / 34-144	UUC	
STD Setting	(dB)	
Initial	143.0	
Final	143.0	
Deviated	0.0	0.10

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.06 Issue date 17/2/25

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. **Certificate No :** 25-SLM-225
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, **Request No :** Req-2025-1548
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Sound Level Meter Microphone Class : 1
Manufacturer : RION Microphone Model : UC-39
Model : NL-53 Microphone S/N : 25582
Serial Number : 00541052 Preamplifier Model : NH-25
ID : ENSL 24105 Preamplifier S/N : 34005
Resolution : 0.1 dB 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 : 7 July 2025
Calibrated Date : 17 July 2025
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
Multifunction Acoustic Calibrator	Brüel&Kjaer	4226	3412381	8 May 2026	NIMT
Audio Generator	SvanteK	Svan401	131	15 October 2025	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 %.

Calibrated By :



Service Calibration Engineer

Approved By :



Calibration Engineer Supervisor

Issue Date : 17 July 2025

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.06 Issue date 17/2/25

Certificate No : 25-SLM-225
Request No : Req-2025-1548

1. Indication at the calibration check frequency

UUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY
	Level	UUC	ERR	UUC	ERR	
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)	(± dB)
1000 Hz 94 dB	93.98	94.2	0.22	94.0	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand Cirrus, Model CR:515, SN. 88373

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	14.9	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130		
UUC Weighting	(dB)	(± dB)
A	11.3	0.10
C	13.3	0.10
Z	17.0	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY
	A	C	Z	
FAST / 30-130	(dB)	(dB)	(dB)	(± dB)
STD Setting	(dB)	(dB)	(dB)	(± dB)
125 Hz	0.1	0.3	0.3	0.60
1000 Hz	0.0	0.0	0.0	0.60
4000 Hz	0.0	0.0	0.0	0.60
8000 Hz	-0.4	-0.4	-0.4	0.70

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.06 Issue date 17/2/25

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY
FAST / 30-130	Weighting Response curve			
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)
63 Hz	-0.2	0.0	0.0	0.20
125 Hz	-0.1	0.0	0.0	
250 Hz	-0.1	0.0	0.0	
500 Hz	-0.1	0.0	0.0	
1000 Hz	0.0	0.0	0.0	
2000 Hz	0.0	0.0	0.0	
4000 Hz	0.0	0.0	0.0	
8000 Hz	-0.1	-0.1	-0.1	
16000 Hz	-0.9	-0.9	0.0	

6. Frequency and time weightings at 1kHz

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / 30-130	REF	UUC	ERR	
UUC Weighting	(dB)	(dB)	(dB)	
A	114.00	114.0	0.0	0.20
C	114.00	114.0	0.0	
Z	114.00	114.0	0.0	

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
30-130 / A	REF	UUC	ERR	
UUC Time Respose	(dB)	(dB)	(dB)	
Fast	114.00	114.0	0.0	0.20
Slow	114.00	114.0	0.0	
Leq	114.00	114.0	0.0	

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	114.0	
Final	114.0	
Deviated	0.0	0.10

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY (± dB)
FAST / A / 30-130	REF	UUC	ERR	
STD dB	(dB)	(dB)	(dB)	
138.00	138	138.0	0.0	0.30
134.00	134	134.0	0.0	
129.00	129	129.0	0.0	
124.00	124	124.0	0.0	
119.00	119	119.0	0.0	
114.00	114	114.0	0.0	
109.00	109	109.0	0.0	
104.00	104	104.0	0.0	
99.00	99	99.0	0.0	
94.00	94	94.0	0.0	
89.00	89	89.0	0.0	
84.00	84	84.0	0.0	
79.00	79	79.0	0.0	
74.00	74	74.0	0.0	
69.00	69	69.0	0.0	
64.00	64	64.0	0.0	
59.00	59	59.0	0.0	
54.00	54	54.0	0.0	
49.00	49	49.0	0.0	
44.00	44	44.0	0.0	
39.00	39	39.0	0.0	
34.00	34	34.0	0.0	
29.00	29	29.0	0.0	
24.00	24	23.9	-0.1	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY (± dB)
FAST / A	REF	UUC	ERR	
UUC Range	(dB)	(dB)	(dB)	
30-130	29.60	29.7	0.1	0.30
	114	114.0	0.0	

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY (± dB)
A / 30-130	Toneburst	Ref	UUC	ERR	
UUC Time Response	(ms)	(dB)	(dB)	(dB)	
Fast	200	126.0	126.1	+0.1	0.20
	2	109.0	109.0	0.0	
	0.25	100.0	99.9	-0.1	
Slow	200	119.6	119.6	0.0	
	2	100.0	100.0	0.0	
SEL	200	120.0	120.0	0.0	
	2	100.0	100.0	0.0	
	0.25	91.0	90.9	-0.1	

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY (± dB)
FAST / C / 55-141	REF	UUC	ERR	
STD Setting	(dB)	(dB)	(dB)	
Complete cycle	136.4	135.5	-0.90	0.20
Positive half cycle	135.4	135.1	-0.30	
Negative half cycle	135.4	135.1	-0.30	

Certificate No : 25-SLM-225
Request No : Req-2025-1548

12. Overload indication

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Positive one-half cycle	139.4	
Negative one-half cycle	139.5	
Deviated	-0.1	0.20

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY (± dB)
FAST / A / 30-130	UUC	
STD Setting	(dB)	
Initial	129.0	
Final	129.0	
Deviated	0.0	0.10

End of Certificate

Certificate of Calibration

Customer

Name : SGS (Thailand) Limited. Certificate No : 25-ACT-092
Address : 238 TRR Tower, 19th-21st Floor, Naradhiwas Rajanagarindra Road, Request No : Req-2025-1224
Chong Nonsi, Yannawa, Bangkok 10120

Unit Under Calibration Details

Measurement item : Acoustic Calibrator Class : 1
Manufacturer : Cirrus Range : 94 dB / 1000 Hz
Model : CR:515 Instrument Status : Used
Serial Number : 88336
ID : ENSL 19173

Calibration Environment and Details

Temperature : (23 ±2 °C)
Humidity : (50 ± 20 %RH)
Barometric Pressure : (1013 ±10.0 hPa)
Received Date : 30 May 2025
Calibration Date : 10 June 2025
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	12 June 2025
THD Multimeter	2015	1047765	NIMT	4 February 2026

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 :

Service Calibration Engineer

Approved By :

Calibration Engineer Supervisor

Issue Date : 10 June 2025

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-ACT-02 Rev.04 Issue date 17/2/25

Certificate No : 25-ACT-092

Request No : Req-2025-1224

Sound pressure level

Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	94.00	0.00	-	-	0.12

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	
94 dB / 1000 Hz	1000.0	0.00	-	-	0.01

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

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)
	Measured (%)	Measured (%)	
94 dB / 1000 Hz	2.20	-	0.17

Note :

- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration

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-ACT-02 Rev.04 Issue date 17/2/25



MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD

214 Bangwaek Rd. Bangpai Bangkac Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



CALIBRATION CERTIFICATE

Page 1 of 2

Certificate No. : S2026040499-0001

Date Issued : 06-May-26

Customer : SGS (Thailand) Limited
1/209, 1/211 Moo 1, T.Ban Chang, A.Ban Chang, Rayong 21130
Thailand

Equipment : Oven
Manufacturer : Memmert
Model : UF110
Serial No. : B415.2321
ID No./Tag No. : O2016001
Date Received : 28-Apr-26
Date Calibrated : 28-Apr-26
Calibrated by : Wayu Phromtrai

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by:



Certificate No. : S2026040499-0001

Environment : Ambient Temperature : Start record 25.7 °C, Stop record 25.5 °C
Relative Humidity : Start record 55.2 %RH, Stop record 55.4 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
85	85.0	85.0	0.27	0.13	0.65
104	104.0	104.0	0.10	0.05	0.25
150	150.0	150.0	0.49	0.61	1.03
180	180.0	180.0	0.42	0.40	0.89

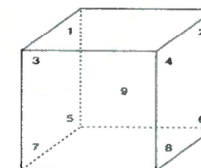
Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ (±°C)
85	84.88	84.80	84.89	84.87	84.79	84.77	84.81	84.82	84.88	0.38
104	103.60	103.67	103.64	103.67	103.65	103.61	103.62	103.61	103.63	0.27
150	150.08	150.09	150.07	150.02	150.06	150.06	150.03	150.08	150.05	0.63
180	180.03	180.08	180.10	180.06	180.07	180.04	180.09	180.12	180.05	0.58

STD = Standard

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. L202602016-0005 for Temperature Indicator with Sensor Serial No. US37020317, Due 08-Oct-26

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate



CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026
Cert No. 26/1091
Order No. 26030156

Customer SGS (Thailand) Limited.
1/209, 1/211 Moo 1, T. Ban Chang, A. Ban Chang Rayong 21130 Thailand.

Place of Calibration Sample Area

Description Incubator

Model SRI20-2

Serial No. 08027015

ID.No. C2015019

Date of Receipt Mar 25, 2026

Date of Calibration Mar 25, 2026

Environment

Temperature	(Min)	21.7	°C	(Max)	22.5	°C
Relative Humidity	(Min)	45.0	%rh	(Max)	51.6	%rh

Calibration Method

- This calibration was performed using work instruction No. WI-17 which based on AS2853:1986.
- The Temperature Scale in use at this laboratory is The International Temperature Scale of 1990 (ITS-90).
- The measurement is traceable to The International System of Units (SI).

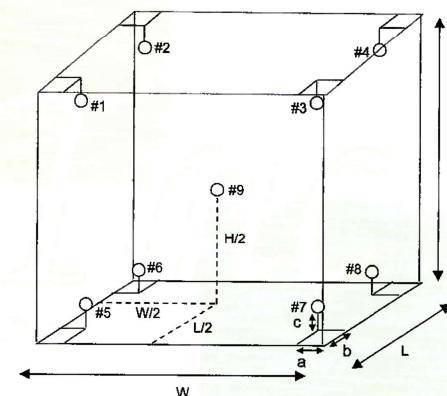
Standard Equipment	Serial No.	Certificate No.	Due Date
1) Data Acquisition Switch Unit with Sensor	MY49013906	QR25-1085	08 Apr 2026

DM

CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026
Cert No. 26/1091
Order No. 26030156

Results (without adjustment)



Position of reference thermometers were placed

Note.

- 1). Dimension (W x L x H) is 70 cm x 60 cm x 140 cm
- 2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.
- 3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

DM



CALIBRATION CERTIFICATE

Date of Issue Mar 26, 2026

Cert No. 26/1091

Order No. 26030156

Results (without adjustment)

Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Reference Thermometer (°C)		Stability $\pm$ (°C)	Uniformity (°C)	Uncertainty $\pm$ (°C)
10.0	25.0	25.0	Position 1	9.570	0.111	0.720	0.36
			Position 2	9.441			
			Position 3	9.638			
			Position 4	9.336			
			Position 5	9.438			
			Position 6	9.829			
			Position 7	9.588			
			Position 8	9.455			
			Position 9	9.168			

The stability and uniformity were taken into account in the measurement uncertainty stated.

The above results are valid exclusively for calibration samples as mentioned in this report.

This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ONAC requirements.

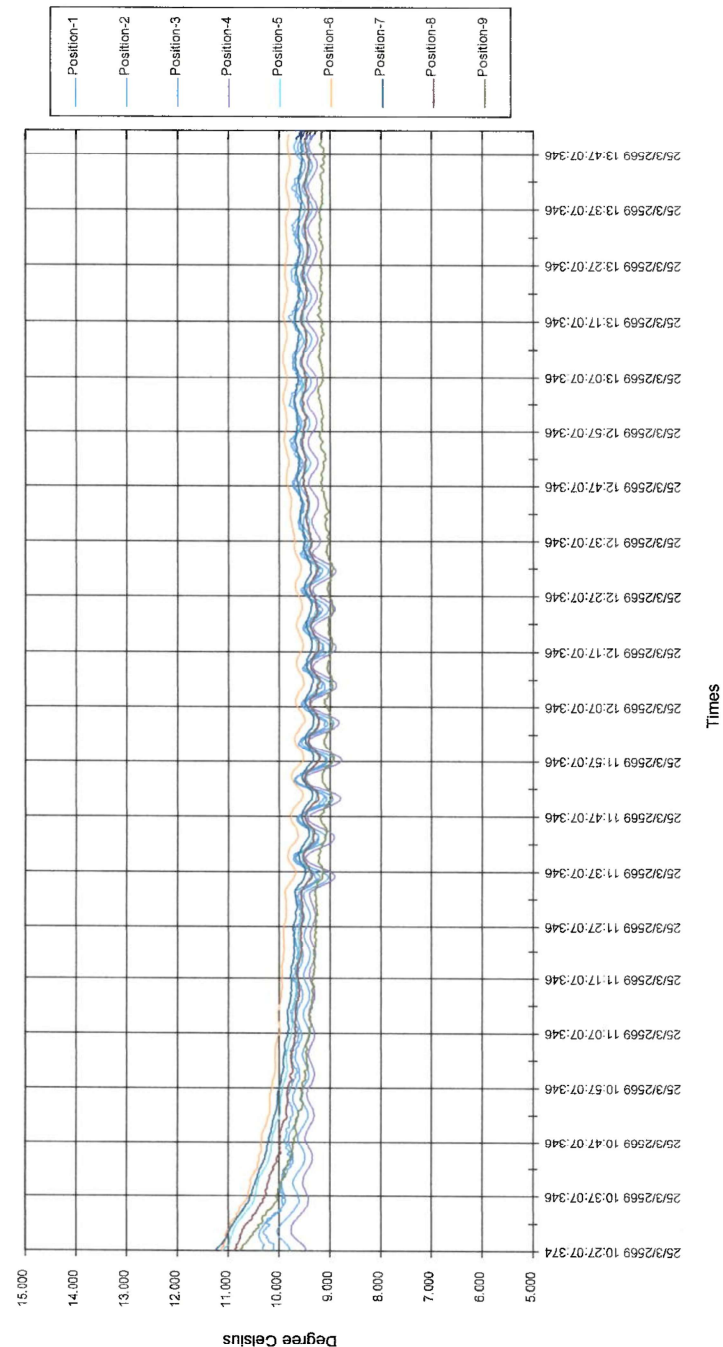
APPROVED SIGNATORY :



Incubator

Model. SRI20-2 S/N. 08027015 ID No. C2015019

Cert No. 26/1091





Certificate of Calibration

Certificate No.: C24260098

Page: 2 of 2

Equipment: CONDUCTIVITY METER
Manufacturer: HACH
Model: HQ14d
Serial No.: 141200015083
ID No.: -
Condition of the item: Normal

Certificate No.: C24260098
Job No.: WO-00118709
Issued Date: 28 April 2026
Page: 1 of 2

Customer: SGS (THAILAND) CO., LTD.
 1/209, 1/211 Moo 1, Tambol Banchang,
 Amphur Banchang, Rayong 21130 Thailand

Environment Condition: Temperature 23 °C ± 2 °C
 Relative Humidity 50 % ± 15 %

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

Calibration By: Mr.Pongpisut Suebchantha

Calibration Date: 28 April 2026

The Method Used: In house method, CAL-WI-49, base on ASTM D 1125-14 and D 5391-14

Traceability: This certificate is traceable to the SI Units maintained by CRM of NIST(SRM) through CPA chem Co., Ltd. (ISO/IEC 17034) Certificate No. 1100180, 1100182, 1100184

Calibration Results:

Manufacturer: HACH **Model :** CDC401 **Electrode Serial No.:** 150122587009

Before Adjustment

Standard Conductivity Solution	Unit Under Calibration Reading	Correction	Coverage Factor (k)	Uncertainty (±)
25.000 μS/cm	26.2 μS/cm	-1.200 μS/cm	2.00	0.21 μS/cm
1413.5 μS/cm	1395 μS/cm	18.5 μS/cm	2.00	9.0 μS/cm
111.3 mS/cm	109.6 mS/cm	1.7 mS/cm	2.00	0.67 mS/cm

After Adjustment ; at 1413.5 μS/cm

Standard Conductivity Solution	Unit Under Calibration Reading	Correction	Coverage Factor (k)	Uncertainty (±)
25.000 μS/cm	26.4 μS/cm	-1.400 μS/cm	2.00	0.21 μS/cm
1413.5 μS/cm	1413 μS/cm	0.5 μS/cm	2.00	9.0 μS/cm
111.3 mS/cm	111.6 mS/cm	-0.3 mS/cm	2.00	0.67 mS/cm

The End of Certificate

Person in charge

Authorized signatory

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

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with Evaluation of measurement data - Guide to the expression of uncertainty in measurement (JCGM 100).

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

บริษัท ดีเคเอส อีเซีย จำกัด
 DKSH Technology Limited
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Delivering Growth - in Asia and Beyond.

CAL-FM-C24-10: 30 Jun 2025

บริษัท ดีเคเอส อีเซีย จำกัด
 DKSH Technology Limited
 2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
 2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
 Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C24-10: 30 Jun 2025

Checklist for Conductivity Meter

Worksheet number: WO-00118709

Instrument type: Conductivity Meter

Model: HQ14d

S/N: 141200015083

Check (receive)		Checklist	Check (send)		Note
28 Apr 2026			28 Apr 2026		
Normal	Defective		Normal	Defective	
☒	☐	1. Integrity of the tools	☒	☐	
☒	☐	2. Cleanliness of tools	☒	☐	
☒	☐	3. On-Off Swithch	☒	☐	
☒	☐	4. Keypad	☒	☐	
☒	☐	5. Display, Screen Contrast	☒	☐	
☒	☐	6. Electrode and Connection Cable	☒	☐	
☐	☐	7. Electrode (Dust Protection Hood)	☐	☐	
☐	☐	8. Stand	☐	☐	

Recommend : Electrode Measurement Temperature 25.1 °C by Control Waterbath at 25.0 °C

Mr.Pongpisut Suebchantha
Service Engineer



ARCHEMICA

Certificate of Calibration

Aquion RFIC : Anion System (ID#1054)

This certificate is to verify that instrument below are calibrated
by
Archemica Lab Co.,Ltd.

Aquion S/N 220380025

AS-DV S/N 2203880170

For

SGS (Thailand) Limited (Rayong Branch).



Operator Signature

Date: 26 / May / 2026

Applications Chemist



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert.No.: 26CH581
Page.: 1 of 3

Equipment : pH / Conductivity Meter
Manufacturer : Mettler Toledo
Model : S213
Serial No. : B902060027
ID No. : P20190019
Condition As-Received: Used Item
Received Date : 28 May 2026
Calibration Date : 29 May 2026
Reference : 2605-0926WSC-3
Submitted by : SGS (Thailand) Limited
1/209, 1/211 Moo 1, T.Ban Chang,
A.Ban Chang, Rayong 21130
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with DC voltage
standard and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with temperature standard
Calibrated by : 
Approved by : 
Issue Date : 01 June 2026

Approved Signatory

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Cert.No.: 26CH581
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 1.685	CPA chem	1005300	15 June 2026
pH 4.008	CPA chem	1187328	18 Jan 2028
pH 6.979	CPA chem	1187330	18 Jan 2027
pH 10.010	CPA chem	1187332	18 Jan 2027

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Document Process Calibrator at pH (1.7,4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: B902060027	1.680	314.73	314.6	1.680	0.058	2.00
	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.4	10.000	0.058	2.00



Cert.No.: 26CH581
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing four buffers standard curve by using buffer nominal pH (1.7,4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement ($\pm$)	Coverage factor k
pH Electrode S/N.: 8512743	1.685	1.686	320.9	0.0044	2.00
	4.008	4.007	183.1	0.0044	2.00
	6.979	6.979	9.2	0.0084	2.00
	10.010	10.011	-163.4	0.0070	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab Expert Pro-ISM
- Serial No. : 8512743

Dimension of probe

- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement ($\pm$ °C)	Coverage factor k
25.0	25.001	25.0	-0.001	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

-000-

Calibration Certificate ID
TH3066-001-031626-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.

846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company:	SGS (Thailand) Co., Ltd.		
Address:	1/209,1/211 Moo 1, Ban Chang		
City:	Ban Chang	Contact:	Sukanda Kerdsongsang
Zip / Postal:	21130		
State / Province:	Rayong		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	Terminal Model:	SAT
Model:	XS205DU	Terminal Serial No.:	B036065880
Serial No.:	B036065880	Terminal Asset No.:	N/A
Instrument Type:	Weighing Instrument	Building:	LABORATORY
Asset Number:	N/A	Floor:	1
		Room:	Balance
Range	Max. Capacity	Readability (d)	
1	81 g	0.00001 g	
2	220 g	0.0001 g	

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)

METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found and As Left calibrations.

The sensitivity/span of the weighing instrument was adjusted before As Found and As Left calibrations with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 19.6 °C	End: 19.1 °C	Start: 46.2 %	End: 43.7 %
As Left	Start: 19.1 °C	End: 18.7 °C	Start: 43.7 %	End: 40.2 %

As Found Calibration Date:	16-Mar-2026
As Left Calibration Date:	16-Mar-2026
Issue Date:	17-Mar-2026

Calibrator:

Approved Signatory:

Technical Manager / Head of Calibration Center

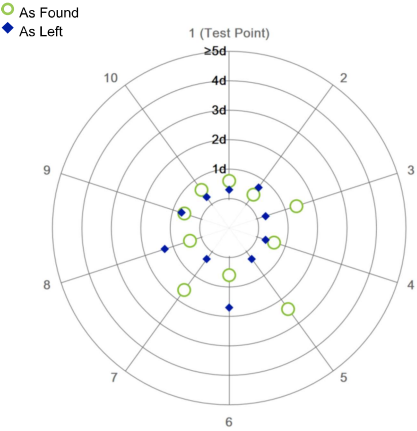
Measurement Results

Repeatability

Test Load: 70 g

	As Found	As Left
1	69.99996 g	70.00009 g
2	69.99997 g	70.00010 g
3	69.99998 g	70.00009 g
4	69.99996 g	70.00009 g
5	69.99999 g	70.00009 g
6	69.99996 g	70.00011 g
7	69.99995 g	70.00009 g
8	69.99997 g	70.00008 g
9	69.99996 g	70.00010 g
10	69.99996 g	70.00009 g

Standard Deviation	0.000012 g	0.000008 g
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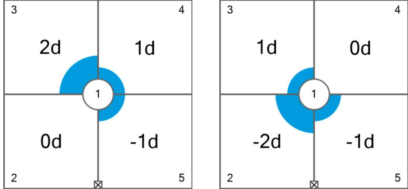
The "d" in the graph represents the readability of the range/interval in which the test was performed.
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9997 g	100.0000 g
2	99.9997 g	99.9998 g
3	99.9999 g	100.0001 g
4	99.9998 g	100.0000 g
5	99.9996 g	99.9999 g

Maximum Deviation	0.0002 g	0.0002 g
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The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

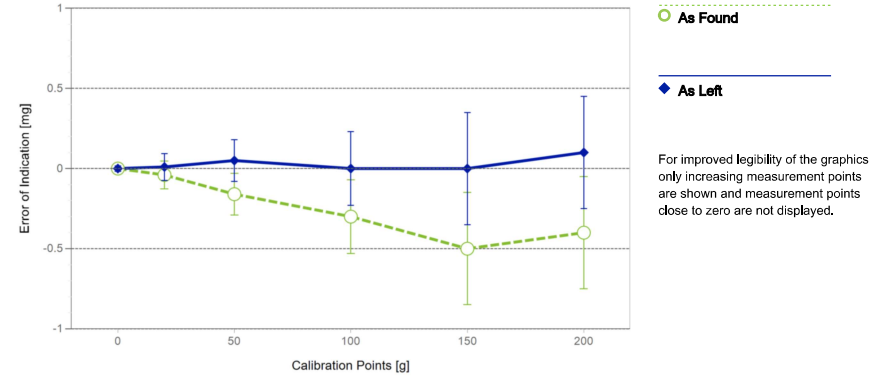
As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.024 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.026 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.029 mg	2
4	0.99999 g	0.99999 g	0.00000 g	0.036 mg	2
5	5.00001 g	5.00001 g	0.00000 g	0.051 mg	2
6	10.00000 g	9.99996 g	-0.00004 g	0.064 mg	2
7	20.00002 g	19.99998 g	-0.00004 g	0.086 mg	2
8	50.00004 g	49.99988 g	-0.00016 g	0.13 mg	2
9	100.0000 g	99.9997 g	-0.0003 g	0.23 mg	2
10	150.0000 g	149.9995 g	-0.0005 g	0.35 mg	2
11 ' 1	200.0000 g	199.9996 g	-0.0004 g	0.35 mg	2

As Left

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.017 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.020 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.023 mg	2
4	0.99999 g	0.99999 g	0.00000 g	0.032 mg	2
5	5.00001 g	5.00001 g	0.00000 g	0.048 mg	2
6	10.00000 g	10.00001 g	0.00001 g	0.062 mg	2
7	20.00002 g	20.00003 g	0.00001 g	0.084 mg	2
8	50.00004 g	50.00009 g	0.00005 g	0.13 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.23 mg	2
10	150.0000 g	150.0000 g	0.0000 g	0.35 mg	2
11 ' 1	200.0000 g	200.0001 g	0.0001 g	0.35 mg	2

*The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS32	Date of Issue:	14-Jan-2026
Certificate Number:	26-004835	Calibration Due Date:	13-Jul-2027

Weight Set 2: OIML E2

Weight Set No.:	WS32-5	Date of Issue:	10-Feb-2026
Certificate Number:	26-020922	Calibration Due Date:	09-Aug-2027

Thermo Hygrometer

Equipment No.:	IN324	Date of Issue:	13-Jan-2026
Certificate Number:	SG-H-00041/69	Calibration Due Date:	13-Jan-2027

Remarks

FACT adjustment functionality activated
Value of the built-in weight adjusted
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide calibration laboratory
Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: $3 K$

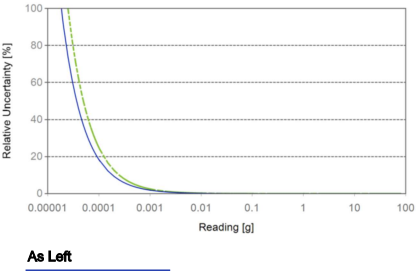
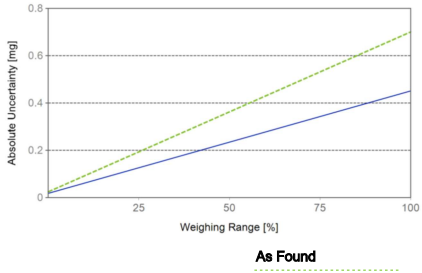
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.00001 g	81 g	$U_1 = 0.025 \text{ mg} + 0.00835 \text{ mg/g} \cdot R$	$U_1 = 0.018 \text{ mg} + 0.00535 \text{ mg/g} \cdot R$
2	0.0001 g	220 g	$U_2 = 0.06 \text{ mg} + 0.00837 \text{ mg/g} \cdot R$	$U_2 = 0.06 \text{ mg} + 0.00530 \text{ mg/g} \cdot R$

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.00220 g	0.025 mg	1.1%	0.018 mg	0.82%
0.02200 g	0.025 mg	0.11%	0.018 mg	0.082%
0.22000 g	0.027 mg	0.012%	0.019 mg	0.0087%
2.20000 g	0.043 mg	0.0020%	0.030 mg	0.0014%
220.0000 g	1.9 mg	0.00086%	1.2 mg	0.00056%



The weighing range shown in the absolute uncertainty graph refers to the first interval/range of the device.



Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
www.mt.com/ACC-Cert-Info



GWP™ Certificate



Process Requirements	
Weighing Tolerance	1%
Smallest Net Weight	0.01000 g
Safety Factor	As found = 1; As left = 2

Results As Found	
Minimum Weight Determined	0.00249 g
Measurement Uncertainty at the Smallest Net Weight	0.25%



The instrument meets the process requirements.

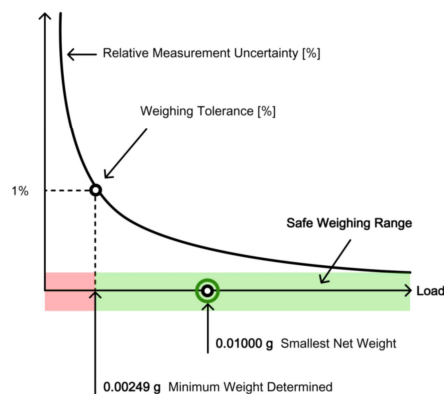
Results As Left	
Minimum Weight Determined at the Safety Factor	0.00368 g
Minimum Weight Determined	0.00184 g
Measurement Uncertainty at the Smallest Net Weight	0.18%



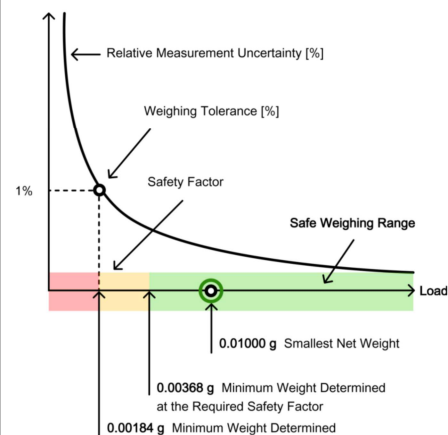
The instrument meets the process requirements.

Safe Weighing Range	
Results As Found	Results As Left

Measurement Uncertainty [%]



Measurement Uncertainty [%]



Are you looking for some clarifications on the terms and Safe Weighing Range graph?

More information at:
www.mt.com/GWP-Cert-Info



Minimum Weight

As Found Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors					
Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.02507 g	0.05056 g	0.07649 g	0.12969 g	0.27119 g
0.2%	0.01248 g	0.02507 g	0.03776 g	0.06347 g	0.12969 g
0.5%	0.00498 g	0.00998 g	0.01499 g	0.02507 g	0.05056 g
1%	0.00249 g	0.00498 g	0.00748 g	0.01248 g	0.02507 g
2%	0.00125 g	0.00249 g	0.00374 g	0.00623 g	0.01248 g
5%	0.00050 g	0.00100 g	0.00150 g	0.00249 g	0.00498 g

Result:

Pass



The instrument meets the process requirements.

As Left Minimum Weight Table: Minimum weights for different weighing tolerances and safety factors					
Weighing Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.01848 g	0.03716 g	0.05604 g	0.09442 g	0.19417 g
0.2%	0.00922 g	0.01848 g	0.02780 g	0.04657 g	0.09442 g
0.5%	0.00368 g	0.00737 g	0.01107 g	0.01848 g	0.03716 g
1%	0.00184 g	0.00368 g	0.00553 g	0.00922 g	0.01848 g
2%	0.00092 g	0.00184 g	0.00276 g	0.00461 g	0.00922 g
5%	0.00037 g	0.00074 g	0.00111 g	0.00184 g	0.00368 g

Result:

Pass



The instrument meets the process requirements.

The minimum weight values are calculated from the measurement uncertainty in use equation for various weighing tolerances and safety factors.

At the minimum weight, the relative uncertainty in use equals the weighing tolerance divided by the safety factor. If "N/A" is shown in the minimum weight table, no appropriate value could be calculated.

The information and the pass-fail assessment presented in this certificate apply to the fine range.

METTLER TOLEDO is not responsible for the definition of the process requirements. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.



Certificate of Conformity

BANGKOK INDUSTRIAL GAS CO.,LTD.

1 Park Silom Tower, 24th Floor, Convent Road

Silom, Bangrak, Bangkok 10500 Thailand

Tel : (662) 481-6789 Fax : (662) 481-6790

Customer Name : SGS (Thailand) Co., Ltd.				Delivery Date : 21 Feb 2024			
Product : 1100060				Analyzed Date :			
Product Name : CY N2 UHP 7M3 47S CGA580				Best if used by : -			
Cylinder Type : 47 LITERS STEEL				Delivery order : 3300191491			
Cylinder Valve : CGA 580				Inspection lot : 040000035171			
Filling Pressure : 2000 PSIG @ 27°C				Gas content : 7 M3			
COMPONENT	UNIT	LOWER LIMIT	UPPER LIMIT	NOMINAL VALUE	ACTUAL VALUE	ANALYTICAL ACCURACY	TEST METHOD

Purity	%	99.9990					
Oxygen	ppm(V)		<3.0000				
Moisture	ppm(V)		<3.0000				
Carbon Monoxide	ppm(V)		<1.0000				
Carbon Dioxide	ppm(V)		<1.0000				
Total Hydrocarbon as CH4	ppm(V)		<1.0000				

Batch : 190224N201,120224N201

Sampling Cylinder :

Cylinder Serial Number : D045082,13D126013,17K686056,20K047009

Remark :

This certificate is issued electronically and is valid without a signature.



Certificate of Conformity

BANGKOK INDUSTRIAL GAS CO.,LTD.

1 Park Silom Tower, 24th Floor, Convent Road

Silom, Bangrak, Bangkok 10500 Thailand

Tel : (662) 481-6789 Fax : (662) 481-6790

Customer Name : SGS (Thailand) Limited				Delivery Date : 03 Jul 2025			
Product : 1100060				Analysis Date :			
Product Name : CY N2 UHP 7M3 47S CGA580				Best if Use By : -			
Cylinder Type : 47 LITERS STEEL				Delivery Order : 3300010176			
Cylinder Valve : CGA 580				Inspection Lot : 40000005366			
Filling Pressure : 2000 PSIG @ 27°C				Gas Content : 7 M3			
COMPONENT	UNIT	LOWER LIMIT	UPPER LIMIT	NOMINAL VALUE	ACTUAL VALUE	ANALYTICAL ACCURACY	TEST METHOD

Purity	%	99.9990					
Oxygen	ppm(V)		<3.0000				
Moisture	ppm(V)		<3.0000				
Carbon Monoxide	ppm(V)		<1.0000				
Carbon Dioxide	ppm(V)		<1.0000				
Total Hydrocarbon as CH4	ppm(V)		<1.0000				

Batch : 010725N201

Sampling Cylinder :

Cylinder Serial Number : D892075,11D062106,D9143166,11D126047

Remark :

This certificate is issued electronically and is valid without a signature.

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI87E3HACAHC
Cylinder Number: ND54008
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO2,BALN

Customer PO Number: 5222003790
Reference Number: 160-402517687-1
Cylinder Volume: 261.0 CF
Cylinder Pressure: 2214 PSIG
Valve Outlet: 580
Certification Date: Aug 26, 2022

Expiration Date: Aug 26, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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.

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	Assay Dates
CARBON DIOXIDE	13.00 %	13.00 %	G1	+/- 0.5% NIST Traceable	08/26/2022
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	200605-04	6088256Y	24.63 % CARBON DIOXIDE/NITROGEN	+/- 0.4%	Feb 08, 2027

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA VA5011 TSV6VU9P NDIR CO2	NDIR	Aug 03, 2022

Triad Data Available Upon Request

NOTES: NET WEIGHT 9.17 Kgs
GROSS WEIGHT 49.06 Kgs
PO# 5222003790



Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02NI87E3HA0000
Cylinder Number: GN0019211
Laboratory: 124 - Riverton (SAP) - NJ
PGVP Number: B52019
Gas Code: CO2,BALN

Reference Number: 82-401420324-1
Cylinder Volume: 260.5 CF
Cylinder Pressure: 2214 PSIG
Valve Outlet: 580
Certification Date: Feb 14, 2019

Expiration Date: Feb 14, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 volume/volume 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	Assay Dates
CARBON DIOXIDE	13.00 %	13.02 %	G1	+/- 0.7% NIST Traceable	02/14/2019
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060629	CC413730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 09, 2019

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA 510-CO2-19GYCXEG	NDIR	Feb 04, 2019

Triad Data Available Upon Request

NOTES:

Gross Weight: 108.50 lbs.
Net Weight: 20.23 lbs.
PO# 5219000555

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02NI79E3HA0000 Reference Number: 82-401420321-1
Cylinder Number: GN0018529 Cylinder Volume: 271.2 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2214 PSIG
PGVP Number: B52019 Valve Outlet: 580
Gas Code: CO2,BALN Certification Date: Feb 14, 2019

Expiration Date: Feb 14, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 volume/volume 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	Assay Dates
CARBON DIOXIDE	21.00 %	20.95 %	G1	+/- 0.8% NIST Traceable	02/14/2019
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061545	CC354843	19.87 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2024
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle		
Horiba VIA 510-CO2-19GYCXEG			NDIR		
			Last Multipoint Calibration		
			Feb 04, 2019		

Triad Data Available Upon Request

NOTES:

Gross Weight: 109.98 lbs.

Net Weight: 21.95 lbs.

PO# 5219000555

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

Page 1 of 82-401420321-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI79E3HA0000 Reference Number: 160-402500111-1
Cylinder Number: ND11246 Cylinder Volume: 271.0 CF
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2214 PSIG
PGVP Number: A12022 Valve Outlet: 580
Gas Code: CO2,BALN Certification Date: Aug 08, 2022

Expiration Date: Aug 08, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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.

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	Assay Dates
CARBON DIOXIDE	21.00 %	21.02 %	G1	+/- 0.4% NIST Traceable	08/08/2022
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	200605-04	6088256Y	24.63 % CARBON DIOXIDE/NITROGEN	+/- 0.4%	Feb 08, 2027
ANALYTICAL EQUIPMENT					
Instrument/Make/Model			Analytical Principle		
HORIBA VA5011 T5V6VU9P NDIR CO2			NDIR		
			Last Multipoint Calibration		
			Aug 03, 2022		

Triad Data Available Upon Request

NOTES: Gross Weight: 49.2 Kg

Net Weight: 10.0 Kg

PO# 5222003790



Approved for Release

Page 1 of 1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI88E200000C
Cylinder Number: 5139917Y
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: O2,BALN

Reference Number: 160-402891090-1
Cylinder Volume: 216.6 CF
Cylinder Pressure: 2014 PSIG
Valve Outlet: 590
Certification Date: Nov 27, 2023

Expiration Date: Nov 27, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	12.00 %	12.07 %	G1	+/- 0.4% NIST Traceable	11/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Nov 08, 2023

Triad Data Available Upon Request

NOTES: Gross Weight: 59.3Kg
Net Weight: 7.2 Kg
PO# 5223006228



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Page 1 of 1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI88E200000C
Cylinder Number: 5139910Y
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: O2,BALN

Reference Number: 160-402891090-1
Cylinder Volume: 216.6 CF
Cylinder Pressure: 2014 PSIG
Valve Outlet: 590
Certification Date: Nov 27, 2023

Expiration Date: Nov 27, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	12.00 %	12.09 %	G1	+/- 0.4% NIST Traceable	11/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Nov 08, 2023

Triad Data Available Upon Request

NOTES: Gross Weight: 59.3Kg
Net Weight: 7.2 Kg
PO# 5223006228



Approved for Release



Page 1 of 1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI79E3HAC2EC
Cylinder Number: ND60790
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: O2,BALN

Reference Number: 160-402311012-1
Cylinder Volume: 250.6 CF
Cylinder Pressure: 2214 PSIG
Valve Outlet: 590
Certification Date: Jan 20, 2022

Expiration Date: Jan 20, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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.

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	Assay Dates
OXYGEN	21.00 %	20.87 %	G1	+/- 0.4% NIST Traceable	01/20/2022
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010230	K005228	23.20 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2022

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Jan 06, 2022

Triad Data Available Upon Request

NOTES: Gross Weight: 49.5 Kg
Net Weight: 9 Kg
Cylinder: 300 Aluminum
Valve: CGA 590 Brass
PO# 5221006285



Approved for Release



CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E02NI79E20004DC
Cylinder Number: 4621265Y
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12023
Gas Code: O2,BALN

Reference Number: 160-402891088-1
Cylinder Volume: 218.0 CF
Cylinder Pressure: 2014 PSIG
Valve Outlet: 590
Certification Date: Nov 27, 2023

Expiration Date: Nov 27, 2031

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	21.00 %	20.90 %	G1	+/- 0.5% NIST Traceable	11/27/2023
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Nov 08, 2023

Triad Data Available Upon Request

NOTES: Gross Weight: 59.0 Kg
Net Weight: 7.4 Kg
PO# 5223006228



Approved for Release





บริษัท เพโทร-อินสตรูเมนต์ จำกัด

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http : // www.pico.co.th E-mail-address : Combustion@pico.co.th

Calibration Report

1Single-Point Gas Test Report

Equipment : All Gas Analyzer Customer Name : SGS (Thailand) Limited
Manufacturer : ABB, Thermo Electron Contact Name : Khun Phatsekorn Soonthornwiphat

Standard gas Information

Cylinder Number : GN0029547 Expiration Date: Mar 05, 2032
Sulfur Dioxide (SO₂) = 89.69 ppm Balance Nitrogen
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2032
Carbon Monoxide (CO) = 90.24 ppm Balance Nitrogen
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2032
Nitrogen Oxide (NO) = 91.02 ppm Balance Nitrogen
Cylinder Number : GN0018529 Expiration Date: Feb 14, 2027
Carbon Dioxide (CO₂) = 20.95 % Balance Nitrogen
Cylinder Number : 4621265Y Expiration Date: Nov 27, 2031
Oxygen (O₂) = 20.90 % Balance Nitrogen

VALIDATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant Conclusion
	Ideal	Actual	Error	Ideal	Actual	%Error	
NO	0.00	0.421	0.42	91.02	79.40	-12.77	Not passed
NO _x	0.00	0.452	0.45	91.02	79.50	-12.66	Not passed
SO ₂	0.00	0.7	0.70	89.69	76.30	-14.93	Not passed
CO	0.00	1.384	1.38	90.24	83.20	-7.80	Not passed
CO ₂	0.00	-0.032	-0.03	20.95	18.35	-12.41	Not passed
O ₂	0.00	-0.06	-0.06	20.90	21.00	0.10	Passed

CALIBRATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant Conclusion
	Ideal	Actual	Error	Ideal	Actual	%Error	
NO	0.00	0.001	0.00	91.02	91.02	0.00	Passed
NO _x	0.00	0.001	0.00	91.02	91.02	0.00	Passed
SO ₂	0.00	0.000	0.00	89.69	89.70	0.01	Passed
CO	0.00	0.001	0.00	90.24	90.24	0.00	Passed
CO ₂	0.00	0.001	0.00	20.95	20.95	0.00	Passed
O ₂	0.00	0.00	0.00	20.90	20.90	0.00	Passed

Remark: Percent Error of each Parameter must be less than ± 5 % of reading.

Note : Perform calibration to all analyzer and the result is in the control limits

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



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http : // www.pico.co.th E-mail-address : Combustion@pico.co.th

Calibration Report

Multi-Point Gas Test Report

Equipment : NO-NO₂-NO_x Analyzer (NO_x) Manufacturer : Thermo Fisher Scientific
Model : 42iHL-BZSSDCA Serial Number : 1152640007

Standard gas Information

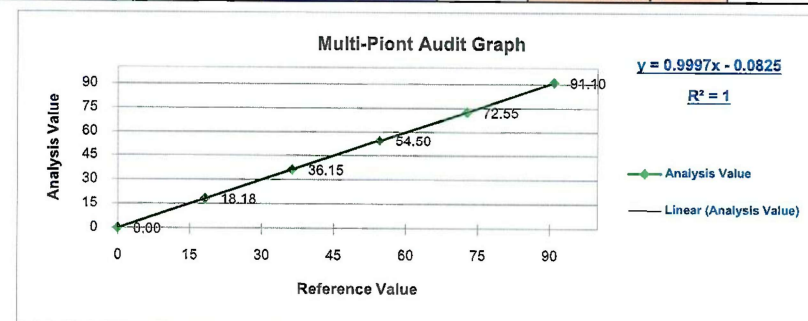
Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026
Nitric Oxide (NO_x) = 91.02 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value		Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	ppm	#1	#2	Avg.			
#1	Zero	0.00	0.01	0.00	0.00	0.00	0.00
#2	20%	18.20	18.20	18.18	-0.02	-0.13	0.13
#3	40%	36.41	36.20	36.15	-0.26	-0.71	0.71
#4	60%	54.61	54.50	54.50	-0.11	-0.21	0.21
#5	80%	72.82	72.60	72.55	-0.27	-0.37	0.37
#6	100%	91.02	91.10	91.10	0.08	0.09	0.09
Measuring Range		100	ppm	Average Difference (%)		0.25	

Correlation Coefficient	1.0000	Slope	0.9997	Intercept	-0.0825
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Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



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Calibration Report

Multi-Point Gas Test Report

Equipment : NO-NO₂-NO_x Analyzer (NO) Manufacturer : Thermo Fisher Scientific
Model : 42iHL-BZSSDCA Serial Number : 1152640007

Standard gas Information

Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026

Nitric Oxide (NO) = 91.0 ppm

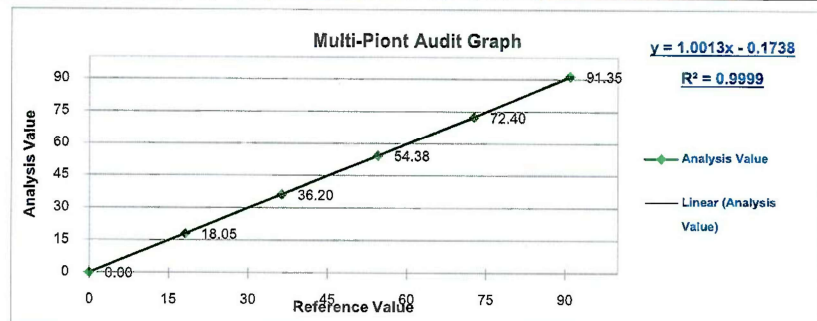
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	ppm		#1	#2	Avg.			
#1	Zero	0.00	0.00	0.00	0.00	0.00	0.00	0.00
#2	20%	18.20	18.10	18.00	18.05	-0.15	-0.85	0.85
#3	40%	36.41	36.10	36.30	36.20	-0.21	-0.57	0.57
#4	60%	54.61	54.40	54.35	54.38	-0.24	-0.43	0.43
#5	80%	72.82	72.40	72.40	72.40	-0.42	-0.57	0.57
#6	100%	91.02	91.30	91.40	91.35	0.33	0.36	0.36
Measuring Range			100 ppm			Average Difference (%)		0.46

Correlation Coefficient	1.0000	Slope	1.0013	Intercept	-0.1738
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Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



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Calibration Report

Multi-Point Gas Test Report

Equipment : SO₂ Analyzer Manufacturer : Thermo Fisher Scientific
Model : 43iHL-DZCA Serial Number : 12403232473

Standard gas Information

Cylinder Number : GN0029547 Expiration Date: Mar 05, 2026

Sulfur Dioxide (SO₂) = 89.69 ppm

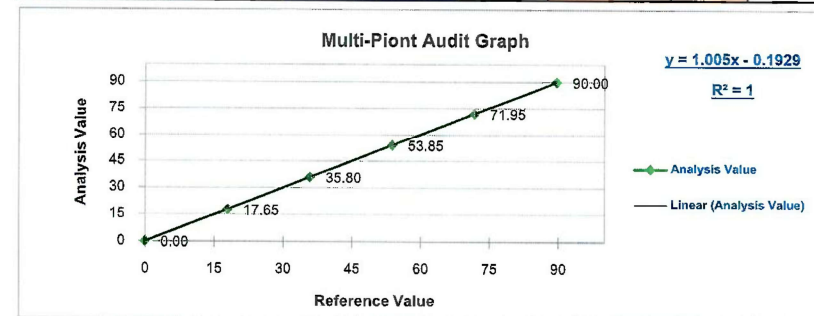
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	ppm		#1	#2	Avg.			
#1	Zero	0.00	0.0	0.0	0.00	0.00	0.00	0.00
#2	20%	17.94	17.6	17.7	17.65	-0.29	-1.61	1.61
#3	40%	35.88	35.8	35.8	35.80	-0.08	-0.21	0.21
#4	60%	53.81	53.7	54.0	53.85	0.04	0.07	0.07
#5	80%	71.75	71.8	72.1	71.95	0.20	0.28	0.28
#6	100%	89.69	90.0	90.0	90.00	0.31	0.35	0.35
Measuring Range			100 ppm			Average Difference (%)		0.42

Correlation Coefficient	1.0000	Slope	1.0050	Intercept	-0.1929
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Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



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http : // www.pico.co.th E-mail-address : Combustion@pico.co.th

Calibration Report

Multi-Point Gas Test Report

Equipment : CO Analyzer Manufacturer : Thermo Fisher Scientific
Model : 48i-BZSCA Serial Number : 1152640010

Standard gas Information

Cylinder Number : GN0029547 Expiration Date : Mar 05, 2026

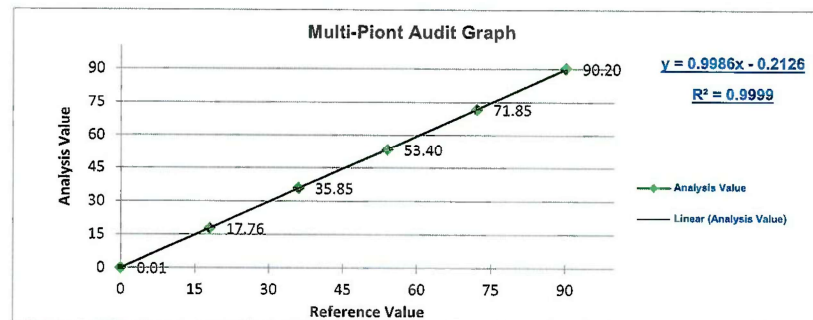
Carbon Monoxide (CO) = 90.24 ppm
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value		Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	ppm	#1	#2	Avg.			
#1	Zero	0.00	0.01	0.01	0.01	0.01	0.01
#2	20%	18.05	17.72	17.80	-0.29	-1.60	1.60
#3	40%	36.10	35.80	35.95	-0.25	-0.68	0.68
#4	60%	54.14	53.30	53.40	-0.74	-1.37	1.37
#5	80%	72.19	71.10	71.60	-0.34	-0.47	0.47
#6	100%	90.24	90.20	90.20	-0.04	-0.04	0.04
Measuring Range		100 ppm			Average Difference (%)		0.70

Correlation Coefficient	1.0000	Slope	0.9986	Intercept	-0.2126
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Remark: Percent error of each level gas must be less than $\pm 5\%$ of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



บริษัท เพโทร-อินสตรูเมนต์ จำกัด

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http : // www.pico.co.th E-mail-address : Combustion@pico.co.th

Calibration Report

Multi-Point Gas Test Report

Equipment : CO₂ Analyzer Manufacturer : Thermo Fisher Scientific
Model : 410i-BZPECA Serial Number : 1170530050

Standard gas Information

Cylinder Number : GN0018529 Expiration Date : Feb 14, 2027

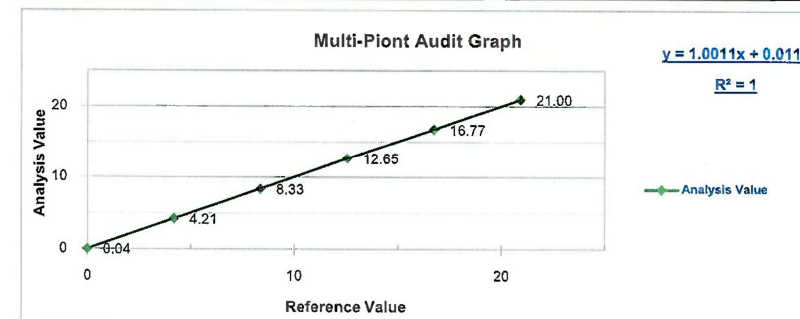
Carbon Dioxide (CO₂) = 20.95 %

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value		Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	%	#1	#2	Avg.			
#1	Zero	0.00	0.04	0.04	0.04	0.04	0.04
#2	20%	4.19	4.20	4.21	0.02	0.48	0.48
#3	40%	8.38	8.30	8.33	-0.05	-0.60	0.60
#4	60%	12.57	12.60	12.70	0.08	0.64	0.64
#5	80%	16.76	16.70	16.83	0.00	0.03	0.03
#6	100%	20.95	21.00	21.00	0.05	0.24	0.24
Measuring Range		25 %			Average Difference (%)		0.34

Correlation Coefficient	1.0000	Slope	1.0011	Intercept	0.0119
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Remark: Percent error of each level gas must be less than $\pm 5\%$ of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026



บริษัท เพโทร-อินสตรูเมนต์ จำกัด

PETRO-INSTRUMENTS CORP., LTD.

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http : // www.pico.co.th E-mail-address : Combustion@pico.co.th

Calibration Report

Multi-Point Gas Test Report

Equipment : O₂ Analyzer Manufacturer : ABB
Model : AO2020 Serial Number: 3.269410.5

Standard gas Information

Cylinder Number : 4621265Y

Expiration Date: Nov 27, 2031

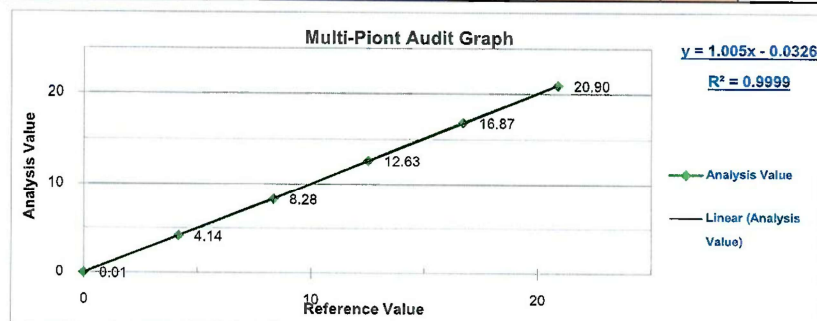
Oxygen (O₂) = 20.90 %

Balance Nitrogen

Multi-Point Gas Test Data

Reference gas value		Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.<±5%)
Level	%	#1	#2	Avg.			
#1	Zero	0.00	0.01	0.01	0.01	0.01	0.01
#2	20%	4.18	4.10	4.14	-0.04	-1.08	1.08
#3	40%	8.36	8.20	8.28	-0.08	-0.96	0.96
#4	60%	12.54	12.60	12.65	0.09	0.68	0.68
#5	80%	16.72	16.84	16.90	0.15	0.90	0.90
#6	100%	20.90	20.90	20.90	0.00	0.00	0.00
Measuring Range		25	%	Average Difference (%)		0.60	

Correlation Coefficient	1.0000	Slope	1.0050	Intercept	-0.0326
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Remark: Percent error of each level gas must be less than ± 5 % of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026

CALIBRATION REPORT

PAGE 7 OF 10

PM-SGS CEMs MOBILE#03-2026



บริษัท เพโทร-อินสตรูเมนต์ จำกัด

PETRO-INSTRUMENTS CORP., LTD.

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Calibration Report

Calibration Drift, LDL and Time Gas Response Test Report

ANALYZER TESTED LIST

ANALYZER NAME	BRAND	MODEL	SERIAL NUMBER
CO ANALYZER	THERMO ELECTRON	48i-BZSCA	1152640010
CO ₂ ANALYZER	THERMO ELECTRON	410i-BZPECA	1170530050
O ₂ ANALYZER	ABB	AO2020	3.269410.5
NO _x ANALYZER	THERMO ELECTRON	42iHL-BZSSDCA	1152640007
SO ₂ ANALYZER	THERMO ELECTRON	43iHL-DZCA	12403232473

CALIBRATION DRIFT TESTING REPORT

Parameters	Zero			Span			Judgement
	15-Jan-26	16-Jan-26	%DRIFT	15-Jan-26	16-Jan-26	%DRIFT	
CO	0.006	-0.012	0.00	90.00	90.00	0.00	PASSED
CO ₂	-0.033	-0.041	-0.03	21.00	21.00	0.00	PASSED
O ₂	-0.070	-0.080	-0.04	20.95	20.96	0.04	PASSED
NO	0.041	0.042	0.00	91.10	90.90	-0.04	PASSED
NO _x	0.058	0.062	0.00	91.00	91.00	0.00	PASSED
SO ₂	0.230	0.180	-0.01	90.70	90.50	-0.04	PASSED

LOWER DETECTABLE LIMIT TESTING REPORT

Parameters	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	STDEV.
CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
CO ₂	-0.032	-0.029	-0.550	-0.055	-0.018	-0.046	-0.041	-0.051	-0.033	-0.048	0.162
O ₂	-0.053	-0.055	-0.057	-0.058	-0.059	-0.061	-0.062	-0.064	-0.064	-0.065	0.004
NO	0.037	0.042	0.039	0.037	0.035	0.038	0.038	0.042	0.039	0.040	0.002
NO _x	0.043	0.042	0.042	0.045	0.038	0.036	0.036	0.044	0.050	0.054	0.006
SO ₂	0.244	0.234	0.216	0.224	0.232	0.189	0.204	0.221	0.215	0.212	0.016

CONCLUSION

CO Lower detectable limit (LDL) value is 0.000 PPM
CO₂ Lower detectable limit (LDL) value is 0.162 %
O₂ Lower detectable limit (LDL) value is 0.004 %VOL.
NO Lower detectable limit (LDL) value is 0.002 PPM
NO_x Lower detectable limit (LDL) value is 0.006 PPM
SO₂ Lower detectable limit (LDL) value is 0.016 PPM

GAS RESPONSE TIME TESTING REPORT

CO Response time 12 <20 Sec
CO₂ Response time 12 <20 Sec
O₂ Response time 8 <20 Sec
NO_x Response time 15 <20 Sec
SO₂ Response time 15 <20 Sec
With Sampling Line 80 meter 60 <120 Sec

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026

CALIBRATION REPORT

PAGE 8 OF 10

PM-SGS CEMs MOBILE#03-2026



บริษัท เพโทร-อินสตรูเมนต์ จำกัด

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Calibration Report

VALIDATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant Conclusion
	Ideal	Actual	Error	Ideal	Actual	%Error	
CO	0.00	0.014	0.01	905.9	788	-13.01	Not passed

CALIBRATION RESULT TABLE

Parameter	ZERO			SPAN			Resultant Conclusion
	Ideal	Actual	Error	Ideal	Actual	%Error	
CO	0.00	0.017	0.02	905.9	906	0.01	Passed

Remark: Percent Error of each Parameter must be less than $\pm 5\%$ of reading.



บริษัท เพโทร-อินสตรูเมนต์ จำกัด

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Calibration Report

Multi-Point Gas Test Report

Equipment : CO Analyzer Manufacturer : Thermo Fisher Scientific
Model : 48I-BZSCA Serial Number : 1152640010

Standard gas Information

Cylinder Number : ND57460

Expiration Date: Jul 20, 2029

Carbon Monoxide (CO) = 905.9 ppm

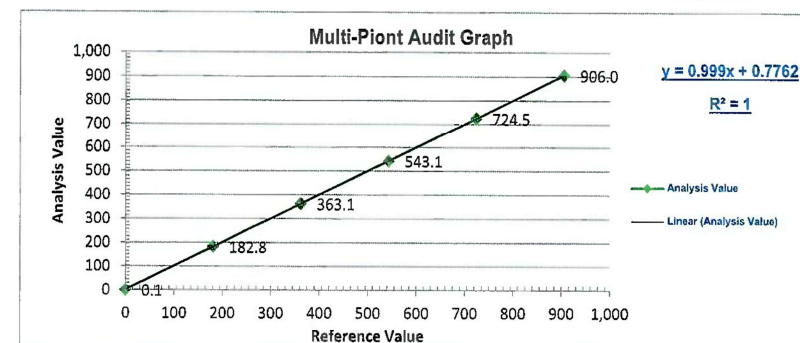
Balance Nitrogen

Zero air used Nitrogen 99.999%

Multi-Point Gas Test Data

Reference gas value			Analyzer Display Value			Error (ppm)	% Error	%ABS (Std.< $\pm 5\%$)
Level		ppm	#1	#2	Avg.			
#1	Zero	0.0	0.1	0.1	0.1	0.10	0.10	0.10
#2	20%	181.2	182.7	182.8	182.8	1.57	0.87	0.87
#3	40%	362.4	363.2	363.0	363.1	0.74	0.20	0.20
#4	60%	543.5	543.0	543.2	543.1	-0.44	-0.08	0.08
#5	80%	724.7	724.0	725.0	724.5	-0.22	-0.03	0.03
#6	100%	905.9	906.0	906.0	906.0	0.10	0.01	0.01
Measuring Range		1,000 ppm	Average Difference (%)			0.22		

Correlation Coefficient	1.0000	Slope	0.9990	Intercept	0.7762
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Remark: Percent error of each level gas must be less than $\pm 5\%$ of reading.

Multi-Point gas test result ☒ Passed ☐ Not Passed

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026

CALIBRATION REPORT

PAGE 9 OF 10

PM-SGS CEMs MOBILE#03-2026

DONE BY: Mr. Phuwanai Nakakul

DATE: 12-16 January 2026

CALIBRATION REPORT

PAGE 10 OF 10

PM-SGS CEMs MOBILE#03-2026



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Website : <http://www.horiba.com>

MULTI-POINT GAS TEST REPORT OF NITRIC OXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	1
Serial Number	J4D2YU7S	Coefficient	1.0389
		Room Temperature	25.4 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	NO
Concentration	99.999 %	Concentration	89.94 ppm
Expiration Date	-	Expiration Date	28-Sep-30

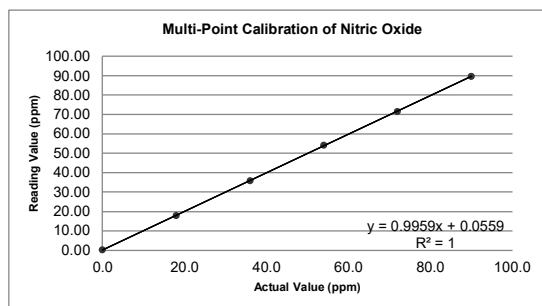
Measurement Range	100
% Measurement Range	89.94

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.1	0.2	0.2	0.17	0.17	
20%	17.99	17.80	17.80	17.90	17.83	-0.15	0.86
40%	35.98	35.50	35.80	35.80	35.70	-0.28	0.77
60%	53.96	54.20	54.09	54.12	54.14	0.17	0.32
80%	71.95	71.40	71.60	71.70	71.57	-0.39	0.54
100%	89.94	89.40	89.70	89.80	89.63	-0.31	0.34
Average						0.56	
Result						PASS	

Slope	0.9959	Interception	0.0559	Correlation Coefficient	1.0000
%Slope	-0.4146%	% Interception	0.0559%	% Correlation Coefficient	-0.0018%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 30-Oct-2025

Approve By

Date 1-Nov-2025



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MULTI-POINT GAS TEST REPORT OF SULFUR DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.1295
		Room Temperature	25.4 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	SO2
Concentration	99.999 %	Concentration	89.71 ppm
Expiration Date	-	Expiration Date	28-Sep-30

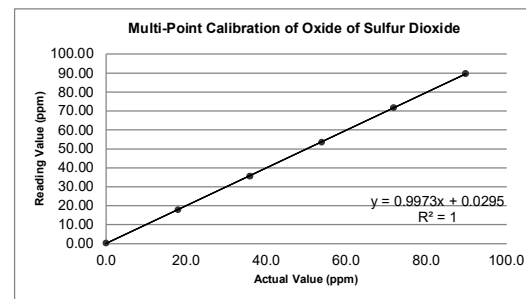
Measurement Range	200
% Measurement Range	44.855

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.2	0.3	0.3	0.27	0.27	
20%	17.94	17.87	17.80	18.00	17.89	-0.05	0.29
40%	35.88	35.30	35.70	35.70	35.57	-0.32	0.88
60%	53.83	53.20	53.60	53.70	53.50	-0.33	0.61
80%	71.77	71.40	71.80	72.00	71.73	-0.03	0.05
100%	89.71	89.40	89.70	89.80	89.63	-0.08	0.09
Average						0.38	
Result						PASS	

Slope	0.9973	Interception	0.0295	Correlation Coefficient	1.0000
%Slope	-0.2665%	% Interception	0.0148%	% Correlation Coefficient	-0.0018%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 30-Oct-2025

Approve By

Date 1-Nov-2025



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MULTI-POINT GAS TEST REPORT OF CARBON MONOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.3248
		Room Temperature	25.4 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND58962
Component	N2	Component	CO
Concentration	99.999 %	Concentration	89.58 ppm
Expiration Date	-	Expiration Date	28-Sep-30

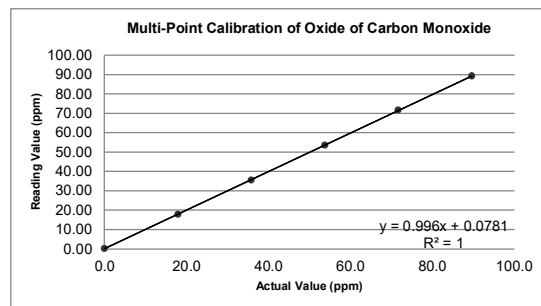
Measurement Range	200
% Measurement Range	44.79

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (ppm)				Difference	
		1	2	3	Average	ppm	%
0%	0.0	0.2	0.3	0.3	0.27	0.27	
20%	17.92	17.92	17.87	17.70	17.83	-0.09	0.48
40%	35.83	35.20	35.60	35.70	35.50	-0.33	0.93
60%	53.75	53.30	53.70	53.90	53.63	-0.11	0.21
80%	71.66	71.40	71.70	71.80	71.63	-0.03	0.04
100%	89.58	89.00	89.40	89.40	89.27	-0.31	0.35
Average						0.40	
Result						PASS	

Slope	0.9960	Interception	0.0781	Correlation Coefficient	1.0000
%Slope	-0.4013%	% Interception	0.0390%	% Correlation Coefficient	-0.0013%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 30-Oct-2025

Approve By

Date 1-Nov-2025



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MULTI-POINT GAS TEST REPORT OF CARBON DIOXIDE

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	0
Serial Number	J4D2YU7S	Coefficient	1.0042
		Room Temperature	25.4 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND11246
Component	N2	Component	CO2
Concentration	99.999 %	Concentration	21.02 %
Expiration Date	-	Expiration Date	8-Aug-30

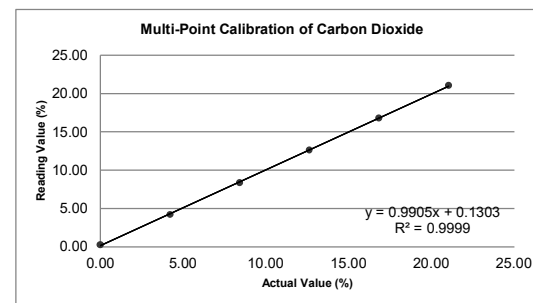
Measurement Range	30
% Measurement Range	70.07

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.20	0.30	0.30	0.27	0.27	
20%	4.20	4.13	4.16	4.17	4.21	0.01	0.14
40%	8.41	8.30	8.38	8.39	8.36	-0.05	0.61
60%	12.61	12.58	12.61	12.64	12.61	0.00	0.02
80%	16.82	16.75	16.77	16.80	16.77	-0.04	0.25
100%	21.02	21.00	21.03	21.05	21.03	0.01	0.03
Average						0.21	
Result						PASS	

Slope	0.9905	Interception	0.1303	Correlation Coefficient	0.9999
%Slope	-0.9492%	% Interception	0.4344%	% Correlation Coefficient	-0.0069%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 30-Oct-2025

Approve By

Date 1-Nov-2025



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MULTI-POINT GAS TEST REPORT OF OXYGEN

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Background	16
Serial Number	J4D2YU7S	Coefficient	1.0266
		Room Temperature	25.4 °C

Standard Gas Information

Zero Gas		Span Gas	
Cylinder Number	D9143166	Cylinder Number	ND60790
Component	N2	Component	O2
Concentration	99.999 %	Concentration	20.87 %
Expiration Date	-	Expiration Date	20-Jan-30

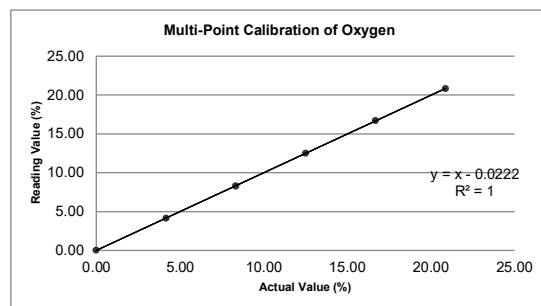
Measurement Range	25
% Measurement Range	83.48

Multi-Point Gas Test Data

Level	Actual Value	Reading Value (%)				Difference	
		1	2	3	Average	%	%
0%	0.00	0.00	0.00	0.00	0.00	0.00	
20%	4.17	4.13	4.18	4.14	4.15	-0.02	0.57
40%	8.35	8.34	8.23	8.26	8.28	-0.07	0.85
60%	12.52	12.48	12.50	12.53	12.50	-0.02	0.15
80%	16.70	16.68	16.72	16.73	16.71	0.01	0.08
100%	20.87	20.82	20.84	20.85	20.84	-0.03	0.16
						Average	0.36
						Result	PASS

Slope	1.0000	Interception	-0.0222	Correlation Coefficient	1.0000
%Slope	0.0000%	% Interception	-0.0889%	% Correlation Coefficient	-0.0007%
Result	PASS	Result	PASS	Result	PASS

Multi-Point Gas Test Chart



Test By

Date 30-Oct-2025

Approved By

Date 30-Nov-2025



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LOWER DETECTABLE LIMIT TESTING REPORT

Equipment Information

Manufacturer	Horiba	Calibration Date	30-Oct-25
Model	HORIBA PG-350	Room Temperature	25.4 °C
Serial Number	J4D2YU7S		

Standard Gas Information

Zero Gas		Component	N2
Cylinder Number	D9143166	Concentration	99.999 %

Parameters	Measurement Range	Unit	Background	Coefficient
NO	100	ppm	1	1.0389
SO ₂	200	ppm	0	1.1295
CO	200	ppm	0	1.3248
CO ₂	30	%	0	1.0042
O ₂	25	%	16	1.0266

TESTING REPORT RESULTS

Parameters	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	STDEV.
NO	0.00	0.10	0.10	0.10	-0.10	-0.10	0.00	-0.10	0.10	0.10	0.092
SO ₂	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.008
CO	0.30	0.30	0.20	0.20	0.30	0.30	0.20	0.30	0.30	0.30	0.048
CO ₂	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.004
O ₂	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.00	0.012

Conclusion

NO Lower detectable limit (LDL) value is	0.092	ppm
SO ₂ Lower detectable limit (LDL) value is	0.008	ppm
CO Lower detectable limit (LDL) value is	0.048	ppm
CO ₂ Lower detectable limit (LDL) value is	0.004	% Vol.
O ₂ Lower detectable limit (LDL) value is	0.012	% Vol.

Test By

Date 30-Oct-2025

Approve By

Date 1-Nov-2025

Test By

Approve By

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0032
Cylinder Number: GN0029553
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12024

Reference Number: 160-402967999-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Feb 27, 2024

Expiration Date: Feb 27, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.55 PPM	G1	+/- 1.1% NIST Traceable	02/20/2024, 02/27/2024
CARBON MONOXIDE	45.00 PPM	45.59 PPM	G1	+/- 0.7% NIST Traceable	02/20/2024
NITRIC OXIDE	45.00 PPM	45.55 PPM	G1	+/- 1.1% NIST Traceable	02/20/2024, 02/27/2024
SULFUR DIOXIDE	45.00 PPM	45.44 PPM	G1	+/- 0.7% NIST Traceable	02/20/2024, 02/27/2024
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	120112-32	KAL004540	49.24 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Aug 31, 2024
NTRM	210607-21	CC708065	48.41 PPM NITRIC OXIDE/NITROGEN	+/- 1.2%	Sep 21, 2025
GMIS	402531833-1	CC740452	51.54 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Dec 05, 2030
PRM	12395	D887660	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 22, 2022
GMIS	124206889139	CC323707	4.097 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
SRM	1693a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 27, 2023
GMIS	071220222B17	EB0141234	50.05 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Dec 21, 2026

The SRM, NTRM, 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	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Feb 01, 2024
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Feb 08, 2024
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2024
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Feb 15, 2024

Approve By

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Triad Data Available Upon Request

NOTES: Gross Weight: 48.3 Kg
Net Weight: 8.2 Kg



Test By

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CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0032
Cylinder Number: GN0032079
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12024

Reference Number: 160-402967999-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Feb 27, 2024

Expiration Date: Feb 27, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.59 PPM	G1	+/- 1.0% NIST Traceable	02/20/2024, 02/27/2024
CARBON MONOXIDE	45.00 PPM	45.67 PPM	G1	+/- 0.7% NIST Traceable	02/20/2024
NITRIC OXIDE	45.00 PPM	45.59 PPM	G1	+/- 0.9% NIST Traceable	02/20/2024, 02/27/2024
SULFUR DIOXIDE	45.00 PPM	45.58 PPM	G1	+/- 0.7% NIST Traceable	02/20/2024, 02/27/2024
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	120112-32	KAL004540	49.24 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Aug 31, 2024
NTRM	210607-21	CC708065	48.41 PPM NITRIC OXIDE/NITROGEN	+/- 1.2%	Sep 21, 2025
GMIS	402531833-1	CC740452	51.54 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Dec 05, 2030
PRM	12395	D887660	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 22, 2022
GMIS	124206889139	CC323707	4.097 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
SRM	1693a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 27, 2023
GMIS	071220222B17	EB0141234	50.05 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Dec 21, 2026

The SRM, NTRM, 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	Analytical Principle	Last Multipoint Calibration
Nicolet ISSO FTIR AUP2010245 CO	FTIR	Feb 01, 2024
Nicolet ISSO FTIR AUP2010245 NO	FTIR	Feb 08, 2024
Nicolet ISSO FTIR AUP2010245 NO2	FTIR	Feb 22, 2024
Nicolet ISSO FTIR AUP2010245 SO2	FTIR	Feb 15, 2024

Triad Data Available Upon Request

NOTES: Gross Weight: 48.3 Kg
Net Weight: 8.2 Kg



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CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0031
Cylinder Number: GN0029540
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12024
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402968380-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Mar 05, 2024

Expiration Date: Mar 05, 2032

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	90.00 PPM	90.66 PPM	G1	+/- 0.6% NIST Traceable	02/27/2024, 03/05/2024
CARBON MONOXIDE	90.00 PPM	90.13 PPM	G1	+/- 0.5% NIST Traceable	02/27/2024
NITRIC OXIDE	90.00 PPM	90.65 PPM	G1	+/- 0.6% NIST Traceable	02/27/2024, 03/05/2024
SULFUR DIOXIDE	90.00 PPM	89.35 PPM	G1	+/- 0.8% NIST Traceable	02/27/2024, 03/05/2024
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	110101-08	KAL003090	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	May 25, 2028
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	± 0.3%	Feb 28, 2025
GMIS	2023042530	CC754387	98.54 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Apr 25, 2031
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027

The SRM, NTRM, 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	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Feb 01, 2024
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Feb 08, 2024
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2024
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Feb 15, 2024

Triad Data Available Upon Request

NOTES:Gross Weight: 48.2 Kg
Net Weight: 8.1 Kg
PO# 5224000763



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CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: BANGKOK INDUSTRIAL
GAS CO LTD
Part Number: E04NI99E3HA0031
Cylinder Number: GN0029547
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12024
Gas Code: CO,NO,NOX,SO2,BALN

Reference Number: 160-402968380-1
Cylinder Volume: 247.0 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Mar 05, 2024

Expiration Date: Mar 05, 2032

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, 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 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. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	90.00 PPM	91.02 PPM	G1	+/- 0.6% NIST Traceable	02/27/2024, 03/05/2024
CARBON MONOXIDE	90.00 PPM	90.24 PPM	G1	+/- 0.5% NIST Traceable	02/27/2024
NITRIC OXIDE	90.00 PPM	91.02 PPM	G1	+/- 0.5% NIST Traceable	02/27/2024, 03/05/2024
SULFUR DIOXIDE	90.00 PPM	89.69 PPM	G1	+/- 0.8% NIST Traceable	02/27/2024, 03/05/2024
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	110101-08	KAL003090	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	May 25, 2028
PRM	C2219101	APE1514048	100.19 PPM NITRIC OXIDE/NITROGEN	± 0.3%	Feb 28, 2025
GMIS	2023042530	CC754387	98.54 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Apr 25, 2031
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
NTRM	160102-22	KAL003820	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Nov 01, 2027

The SRM, NTRM, 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	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Feb 01, 2024
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Feb 08, 2024
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2024
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Feb 15, 2024

Triad Data Available Upon Request

NOTES:Gross Weight: 48.2 Kg
Net Weight: 8.1 Kg
PO# 5224000763



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Meter Console Verification

Dry Gas Meter ID. : ENSS 16113 Date of Calibration : 14-Aug-2025
Instrument Brand : Apex / Model 572 Calibrated By : SY

Wet gas meter Information

Wet gas Brand : Shinagawa Wet gas S/N : 544122
Wet gas Model : W-NK-2.5A Expire Date : 10-Jun-2027

Orifice Setting $\Delta H@$ (mm H ₂ O)	Wet gas		Metering System		Time (min)	Yi	$\Delta H@$
	V _w (L)	T _w (°C)	V _d (L)	T _m (°C)			
13	138.72	25.2	140.0	24.0	12.19	0.9856	48.762
13	138.06	25.0	140.0	24.0	12.22	0.9816	49.564
26	138.64	24.8	140.0	24.5	8.36	0.9870	47.439
26	137.28	24.5	140.0	25.0	8.38	0.9797	48.221
40	273.76	24.3	280.0	25.0	14.08	0.9764	50.367
40	272.64	24.1	280.0	25.0	14.04	0.9730	50.236
50	270.74	23.9	280.0	25.5	12.31	0.9674	50.333
50	271.20	23.8	280.0	26.0	12.32	0.9710	50.178
70	273.46	23.7	280.0	26.0	10.29	0.9776	48.400
70	271.60	23.6	280.0	26.0	10.27	0.9712	48.721
90	268.50	23.6	280.0	26.0	9.11	0.9583	49.595
90	268.50	23.6	280.0	26.0	9.13	0.9583	49.955
Average						0.9739	49.314

Remark : Yi $\leq \pm 0.02$ from average
Yi = 1.00 ± 0.05
 $\Delta H@ \leq \pm 5.08$ mm.H₂O from average
 $\Delta H@ = 46.7 \pm 6.4$ mm.H₂O

Checked By :

Position : Senior Inspector
Date : 14 / 8 / 2025

Approved By :

Position : Technical Specialist Manager
Date : 14 / 08 / 2025

Temperature Display Verification

Dry Gas Meter ID. : ENSS 16113 Date of Calibration : 14-Aug-2025
Instrument Brand : Apex / Model 572 Calibrated By : PK

Temperature Simulator Information

Simulator Brand : Handy Cal Simulator S/N : T1L1015
Simulator Model : CA11E Expire Date : 24-Jul-2026

Standard Value	Instrument Display				
	Stack	Probe	Filter	Aux	Exit
300	300	300	300	300	-
200	200	200	200	200	-
150	151	151	151	151	-
100	101	101	101	101	-
50	51	50	50	51	51
0	0	0	0	0	0
Difference	0.3%	1.0	1.0	1.0	1.0

Remark : Stack $\leq \pm 1.5\%$ Absolute
Probe $\leq \pm 3.0$ °C
Filter $\leq \pm 3.0$ °C
Aux $\leq \pm 3.0$ °C
Exit $\leq \pm 3.0$ °C

Checked By :

Position : Senior Inspector
Date : 14 / 8 / 2025

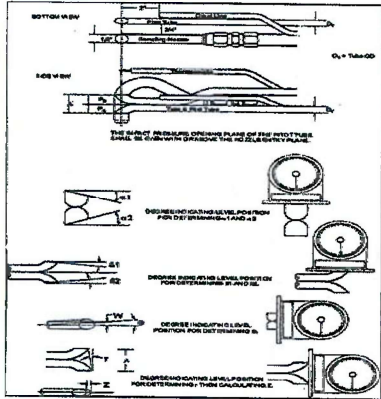
Approved By :

Position : Technical Specialist Manager
Date : 14 / 08 / 2025

SGS

Certificate of Calibration

S-Type Geometric Pitot Tube Calibration
See the Code of Federal Regulations, Title 40, Part 60, Appendix A,
Method 2, Item 4



Pitot tube/Probe No. No.53/A4465

Parameter	Value	Allowable Range	Check
Assembly Level?	Y	Yes or y	PASS
Ports Damaged?	N	No or n	PASS
α1	0.4	-10° < α1 < +10°	PASS
α2	1.1	-10° < α1 < +10°	PASS
β1	1.3	-5° < α1 < +5°	PASS
β2	0.6	-5° < α1 < +5°	PASS
Y	0.9	N/A	-
θ	1.3	N/A	-
D _t	0.375	0.188" to 0.375"	PASS
A	0.93622	2.1D _t ≤ A ≤ 3.0D _t	PASS
A/2D _t	1.248294	1.05 ≤ P _A /D _t ≤ 1.5	PASS
Z = A tan γ	0.014707	Z ≤ 0.125"	PASS
W = A tan θ	0.021246	W ≤ 0.031"	PASS

I certify that: pitot tube/probe No.53/A4465 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification factor of 0.84. See 40 CFR Pt. 60, App A, EPA Method 2

Standard Device

Device Name Digital Inclinator
Manufacturer BASELINE
Model 12-1057
ID No. QC-1824

Expiration data 14-Nov-26
ENSS No. ENSS 22159

Certified by

Date

5/01/2026

Approved by

Date

05/01/26

SGS

Prob Nozzle Diameter Calibration Data Sheet

Date 05/01/2026 Personal CS
Vernier (Digital) Dial Caliper Reference MINV08
Nozzle ID ENSS 092 Stainless Steel Expire Date 05/01/2027

Nozzle No.	Nozzle Diameter (mm)			Hi-Lo	D _{avg}
	D1	D2	D3	ΔD	
1	3.02	3.00	3.00	0.02	3.01
2	4.48	4.42	4.42	0.06	4.44
3	5.80	5.84	5.82	0.04	5.82
4	6.22	6.32	6.24	0.10	6.26
5	7.60	7.50	7.50	0.10	7.53
6	9.04	9.02	9.08	0.06	9.05
7	10.90	10.98	10.92	0.08	10.93

Remark : ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm
D_{avg} = (D1+D2+D3)/3

Checked By :

Position :

Date :

Senior Inspector

5/01/2026

Approved By :

Position :

Date :

Operations Section Head

05/01/26

When you need to be sure

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