

เอกสารแนบ 5

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หนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน



**๑๑ กันยายน ๒๕๖๗**

เรื่อง ต่อยุหน้งสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท โอกลา เทสดีง แอนด์ คอนซัลตัง เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๕ กรกฎาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหน้งสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท โอกลา เทสดีง แอนด์ คอนซัลตัง เซอร์วิส จำกัด จำนวน ๑ แผ่น

ตามคำขอที่อ้างถึง บริษัท โอกลา เทสดีง แอนด์ คอนซัลตัง เซอร์วิส จำกัด ขอต่ออายุหน้งสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๑๙ สถานที่ตั้งเลขที่ ๖๓/๑๓ ซอยเพชรเกษม ๗  
แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท โอกลา เทสดีง แอนด์ คอนซัลตัง เซอร์วิส จำกัด  
ต่ออายุหน้งสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน

- |                           |                            |
|---------------------------|----------------------------|
| ๑) นายธวัชชัย จงวุฒิชัย   | ทะเบียนเลขที่ ว-๒๑๙-ค-๐๐๐๑ |
| ๒) นางสาวปนัดดา พันธกะจับ | ทะเบียนเลขที่ ว-๒๑๙-ค-๐๐๐๒ |
| ๓) นางสาวจามจุรี คำปุย    | ทะเบียนเลขที่ ว-๒๑๙-ค-๐๐๐๓ |

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน

- |                               |                            |
|-------------------------------|----------------------------|
| ๑) นางสาวนิจินาท มะติยาภักดี  | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๑ |
| ๒) นางสาวภาณุชนารถ เขียวชาญ   | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๒ |
| ๓) นางสาวธิดารัตน์ กลัดตลาด   | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๓ |
| ๔) นางสาวเบญจพร อินแก้ว       | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๔ |
| ๕) นางสาววันวิสา หวังแววกกลาง | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๕ |
| ๖) นางสาวรัตตชา ศรีปราสาท     | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๖ |
| ๗) นายปริญญญา กล้าน้อย        | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๗ |
| ๘) นายโกวิท บุฬา              | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๘ |
| ๙) นายพีรพล ถวิลหวัง          | ทะเบียนเลขที่ ว-๒๑๙-จ-๐๐๐๙ |

ค. ขอบข่ายชนิดสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำ/น้ำเสีย และอากาศเสียตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๕ สิงหาคม ๒๕๖๑ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายพรยศ กลั่นกรอง)

รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๔๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th





เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท โอกลา เทสติ้ง แอนด์ คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-๒๑๙  
ที่ ออก ๐๓๑๐(๑)/ ๙๒๔ ๖ ลงวันที่ ๑๑ กันยายน ๒๕๖๗

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรมจำนวน ๑๔ รายการ

น้ำ/น้ำเสีย จำนวน 9 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>[2]</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>[2]</sup>
2	Free Chlorine	Iodometric Method <sup>[2]</sup>
3	Oil & Grease	Liquid-Liquid, Partition Gravimetric Method <sup>[2]</sup>
4	pH	Electrometric Method <sup>[2]</sup>
5	Sulfide	Iodometric Method <sup>[2]</sup>
6	Temperature	Laboratory and Field Methods <sup>[2]</sup>
7	Total Dissolved Solids	Dried at 180 °C <sup>[2]</sup>
8	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method <sup>[2]</sup>
9	Total Suspended Solids	Dried from 103 to 105 °C <sup>[2]</sup>

อากาศเสีย (ปล่องระบาย) จำนวน 5 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	Instrument Analyzer Method <sup>[3]</sup>
2	Opacity	Ringelmann's Method <sup>[1]</sup>
3	Oxides of Nitrogen	Instrument Analyzer Method <sup>[3]</sup>
4	Sulfur Dioxide	Instrument Analyzer Method <sup>[3]</sup>
5	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>[3]</sup>

#### เอกสารอ้างอิง

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำของโรงงาน พ.ศ. 2549. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.
2. APHA, AWWA, WEF. *Standard Methods for the Examination of Water and Wastewater*. 24<sup>th</sup> ed. Washington, DC: APHA, 2023.
3. United States Environmental Protection Agency. *Standard of Performance for New Stationary Source*. 40 CFR 60. Appendix A, 2019.





ที่ อว 0303/167

## ใบรับรองความสามารถห้องปฏิบัติการทดสอบ

ใบรับรองฉบับนี้ให้ไว้เพื่อแสดงว่า

ห้องปฏิบัติการวิเคราะห์ บริษัท โอกลา เทสติ้ง แอนด์ คอนซัลติง เซอร์วิส จำกัด  
เลขที่ 63/13 ซอยเพชรเกษม 7 แขวงวัดท่าพระ  
เขตบางกอกใหญ่ กรุงเทพมหานคร 10600

ได้ผ่านการประเมินความสามารถห้องปฏิบัติการทดสอบตามมาตรฐาน ISO/IEC 17025 : 2017  
และข้อกำหนด กฎระเบียบ และเงื่อนไขการรับรองความสามารถห้องปฏิบัติการทดสอบ  
ของสำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ

LABORATORY ACCREDITATION  
หมายเลขการรับรองระบบงานที่ ทดสอบ - 0334  
BLA-DSS

รายละเอียดการรับรองดังข้อบ่งชี้การรับรองแนบท้าย

ออกให้ ณ วันที่ : 10 มกราคม 2568

หมดอายุ วันที่ : 9 มกราคม 2572

ลงชื่อ :

(นางจันทร์รัตน์ วรสรรพวิทย)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ  
กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม

## ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการวิเคราะห์ บริษัท โอกลา เทสติ้ง แอนด์ คอนซัลติง เซอร์วิส จำกัด

สถานที่ตั้ง : เลขที่ 63/13 ซอยเพชรเกษม 7 แขวงวัดท่าพระ

เขตบางกอกใหญ่ กรุงเทพมหานคร 10600

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0334

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2	น้ำเสีย	<p>- ความเป็นกรด-ด่าง 4.0 ถึง 10.0</p> <p>- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 10 mg/L ถึง 2 000 mg/L</p> <p>- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 100 mg/L ถึง 5 000 mg/L</p>	<p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 4500-H<sup>+</sup> B</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 2540 D</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 2540 C</p>

ออกให้ ณ วันที่ : 10 มกราคม 2568

ลงชื่อ :

(นางจันทร์รัตน์ วรสรรพวิทย์)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

ออกครั้งแรก ณ วันที่ 10 มกราคม 2568

ฉบับที่ 1

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม



## ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการวิเคราะห์ บริษัท โอกลา เทสติ้ง แอนด์ คอนซัลติ้ง เซอร์วิส จำกัด

สถานที่ตั้ง : เลขที่ 63/13 ซอยเพชรเกษม 7 แขวงวัดท่าพระ

เขตบางกอกใหญ่ กรุงเทพมหานคร 10600

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0334

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1	น้ำ	- ความเป็นกรด-ด่าง 6.0 ถึง 9.0  - สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 10 mg/L ถึง 2 000 mg/L  - สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 100 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-H <sup>+</sup> B  Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2540 D  Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2540 C

ออกครั้งแรก ณ วันที่ 10 มกราคม 2568

ฉบับที่ 1

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม

เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์





OKLA TESTING & CONSULTING SERVICE CO., LTD. (Head office)

บริษัท โอคลา เทสติ้ง แอนด์ คอนซัลติ้ง เซอร์วิส จำกัด (สำนักงานใหญ่)

67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

Tel: (66) 02 868 1246

67/35-36 ชั้น 3 เพชรเกษม ซอย 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 6-01-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 763

Temperature, Deg C (Ta): 23

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

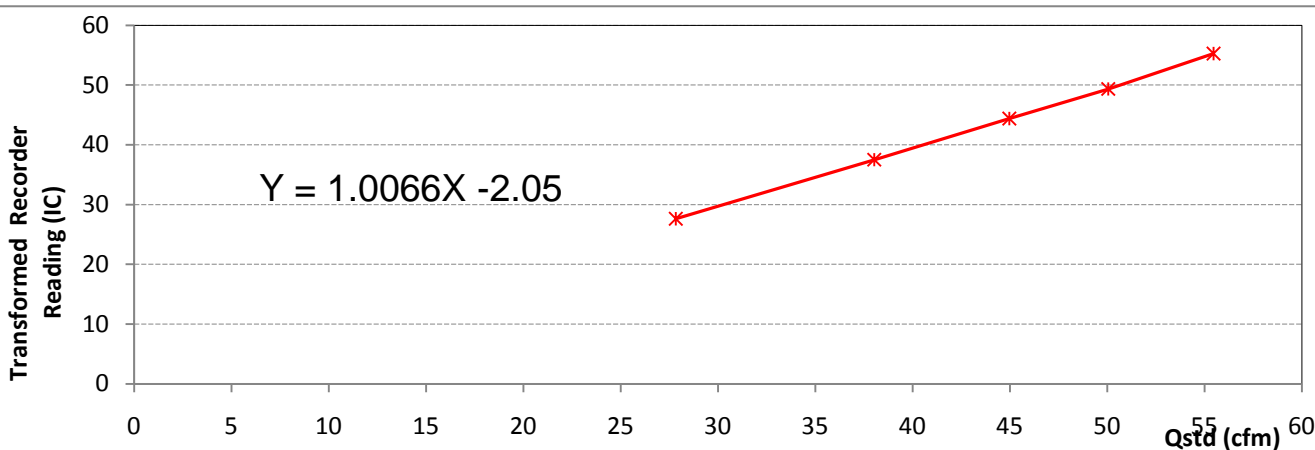
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	9.70	1.578	55.715	54.00	54.29
2	7.80	1.418	50.077	48.00	48.26
3	5.80	1.227	43.336	41.00	41.22
4	3.50	0.960	33.915	32.00	32.17
5	2.00	0.734	25.911	24.00	24.13

Linear Regression

Slope: 1.0066

Intecept: -2.0500

Corr. Coeff: 0.9998



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
67/35-36,3rd Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax:(66) 0-2868-0860			



OKLA TESTING & CONSULTING SERVICE CO., LTD. (Head office)

บริษัท โอคลา เทสติ้ง แอนด์ คอนซัลติง เซอร์วิส จำกัด (สำนักงานใหญ่)

67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

Tel: (66) 02 868 1246

67/35-36 ชั้น 3 เพชรเกษม ซอย 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 3-02-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

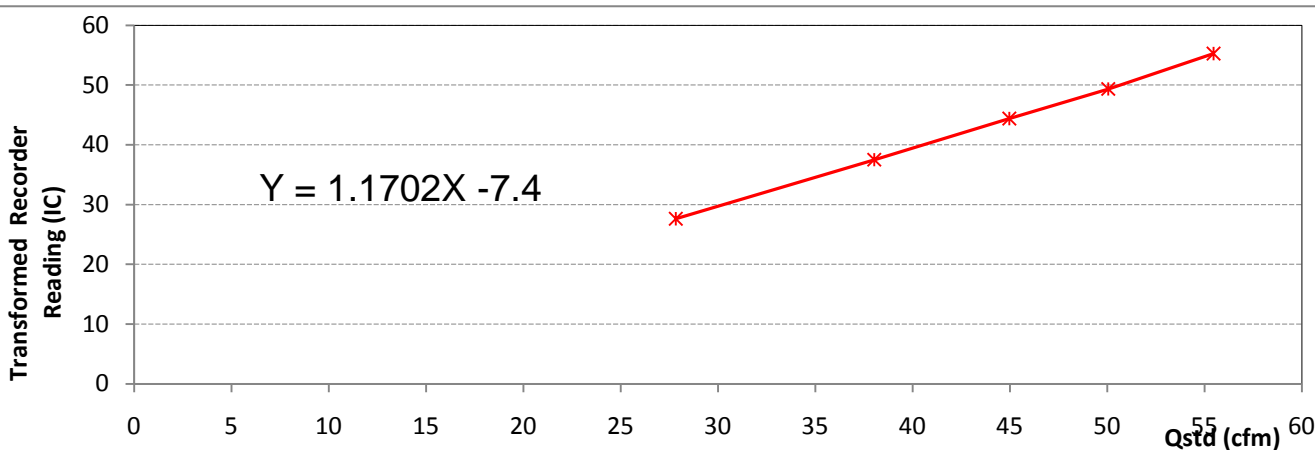
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	8.00	1.425	50.322	52.00	51.88
2	6.70	1.307	46.147	46.00	45.89
3	5.30	1.166	41.167	41.00	40.90
4	3.80	0.992	35.030	34.00	33.92
5	2.50	0.811	28.625	26.00	25.94

Linear Regression

Slope: 1.1702

Intecept: -7.4000

Corr. Coeff: 0.9990



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

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FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

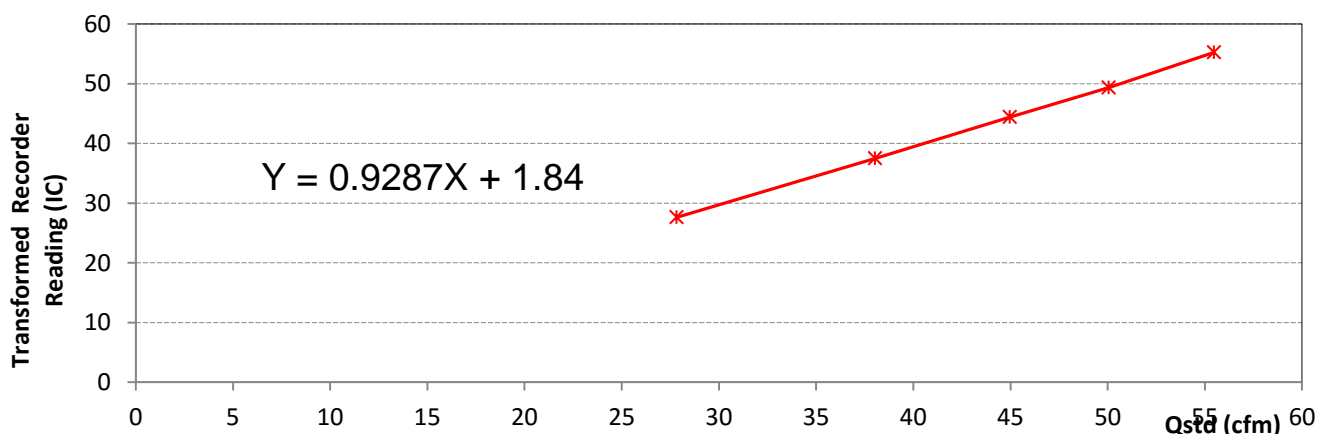
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	9.00	1.509	53.306	52.00	51.88
2	7.00	1.335	47.144	45.00	44.90
3	5.50	1.187	41.916	40.00	39.91
4	3.50	0.953	33.664	35.00	34.92
5	2.00	0.728	25.721	25.00	24.94

Linear Regression

Slope: 0.9287

Intecept: 1.8400

Corr. Coeff: 0.9934



CALIBRATION BY :	Parinya Klumnoi	DATE :	03-03-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	03-03-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

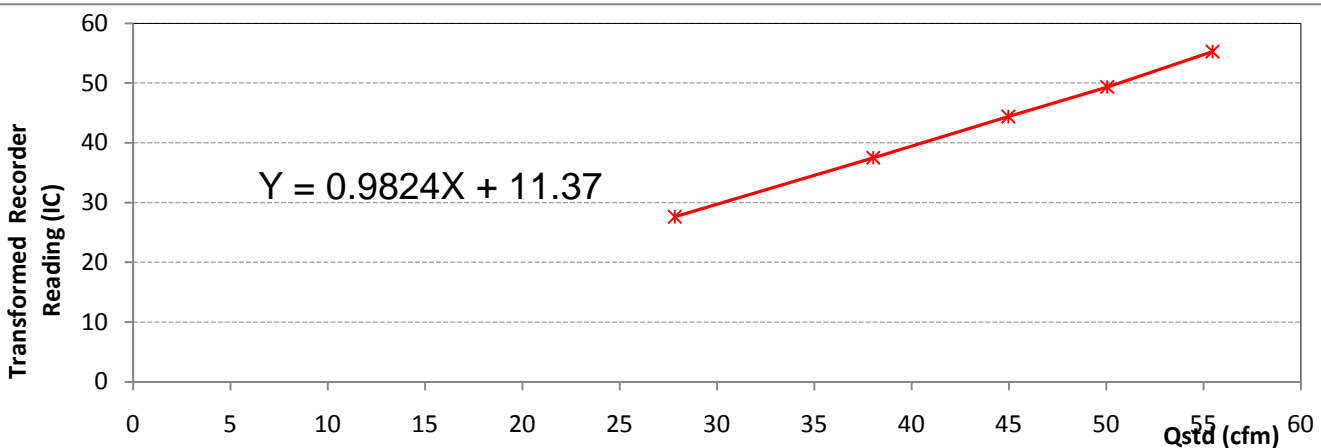
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.40	1.279	45.172	56.00	55.93
2	4.50	1.078	38.059	49.00	48.94
3	3.70	0.980	34.615	45.00	44.94
4	2.80	0.857	30.258	41.00	40.95
5	1.40	0.615	21.724	33.00	32.96

Linear Regression

Slope: 0.9824

Intecept: 11.3700

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

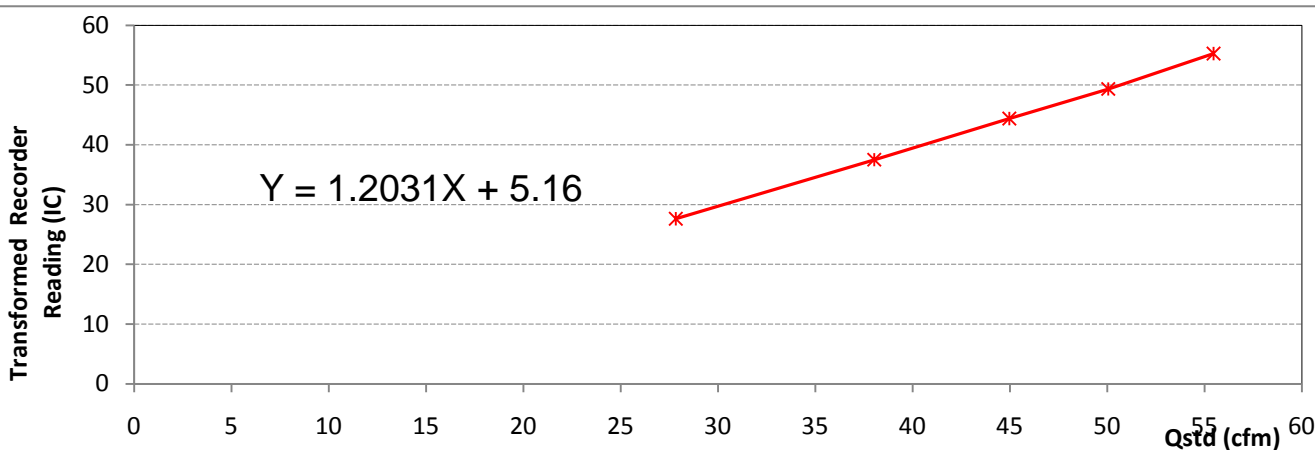
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.10	1.246	43.999	58.00	57.75
2	5.00	1.131	39.941	54.00	53.77
3	3.60	0.964	34.061	46.00	45.80
4	2.20	0.761	26.871	38.00	37.84
5	1.50	0.634	22.383	32.00	31.86

Linear Regression

Slope: 1.2031

Intecept: 5.1600

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-TSP-01

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 27

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

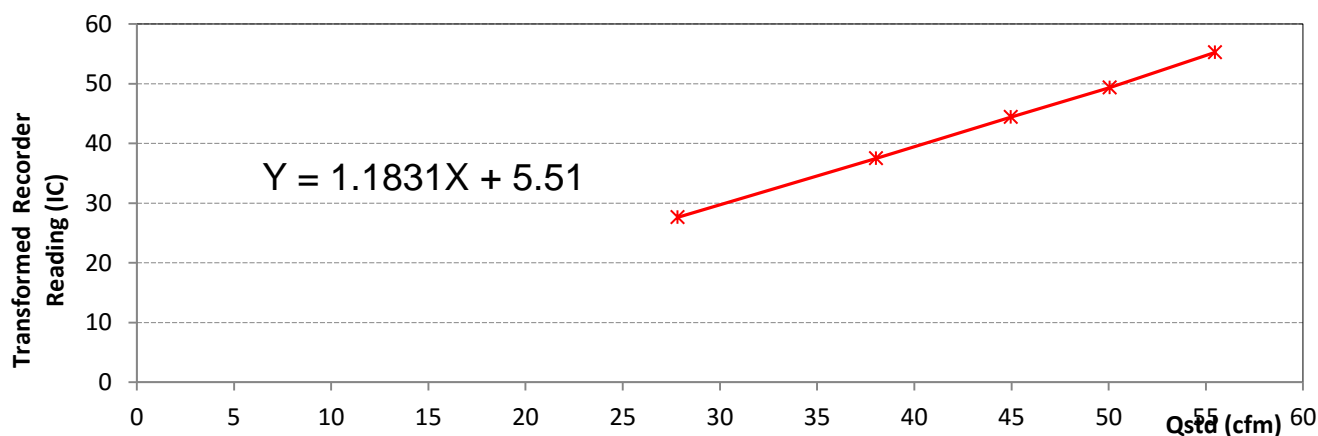
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.20	1.253	44.248	58.00	57.62
2	5.20	1.150	40.617	54.00	53.64
3	3.60	0.962	33.984	46.00	45.70
4	2.00	0.725	25.616	38.00	37.75
5	1.70	0.671	23.704	32.00	31.79

Linear Regression

Slope: 1.1831

Intecept: 5.5100

Corr. Coeff: 0.9925



CALIBRATION BY :	Parinya Klumnoi	DATE :	02-06-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	02-06-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 6-01-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 763

Temperature, Deg C (Ta): 23

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

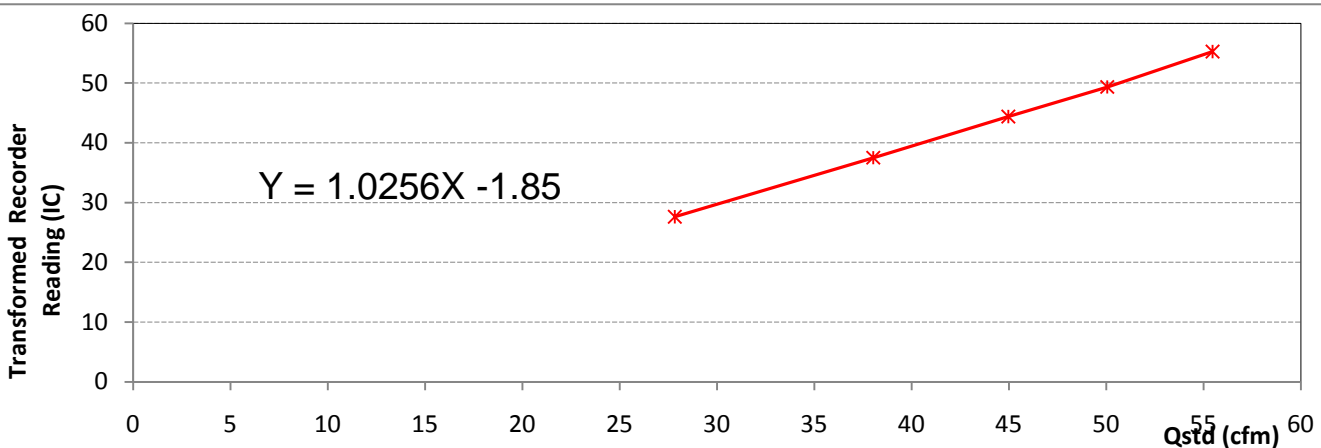
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	9.90	1.594	56.275	56.00	56.30
2	7.60	1.400	49.445	48.00	48.26
3	5.50	1.196	42.230	41.00	41.22
4	3.20	0.920	32.478	32.00	32.17
5	1.80	0.698	24.639	23.00	23.12

Linear Regression

Slope: 1.0256

Intecept: -1.8500

Corr. Coeff: 0.9991



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tel: (66) 02 868 1246

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FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

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## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 3-02-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 29

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

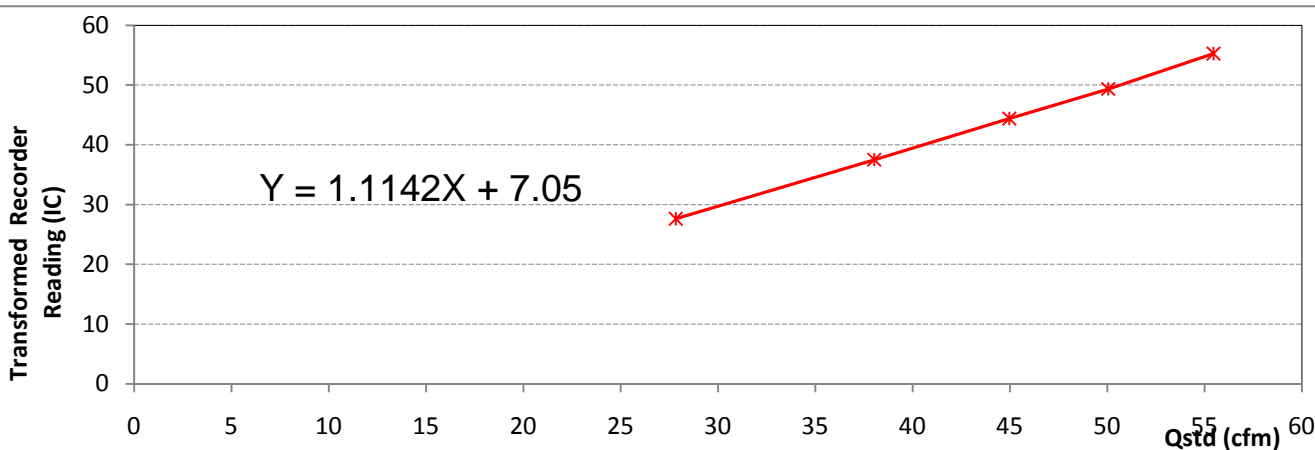
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.40	1.272	44.908	57.00	56.58
2	4.50	1.071	37.838	50.00	49.64
3	3.70	0.975	34.414	46.00	45.66
4	2.80	0.852	30.084	41.00	40.70
5	1.40	0.612	21.601	31.00	30.77

Linear Regression

Slope: 1.1142

Intecept: 7.0500

Corr. Coeff: 0.9991



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 29

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

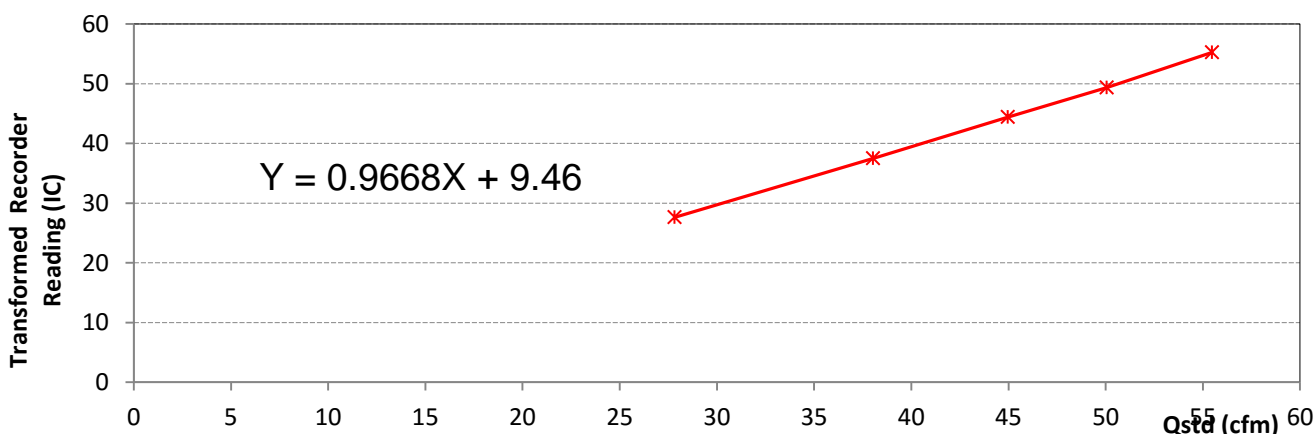
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	7.50	1.374	48.522	56.00	55.59
2	5.50	1.181	41.713	50.00	49.64
3	4.00	1.012	35.738	45.00	44.67
4	2.50	0.807	28.488	42.00	41.69
5	2.00	0.725	25.599	30.00	29.78

Linear Regression

Slope: 0.9668

Intecept: 9.4600

Corr. Coeff: 0.9412



CALIBRATION BY :	Parinya Klumnoi	DATE :	03-03-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	03-03-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

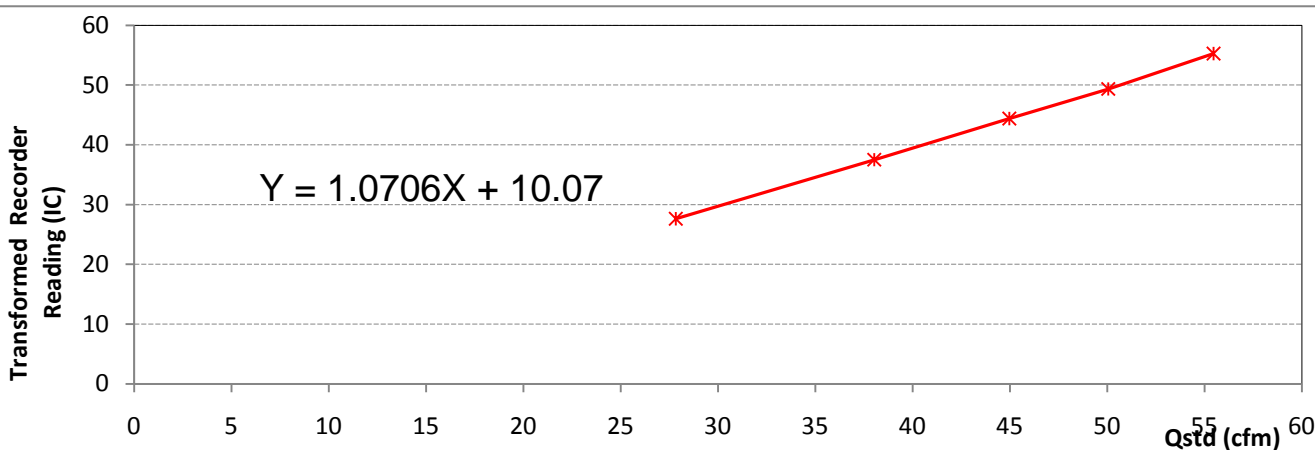
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.20	1.259	44.478	58.00	57.92
2	4.90	1.123	39.666	52.00	51.93
3	3.80	0.993	35.065	48.00	47.94
4	2.50	0.811	28.653	41.00	40.95
5	1.50	0.636	22.447	34.00	33.96

Linear Regression

Slope: 1.0706

Intecept: 10.0700

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

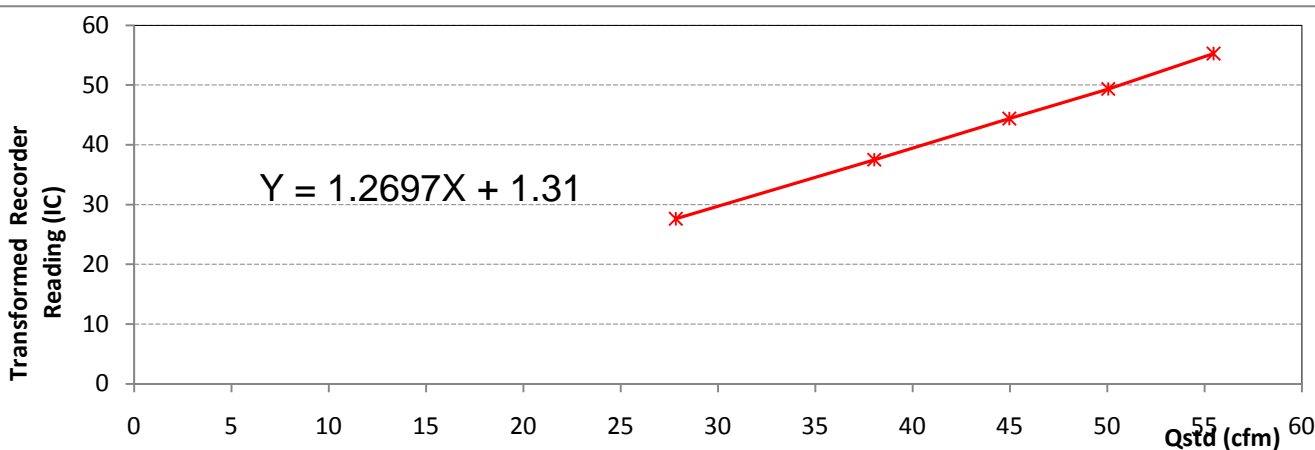
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.10	1.246	43.999	58.00	57.75
2	5.10	1.142	40.327	52.00	51.78
3	3.80	0.990	34.963	46.00	45.80
4	2.00	0.727	25.673	34.00	33.85
5	1.50	0.634	22.383	30.00	29.87

Linear Regression

Slope: 1.2697

Intecept: 1.3100

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-TSP-03

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

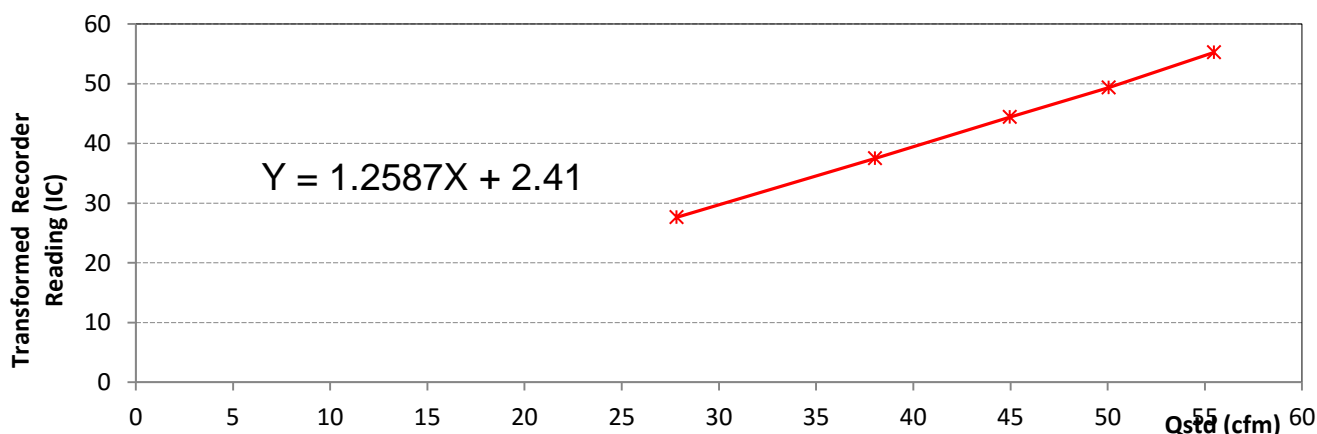
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.00	1.235	43.618	58.00	57.71
2	5.00	1.130	39.915	52.00	51.74
3	3.60	0.964	34.039	46.00	45.77
4	1.80	0.691	24.397	34.00	33.83
5	1.50	0.633	22.369	30.00	29.85

Linear Regression

Slope: 1.2587

Intecept: 2.4100

Corr. Coeff: 0.9979



CALIBRATION BY :	Parinya Klumnoi	DATE :	02-06-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	02-06-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

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## TSP Calibration Report

**Location:** OKLA-Testing Lab **Date:** 06-01-2025

**Sampler:** EM-TSP-05 **Serial No:**

**Barometric pressure, mm Hg (Pa):** 759 **Temperature, Deg C (Ta):** 29

**Transfer Standard Type:** Tisch TE 5025A **Serial No:** 1758

**Last Calibration Date:** 17-Sep-24 **Operator:** Mr.Parinya

**Qstd Slope:** 2.02544 **Qstd Intercept:** -0.03175

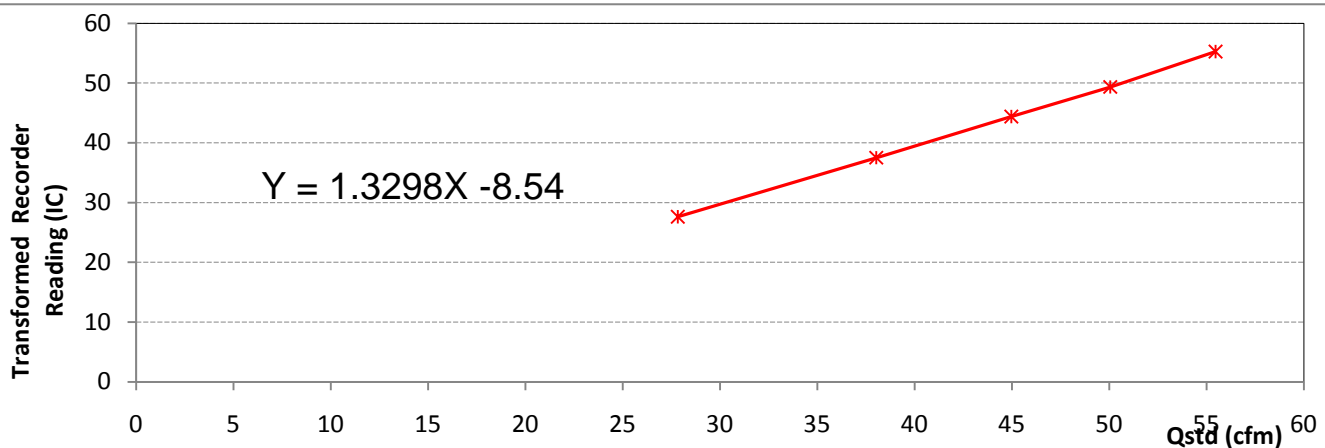
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.281	45.249	52.00	51.62
2	5.30	1.160	40.968	46.00	45.66
3	4.10	1.024	36.168	40.00	39.71
4	2.50	0.807	28.488	30.00	29.78
5	1.40	0.612	21.601	20.00	19.85

Linear Regression

Slope: 1.3298

Intecept: -8.5400

Corr. Coeff: 0.9997



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 03-02-2025

Sampler: EM-TSP-05

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 29

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

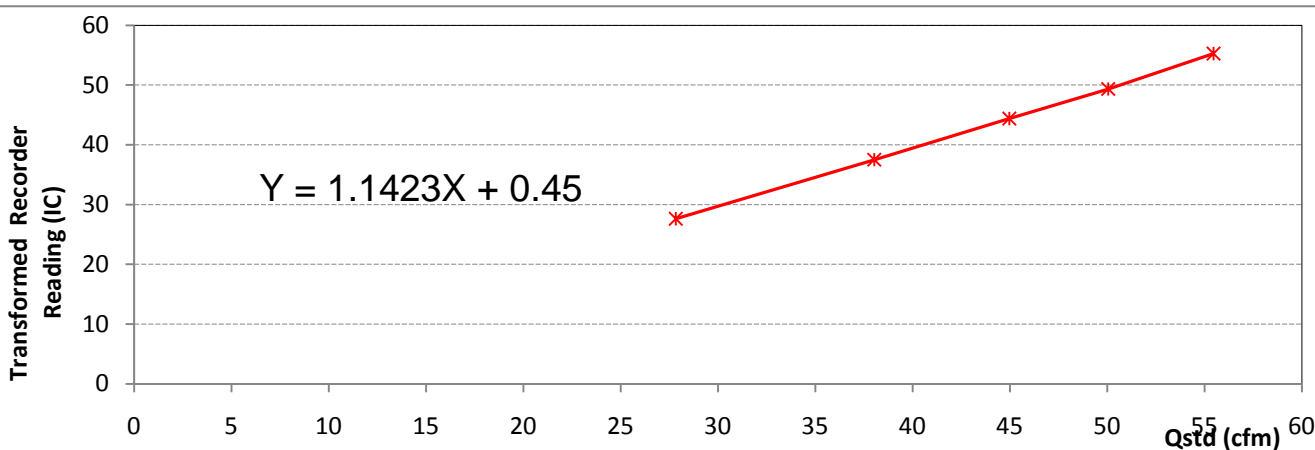
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.00	1.232	43.518	50.00	49.64
2	5.20	1.149	40.590	48.00	47.65
3	4.30	1.048	37.013	42.00	41.69
4	2.30	0.775	27.371	34.00	33.75
5	1.40	0.612	21.601	24.00	23.82

Linear Regression

Slope: 1.1423

Intecept: 0.4500

Corr. Coeff: 0.9913



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-TSP-05

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 29

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

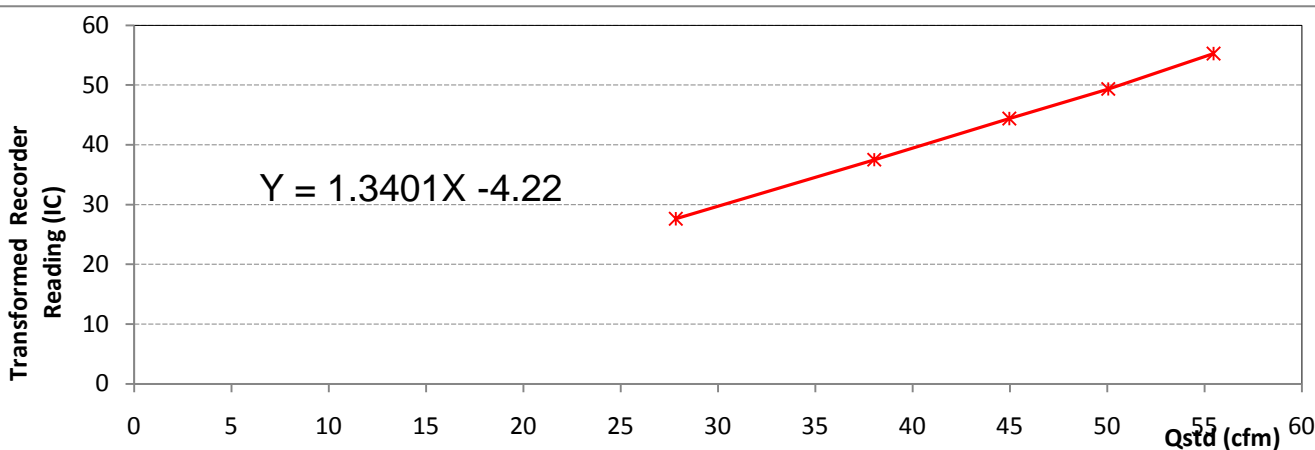
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.80	1.310	46.256	60.00	59.56
2	5.90	1.222	43.163	52.00	51.62
3	4.50	1.071	37.838	46.00	45.66
4	2.80	0.852	30.084	38.00	37.72
5	1.80	0.689	24.343	28.00	27.80

Linear Regression

Slope: 1.3401

Intecept: -4.2200

Corr. Coeff: 0.9909



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/3/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/3/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-TSP-05

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

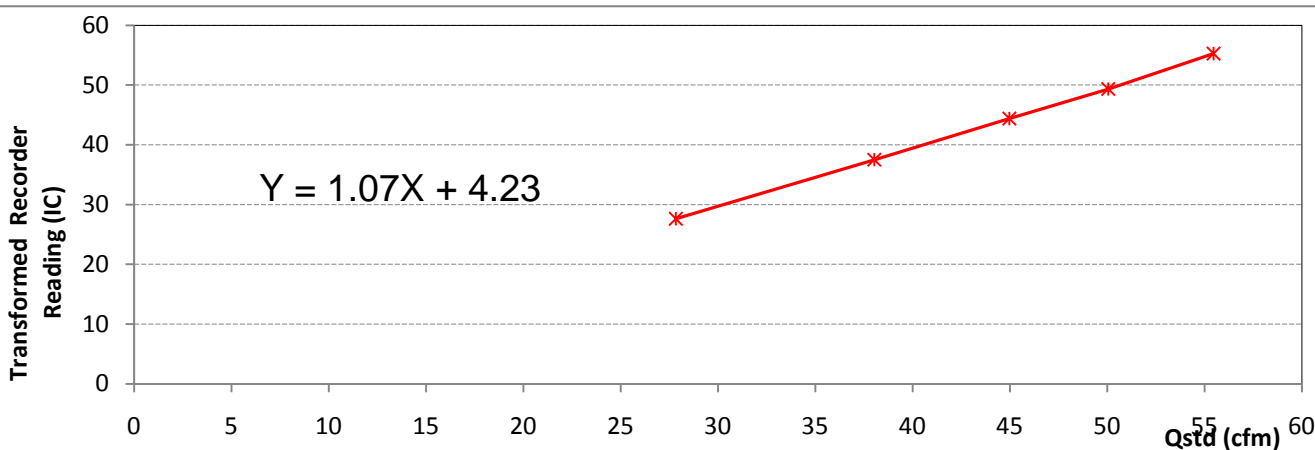
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.289	45.515	54.00	53.93
2	5.50	1.188	41.957	48.00	47.94
3	4.00	1.018	35.946	42.00	41.94
4	2.40	0.796	28.097	36.00	35.95
5	1.30	0.594	20.975	26.00	25.97

Linear Regression

Slope: 1.0700

Intecept: 4.2300

Corr. Coeff: 0.9933



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

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## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-TSP-05

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

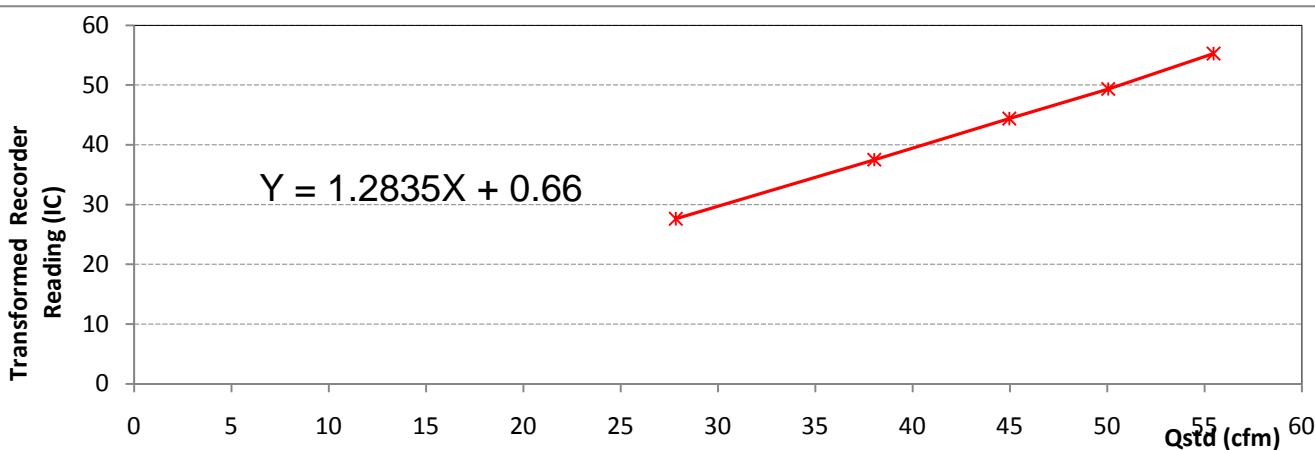
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.20	1.256	44.349	58.00	57.75
2	5.00	1.131	39.941	52.00	51.78
3	3.90	1.003	35.406	46.00	45.80
4	2.20	0.761	26.871	36.00	35.85
5	1.60	0.654	23.081	30.00	29.87

Linear Regression

Slope: 1.2835

Intecept: 0.6600

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-TSP-05

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

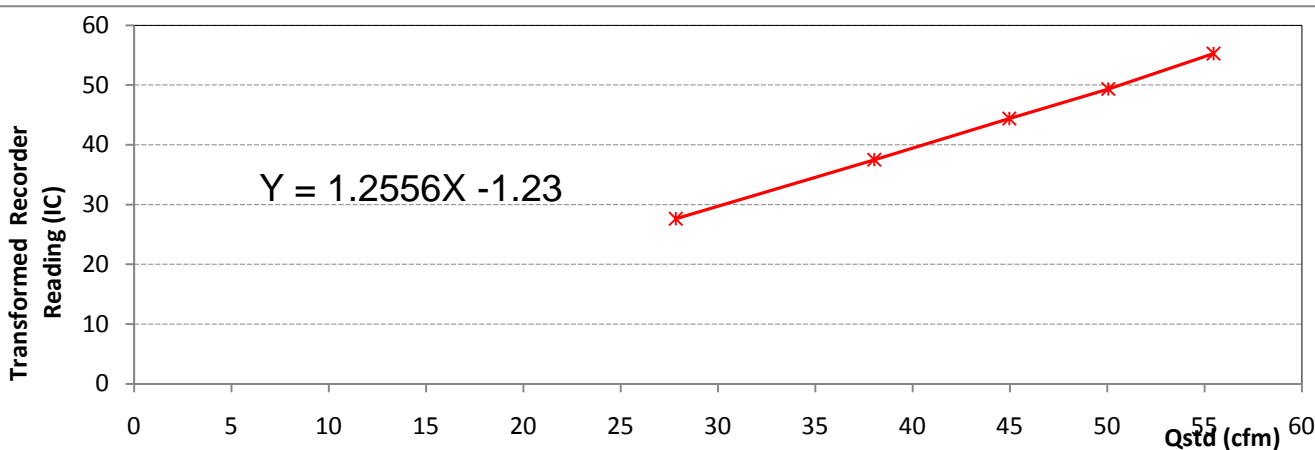
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.284	45.353	56.00	55.72
2	4.90	1.119	39.525	48.00	47.76
3	3.60	0.964	34.039	42.00	41.79
4	2.40	0.793	27.998	36.00	35.82
5	1.80	0.691	24.397	28.00	27.86

Linear Regression

Slope: 1.2556

Intecept: -1.2300

Corr. Coeff: 0.9929



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## TSP Calibration Report

**Location:** OKLA-Testing Lab **Date:** 02-06-2025

**Sampler:** EM-TSP-02 **Serial No:**

**Barometric pressure, mm Hg (Pa):** 755 **Temperature, Deg C (Ta):** 26

**Transfer Standard Type:** Tisch TE 5025A **Serial No:** 1758

**Last Calibration Date:** 17-Sep-24 **Operator:** Mr.Parinya

**Qstd Slope:** 2.02544 **Qstd Intercept:** -0.03175

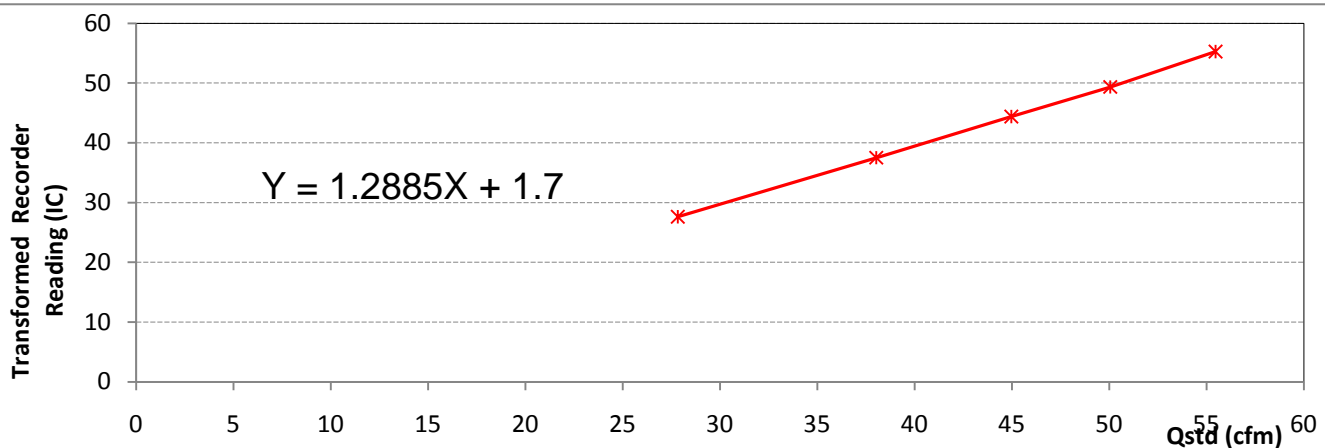
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.00	1.235	43.618	58.00	57.71
2	4.70	1.097	38.733	52.00	51.74
3	3.90	1.002	35.383	48.00	47.76
4	2.50	0.809	28.552	38.00	37.81
5	1.40	0.613	21.649	30.00	29.85

Linear Regression

Slope: 1.2885

Intecept: 1.7000

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## TSP Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-TSP-04

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

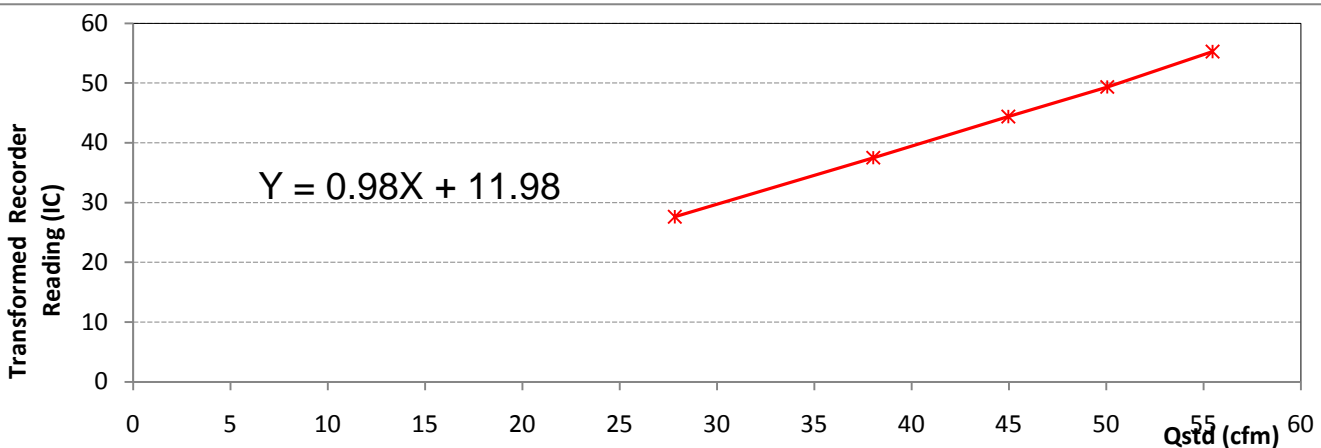
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.40	1.275	45.011	56.00	55.72
2	4.50	1.074	37.924	50.00	49.75
3	3.70	0.977	34.493	46.00	45.77
4	2.50	0.809	28.552	40.00	39.80
5	1.50	0.633	22.369	34.00	33.83

Linear Regression

Slope: 0.9800

Intecept: 11.9800

Corr. Coeff: 0.9991



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 6-01-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 763

Temperature, Deg C (Ta): 23

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

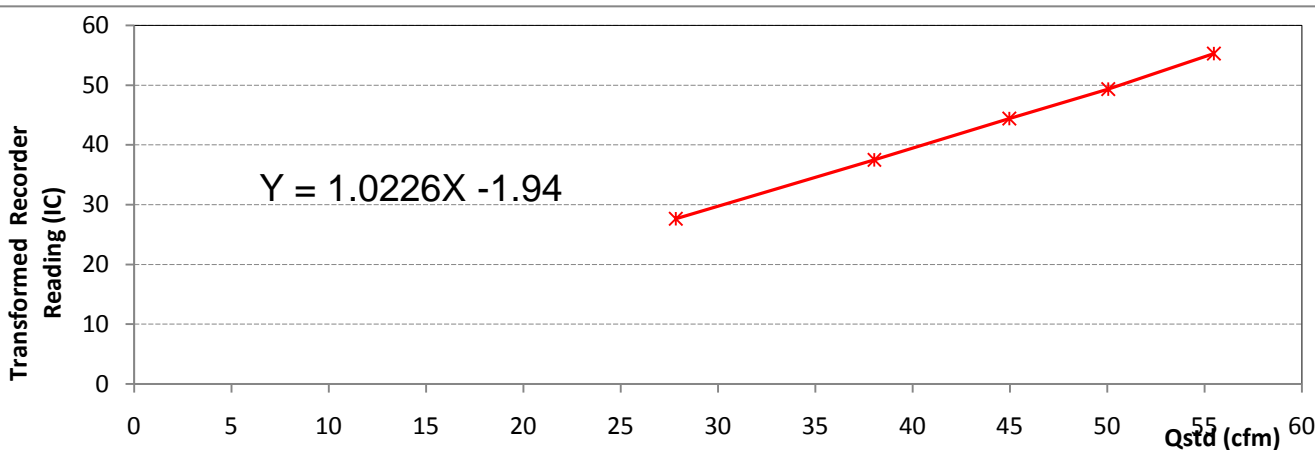
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	10.00	1.601	56.552	56.00	56.30
2	8.00	1.436	50.700	49.00	49.26
3	6.30	1.278	45.118	44.00	44.24
4	4.20	1.049	37.045	36.00	36.19
5	2.10	0.751	26.523	25.00	25.13

Linear Regression

Slope: 1.0226

Intecept: -1.9400

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 3-02-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

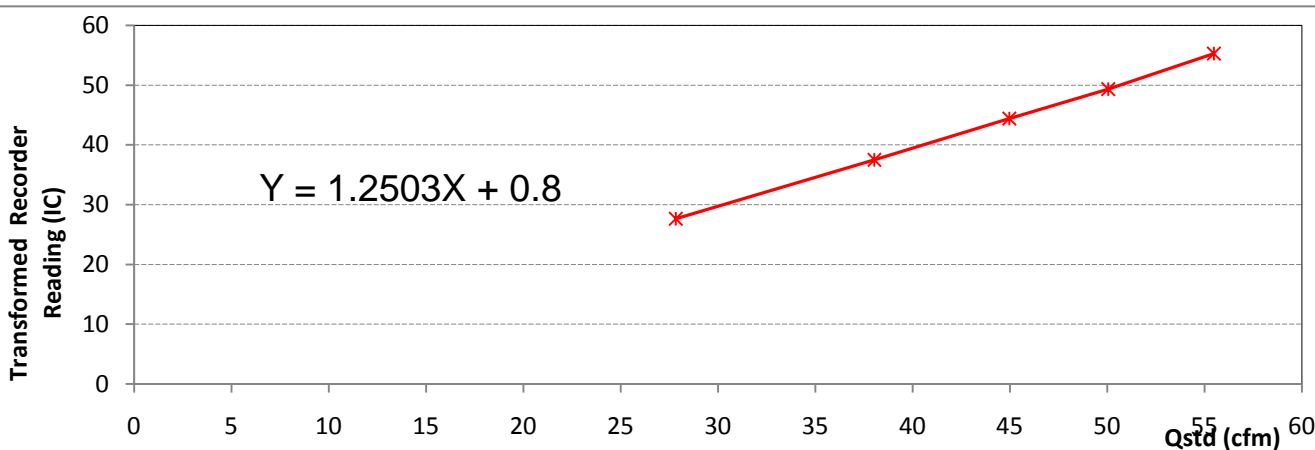
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.288	45.470	58.00	57.86
2	5.20	1.155	40.788	52.00	51.88
3	3.80	0.992	35.030	44.00	43.90
4	2.80	0.856	30.229	39.00	38.91
5	1.50	0.635	22.426	29.00	28.93

Linear Regression

Slope: 1.2503

Intecept: 0.8000

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

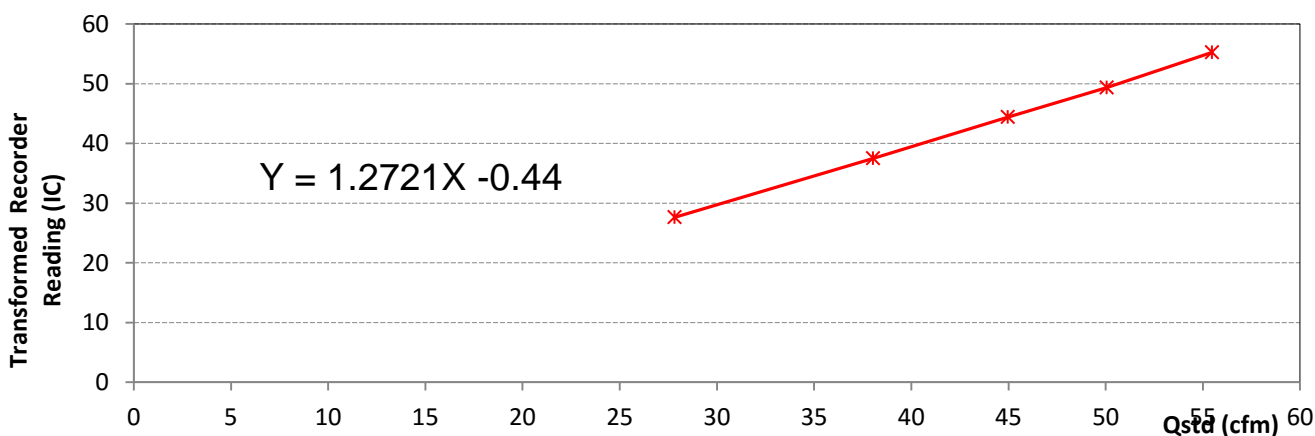
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.30	1.268	44.782	57.00	56.87
2	5.00	1.133	40.017	51.00	50.88
3	4.00	1.017	35.911	43.00	42.90
4	2.50	0.811	28.625	40.00	39.91
5	2.00	0.728	25.721	30.00	29.93

Linear Regression

Slope: 1.2721

Intecept: -0.4400

Corr. Coeff: 0.9683



CALIBRATION BY :	Parinya Klumnoi	DATE :	03-03-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	03-03-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

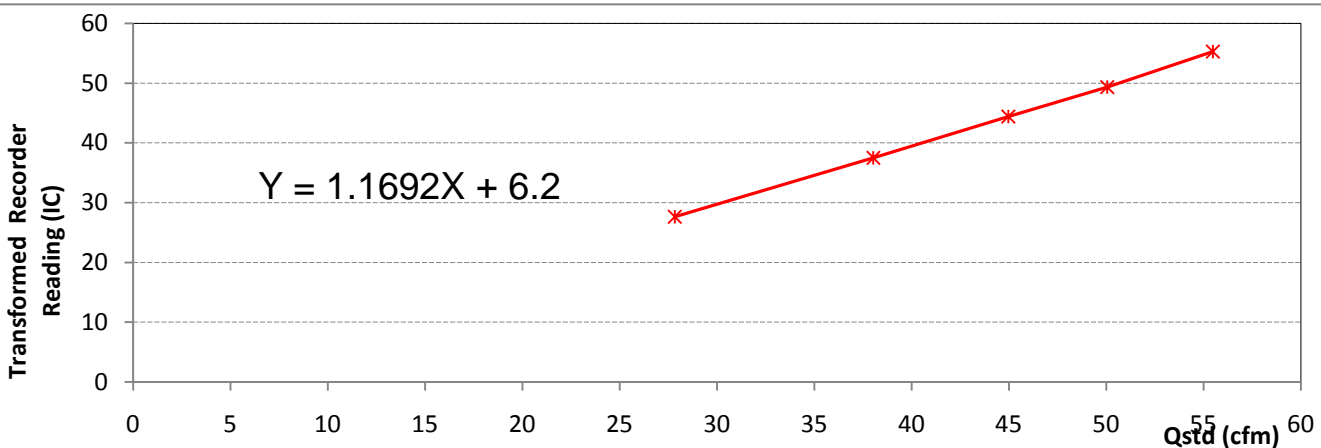
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.10	1.250	44.127	58.00	57.92
2	4.80	1.112	39.270	52.00	51.93
3	3.60	0.967	34.159	46.00	45.94
4	2.30	0.780	27.529	39.00	38.95
5	1.60	0.655	23.147	33.00	32.96

Linear Regression

Slope: 1.1692

Intecept: 6.2000

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

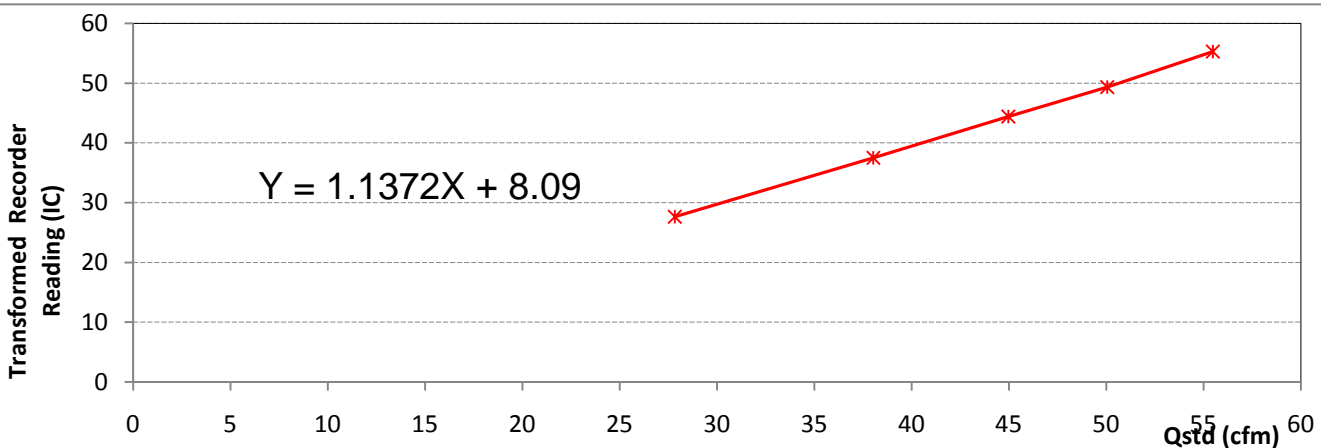
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.285	45.382	60.00	59.74
2	5.00	1.131	39.941	54.00	53.77
3	3.90	1.003	35.406	48.00	47.79
4	2.50	0.809	28.571	41.00	40.82
5	1.80	0.691	24.413	36.00	35.85

Linear Regression

Slope: 1.1372

Intecept: 8.0900

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-PM10-01

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

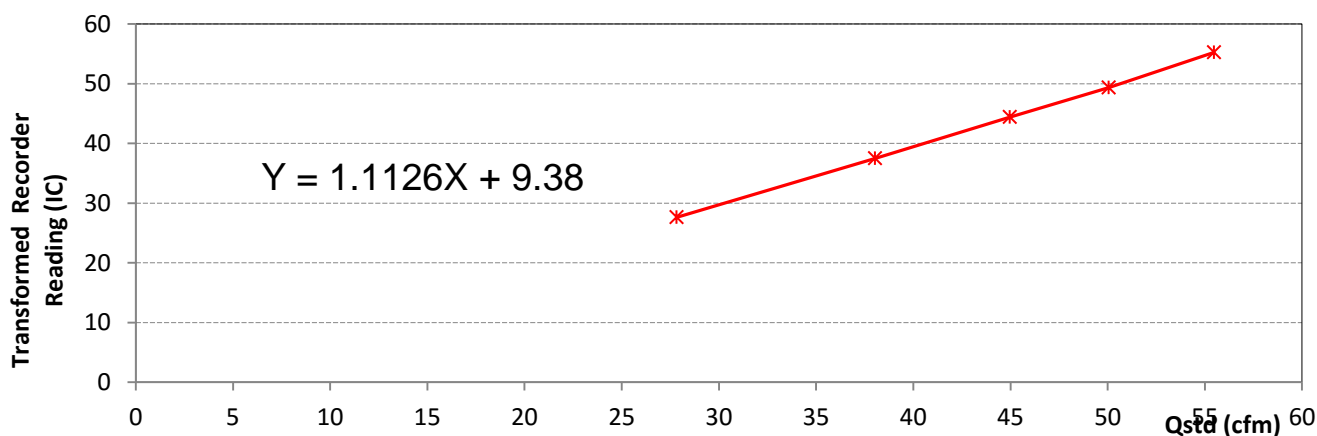
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.40	1.275	45.011	60.00	59.70
2	5.00	1.130	39.915	54.00	53.73
3	3.80	0.989	34.941	48.00	47.76
4	2.40	0.793	27.998	41.00	40.80
5	1.70	0.672	23.742	36.00	35.82

Linear Regression

Slope: 1.1126

Intecept: 9.3800

Corr. Coeff: 0.9995



CALIBRATION BY :	Parinya Klumnoi	DATE :	02-06-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	02-06-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 6-01-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 763

Temperature, Deg C (Ta): 23

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

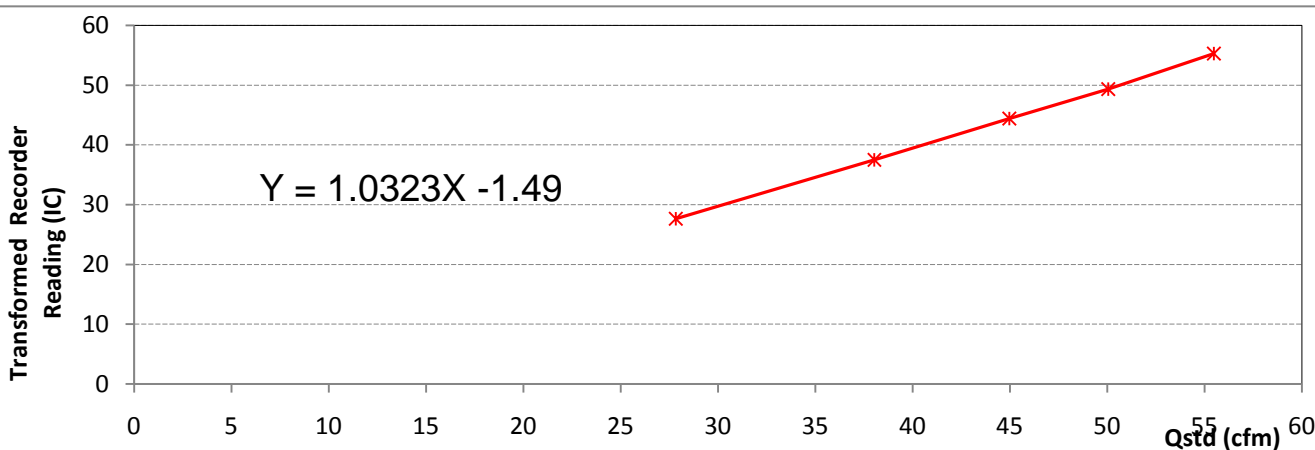
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	9.90	1.594	56.275	56.00	56.30
2	8.70	1.496	52.824	53.00	53.28
3	7.50	1.391	49.126	49.00	49.26
4	4.50	1.085	38.306	38.00	38.20
5	2.00	0.734	25.911	25.00	25.13

Linear Regression

Slope: 1.0323

Intecept: -1.4900

Corr. Coeff: 0.9999



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 3-02-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

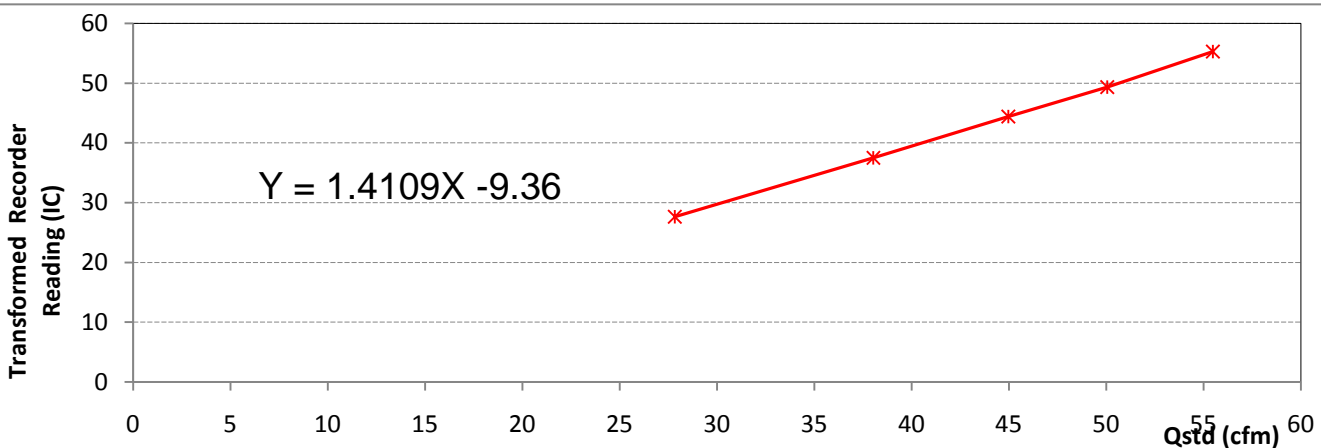
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	7.00	1.335	47.144	57.00	56.87
2	5.60	1.197	42.285	51.00	50.88
3	4.50	1.077	38.021	44.00	43.90
4	3.00	0.885	31.250	35.00	34.92
5	1.90	0.711	25.099	26.00	25.94

Linear Regression

Slope: 1.4109

Intecept: -9.3600

Corr. Coeff: 0.9995



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

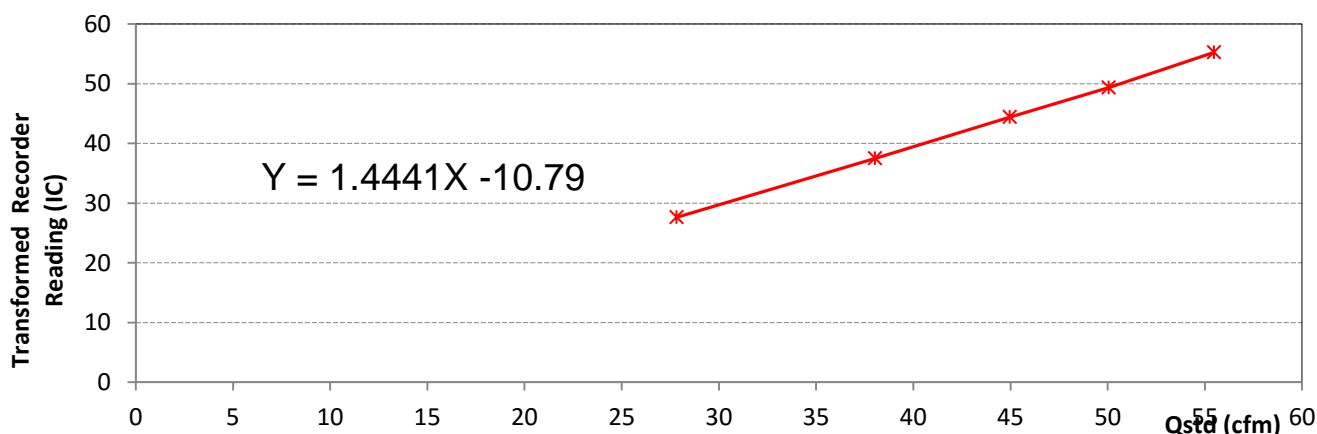
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.80	1.316	46.482	56.00	55.87
2	6.00	1.238	43.730	52.00	51.88
3	4.50	1.077	38.021	45.00	44.90
4	3.00	0.885	31.250	36.00	35.92
5	2.00	0.728	25.721	25.00	24.94

Linear Regression

Slope: 1.4441

Intecept: -10.7900

Corr. Coeff: 0.9956



CALIBRATION BY :	Parinya Klumnoi	DATE :	03-03-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	03-03-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

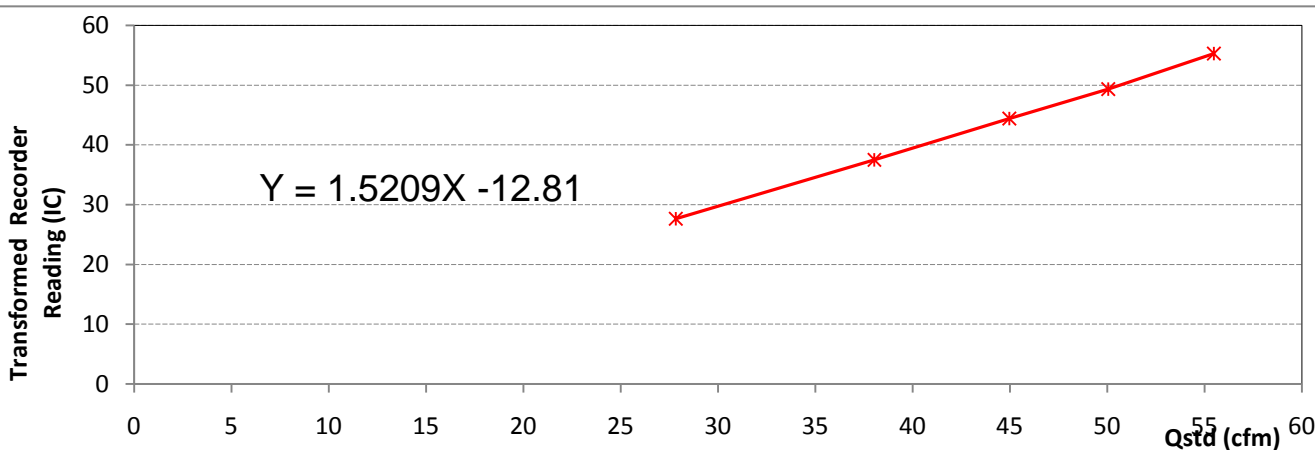
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	7.10	1.346	47.519	60.00	59.92
2	6.30	1.269	44.827	55.00	54.93
3	4.40	1.066	37.646	44.00	43.94
4	3.20	0.914	32.270	37.00	36.95
5	2.20	0.763	26.948	28.00	27.96

Linear Regression

Slope: 1.5209

Intecept: -12.8100

Corr. Coeff: 0.9991



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

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Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

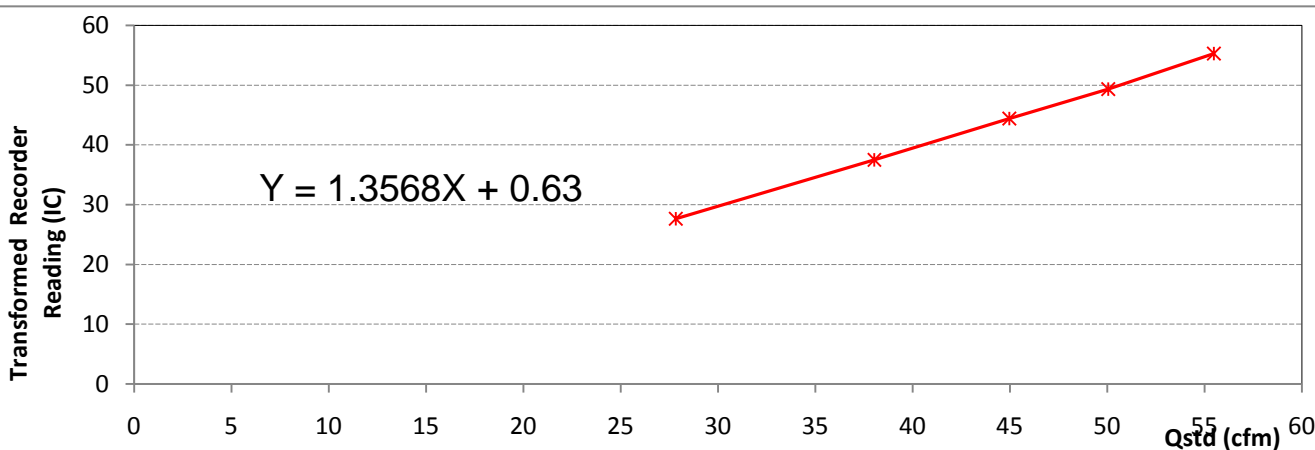
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.00	1.236	43.646	60.00	59.74
2	4.60	1.086	38.355	53.00	52.77
3	3.60	0.964	34.061	47.00	46.80
4	2.40	0.793	28.016	39.00	38.83
5	1.30	0.592	20.915	29.00	28.88

Linear Regression

Slope: 1.3568

Intecept: 0.6300

Corr. Coeff: 0.9999



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-PM10-03

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

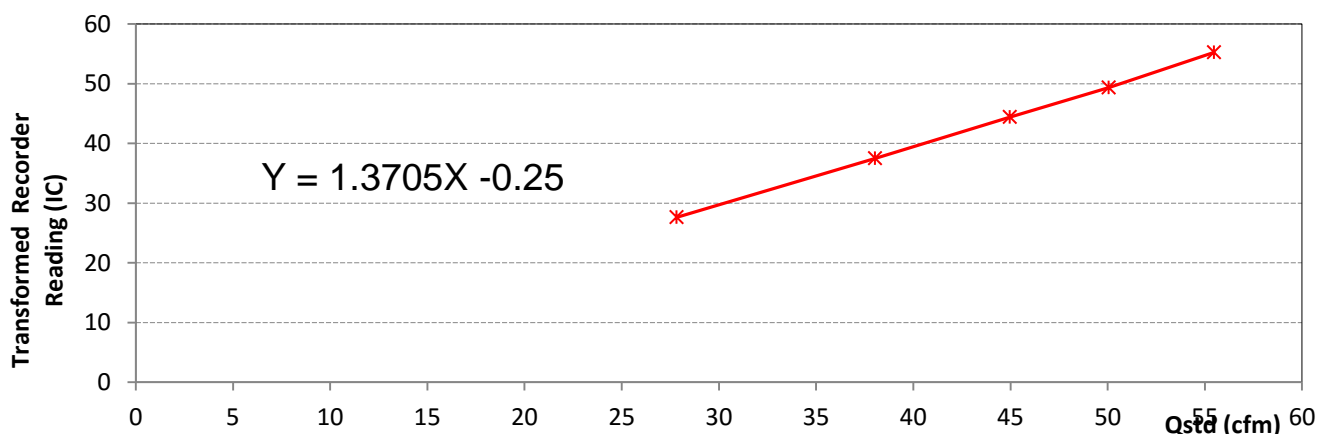
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.10	1.245	43.970	60.00	59.70
2	4.60	1.085	38.331	53.00	52.74
3	3.80	0.989	34.941	47.00	46.77
4	2.20	0.760	26.854	39.00	38.81
5	1.50	0.633	22.369	29.00	28.86

Linear Regression

Slope: 1.3705

Intecept: -0.2500

Corr. Coeff: 0.9926



CALIBRATION BY :	Parinya Klumnoi	DATE :	02-06-25
APPROVED BY :	Tawatchai Chongvutichai	DATE :	02-06-25
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 06-01-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 29

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

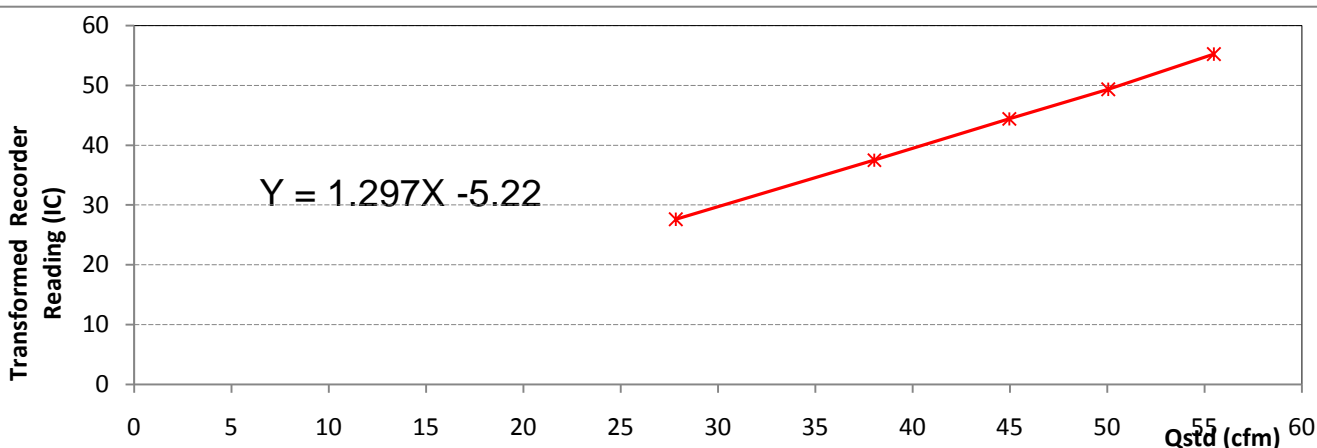
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	5.80	1.212	42.805	50.00	49.64
2	4.70	1.094	38.645	46.00	45.66
3	3.70	0.975	34.414	40.00	39.71
4	2.30	0.775	27.371	30.00	29.78
5	1.50	0.632	22.320	24.00	23.82

Linear Regression

Slope: 1.2970

Intecept: -5.2200

Corr. Coeff: 0.9985



CALIBRATION BY :	Parinya Klumnoi	DATE :	6/1/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	6/1/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tel: (66) 02 868 1246

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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 03-02-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

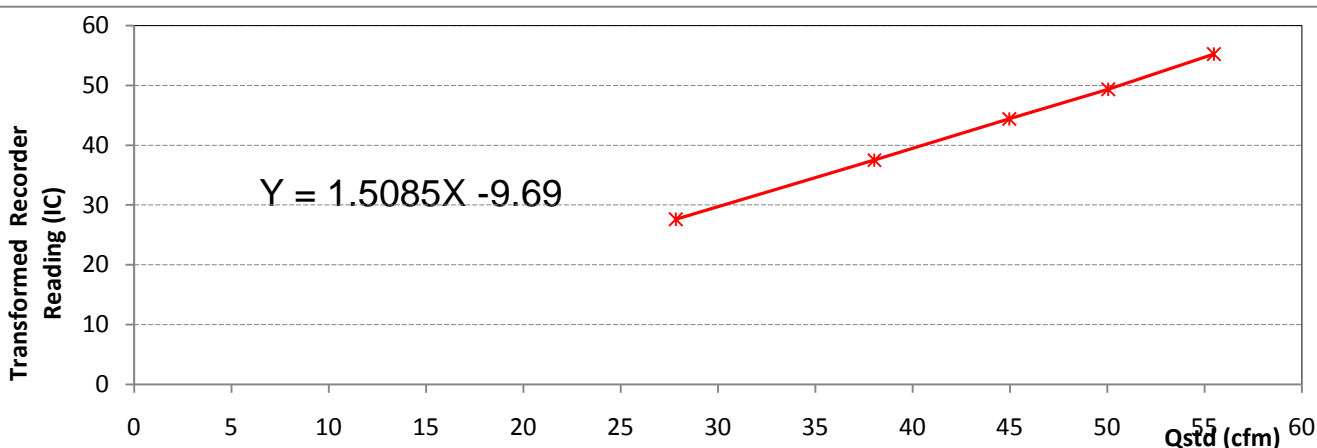
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	5.90	1.228	43.373	56.00	55.87
2	4.60	1.088	38.429	48.00	47.89
3	3.60	0.966	34.126	42.00	41.90
4	2.50	0.811	28.625	34.00	33.92
5	1.70	0.674	23.801	26.00	25.94

Linear Regression

Slope: 1.5085

Intecept: -9.6900

Corr. Coeff: 0.9996



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/2/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/2/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 03-03-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 759

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

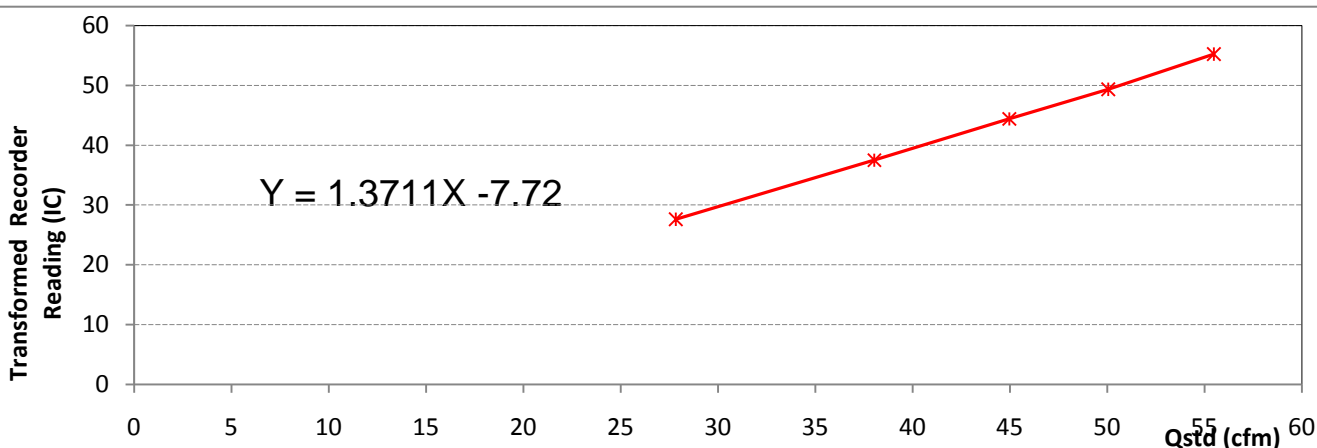
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	5.80	1.218	43.014	52.00	51.88
2	4.40	1.065	37.609	44.00	43.90
3	3.50	0.953	33.664	38.00	37.91
4	2.70	0.841	29.704	32.00	31.93
5	1.50	0.635	22.426	24.00	23.94

Linear Regression

Slope: 1.3711

Intecept: -7.7200

Corr. Coeff: 0.9971



CALIBRATION BY :	Parinya Klumnoi	DATE :	3/3/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	3/3/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 01-04-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 758

Temperature, Deg C (Ta): 25

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

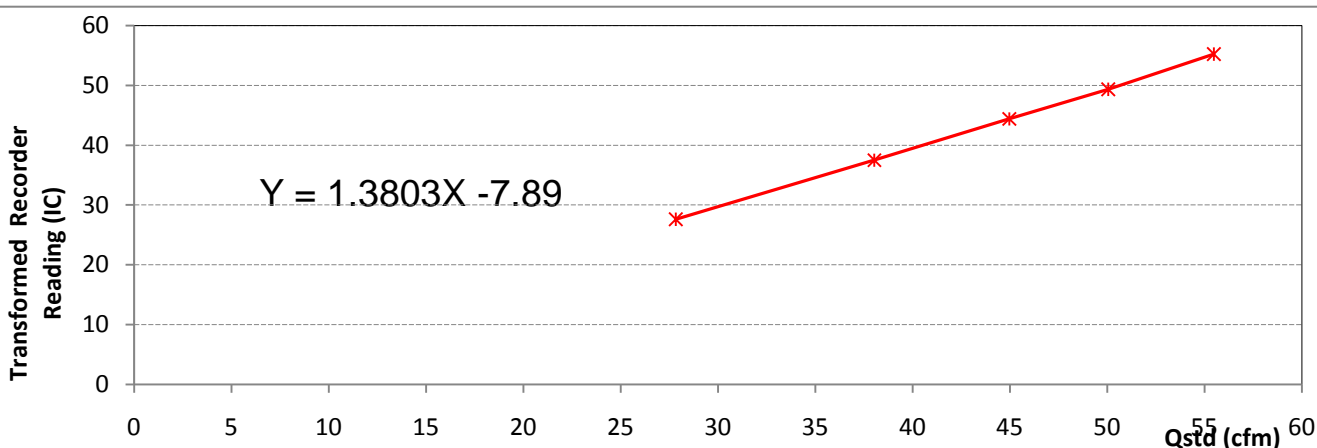
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.30	1.269	44.827	54.00	53.93
2	4.80	1.112	39.270	46.00	45.94
3	3.60	0.967	34.159	40.00	39.95
4	2.30	0.780	27.529	30.00	29.96
5	1.40	0.615	21.724	22.00	21.97

Linear Regression

Slope: 1.3803

Intecept: -7.8900

Corr. Coeff: 0.9995



CALIBRATION BY :	Parinya Klumnoi	DATE :	1/4/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	1/4/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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J-NAC Group

Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-05-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 756

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

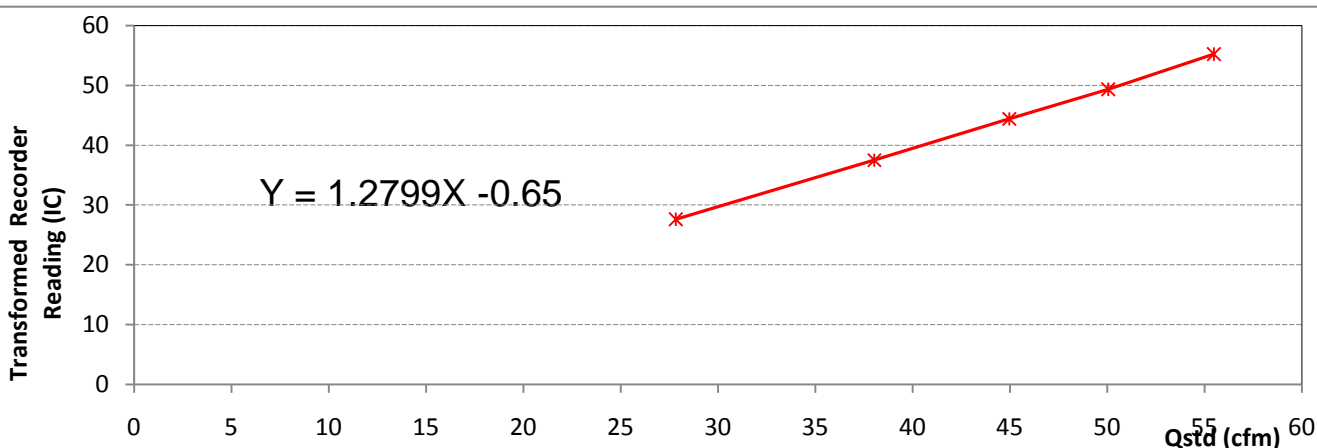
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.285	45.382	58.00	57.75
2	4.60	1.086	38.355	48.00	47.79
3	3.10	0.897	31.688	40.00	39.83
4	2.70	0.840	29.647	38.00	37.84
5	1.50	0.634	22.383	28.00	27.88

Linear Regression

Slope: 1.2799

Intecept: -0.6500

Corr. Coeff: 0.9992



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/5/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/5/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-PM10-05

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

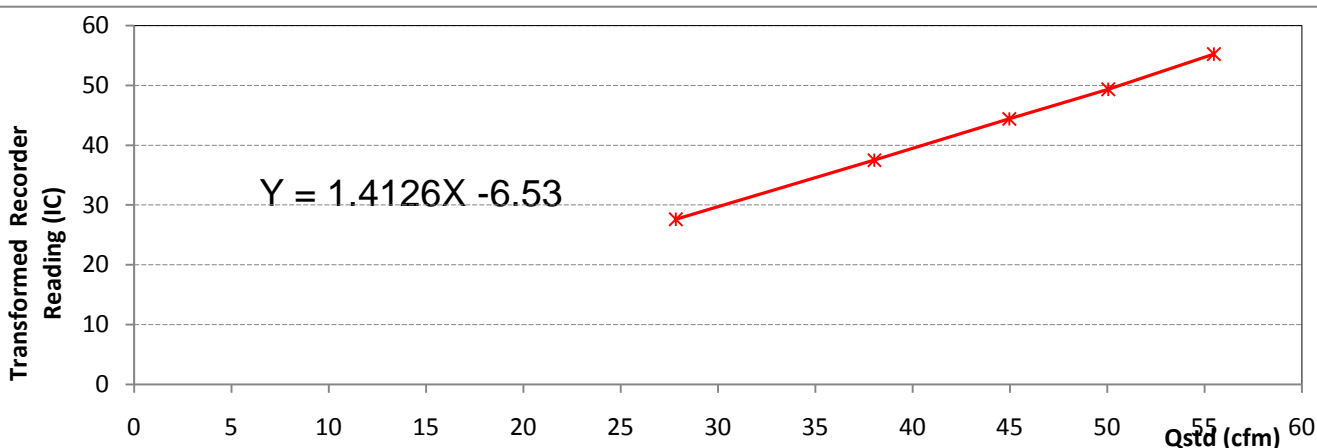
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.10	1.245	43.970	56.00	55.72
2	4.30	1.050	37.097	46.00	45.77
3	3.40	0.938	33.111	40.00	39.80
4	2.70	0.839	29.629	36.00	35.82
5	1.80	0.691	24.397	28.00	27.86

Linear Regression

Slope: 1.4126

Intecept: -6.5300

Corr. Coeff: 0.9995



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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Website: www.okla-testing.com

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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-PM10-02

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

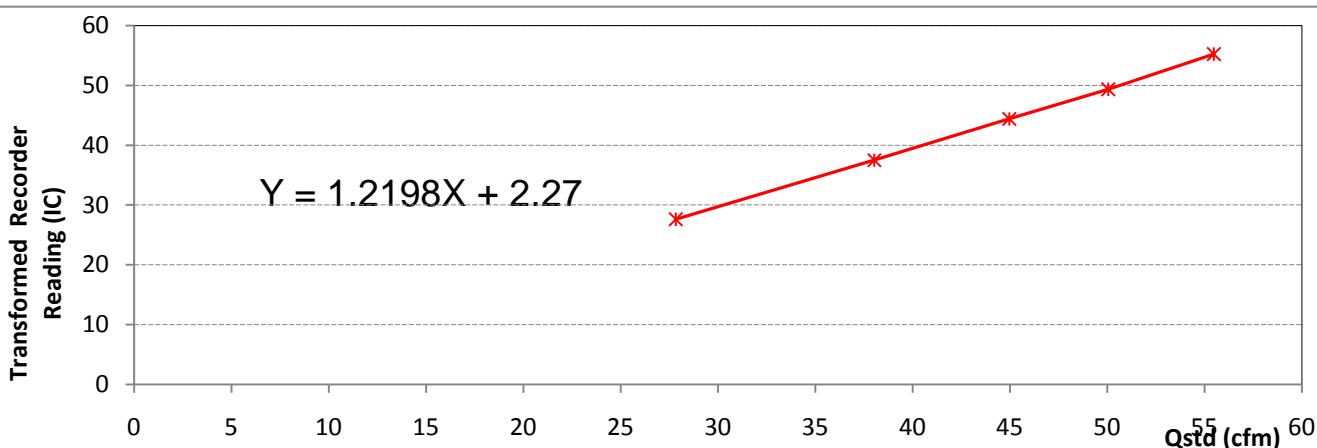
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	6.50	1.284	45.353	58.00	57.71
2	5.20	1.152	40.683	52.00	51.74
3	3.90	1.002	35.383	46.00	45.77
4	2.70	0.839	29.629	38.00	37.81
5	1.50	0.633	22.369	30.00	29.85

Linear Regression

Slope: 1.2198

Intecept: 2.2700

Corr. Coeff: 0.9994



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
67/35-36,3rd Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax:(66) 0-2868-0860			



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FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

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Tax ID: 0105553003058



## PM10 Calibration Report

Location: OKLA-Testing Lab

Date: 02-06-2025

Sampler: EM-PM10-04

Serial No:

Barometric pressure, mm Hg (Pa): 755

Temperature, Deg C (Ta): 26

Transfer Standard Type: Tisch TE 5025A

Serial No: 1758

Last Calibration Date: 17-Sep-24

Operator: Mr.Parinya

Qstd Slope: 2.02544

Qstd Intercept: -0.03175

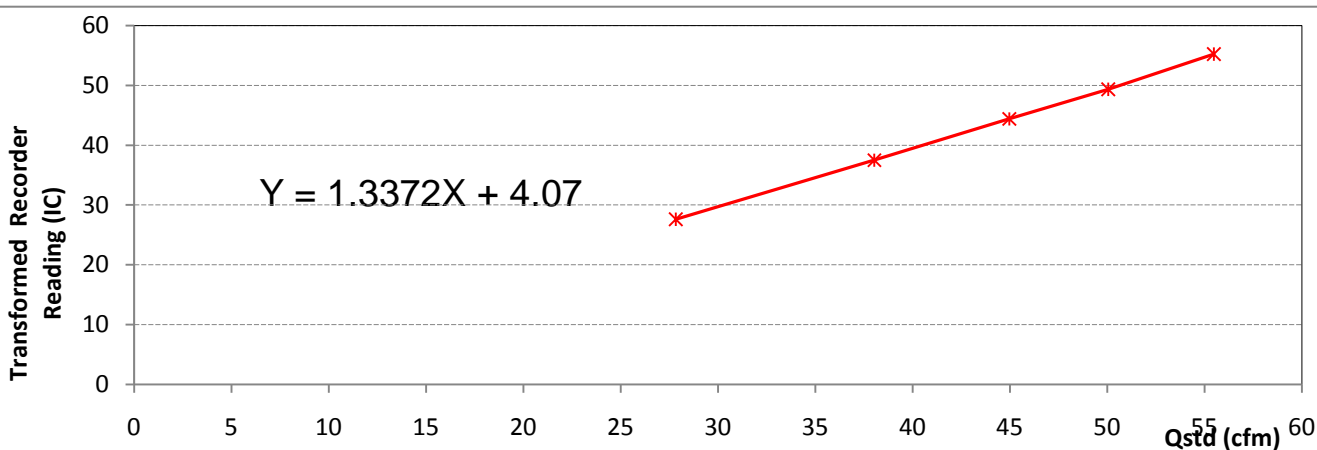
Plate No	H2O (in)	Qstd		I (Chart)	IC (corrected)
		(m3/min)	(cfm)		
1	5.40	1.173	41.437	60.00	59.70
2	4.40	1.062	37.513	54.00	53.73
3	3.60	0.964	34.039	50.00	49.75
4	2.40	0.793	27.998	42.00	41.79
5	1.50	0.633	22.369	34.00	33.83

Linear Regression

Slope: 1.3372

Intecept: 4.0700

Corr. Coeff: 0.9995



CALIBRATION BY :	Parinya Klumnoi	DATE :	2/6/2025
APPROVED BY :	Tawatchai Chongvutichai	DATE :	2/6/2025
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22			
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# Calibrate report

Product	Dust Monitoring System	Model	ES80A-Y8
Quantity	1pcs	Cali date	October, 10, 2024
Product No.	202410101310285		
Appearance	<input checked="" type="checkbox"/> Clean <input checked="" type="checkbox"/> Non corrosive <input checked="" type="checkbox"/> No damage		
Gas type	PM2.5:ug/m <sup>3</sup> PM10:ug/m <sup>3</sup> Temperature and humidity: °C/%RH    Atmospheric : hpa		
Accuracy	± 3%F.S		
resolution	1ug/m <sup>3</sup>		
Response time	≤30S		
Survey range	PM2.5:0-1000ug/m <sup>3</sup> PM10:0-2000ug/m <sup>3</sup> Temperature: -20-50°C    Humidity:0%-95%RH    Atmospheric :600-1100 hpa		
Signal output mode	4G LTE		
Power supply voltage	AC 220V/50Hz		
Power dissipation	≤ 30W		
Working temperature and humidity range	-20°C-50°C / 0%RH-100%RH		
Testing condition indoor	Temperature: 25°C    Humidity: 55%RH		
Cali gas test	1.PM2.5:Measured value: <u>13</u> ug/m <sup>3</sup> PM10:Measured value: <u>15</u> ug/m <sup>3</sup> 2.Temperature: Measured value: <u>24.4</u> °C    Humidity:Measured value: <u>53</u> %RH 3.Atmospheric:Measured value <u>1007</u> hpa		
Test result	Qualified		
Remark			

Quality judgment:

Date: October 10, 2024



Tester : Ai Huai Zhou

OQC : Chang Yang

Auditor: Yan Hui Wang



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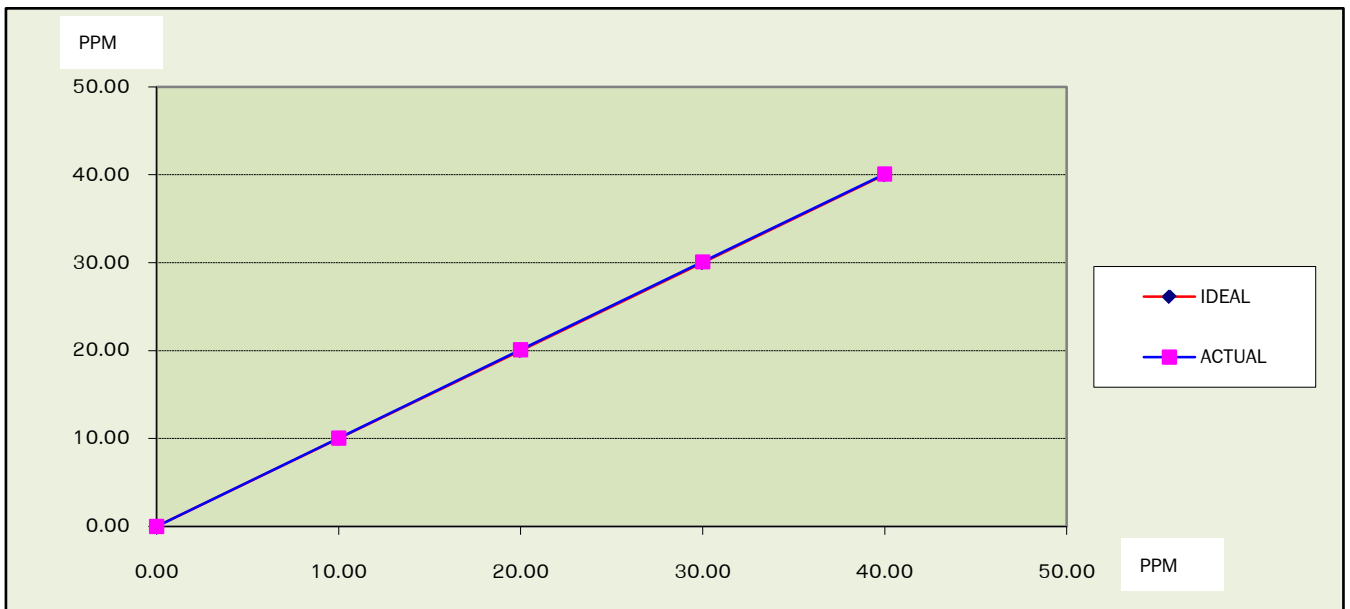
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA	<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226	
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM		<b>CYLINDER NO :</b> CC734373	
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI		<b>CERTIFIED DATE :</b> 12/05/2020	
<b>CERTIFIED BY :</b> AIRGAS		<b>EXPIRED DATE :</b> 12/05/2028	

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.0500	0.1	0.50
<b>2</b>	20.00	20.1000	0.1	0.50
<b>3</b>	30.00	30.1000	0.1	0.33
<b>4</b>	40.00	40.1000	0.1	0.25
<b>AVERAGE (%)</b>				0.40



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 6/01/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 6/01/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญ์ กล้าน้อย 02-8681246 ต่อ 22

67/35-36, 3<sup>rd</sup> Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax: (66) 0-2868-0860



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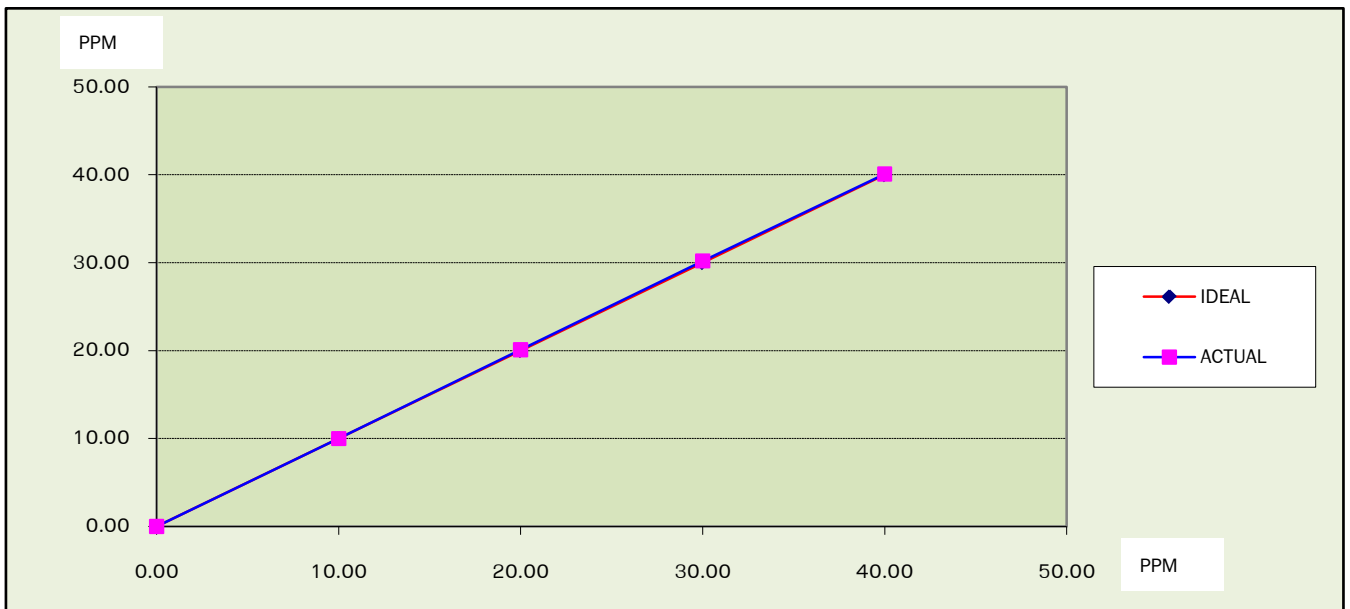
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA		<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM			<b>CYLINDER NO :</b> CC734373
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI			<b>CERTIFIED DATE :</b> 12/05/2020
<b>CERTIFIED BY :</b> AIRGAS			<b>EXPIRED DATE :</b> 12/05/2028

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.0000	0.0	0.00
<b>2</b>	20.00	20.1000	0.1	0.50
<b>3</b>	30.00	30.2000	0.2	0.67
<b>4</b>	40.00	40.1000	0.1	0.25
<b>AVERAGE (%)</b>				0.35



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 3/02/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 3/02/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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Website: www.okla-testing.com

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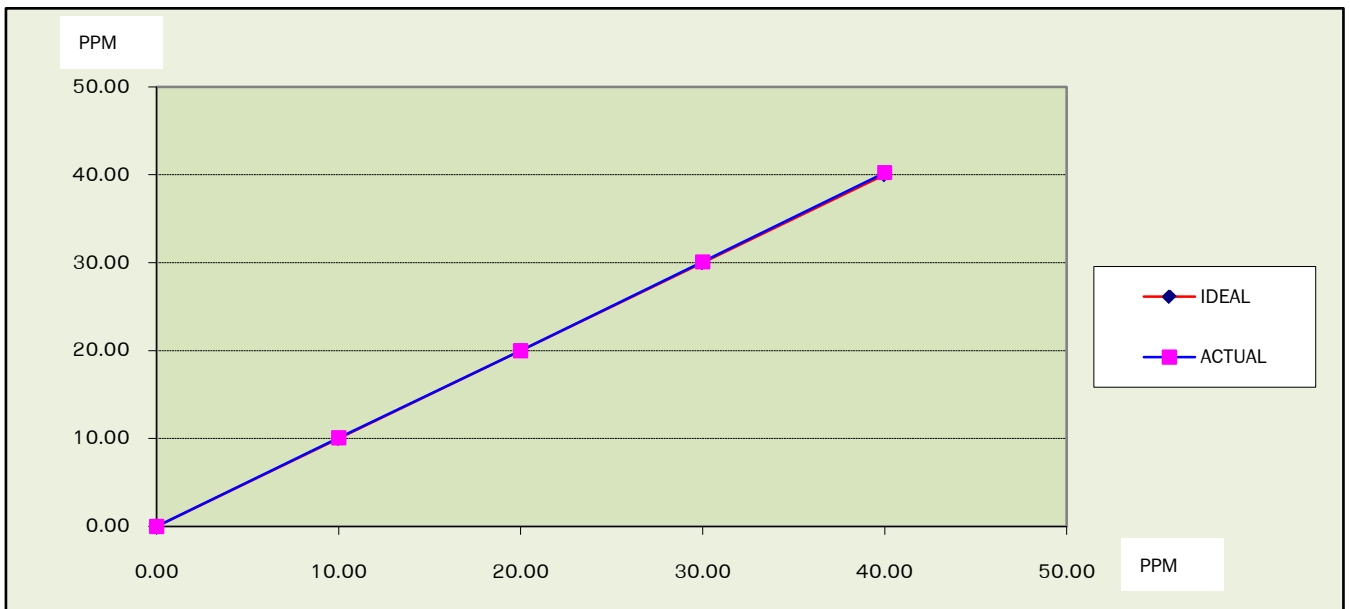
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA	<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226	
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM		<b>CYLINDER NO :</b> CC734373	
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI		<b>CERTIFIED DATE :</b> 12/05/2020	
<b>CERTIFIED BY :</b> AIRGAS		<b>EXPIRED DATE :</b> 12/05/2028	

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.0800	0.1	0.80
<b>2</b>	20.00	20.0000	0.0	0.00
<b>3</b>	30.00	30.1000	0.1	0.33
<b>4</b>	40.00	40.2500	0.3	0.63
<b>AVERAGE (%)</b>				0.44



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 3/03/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 3/03/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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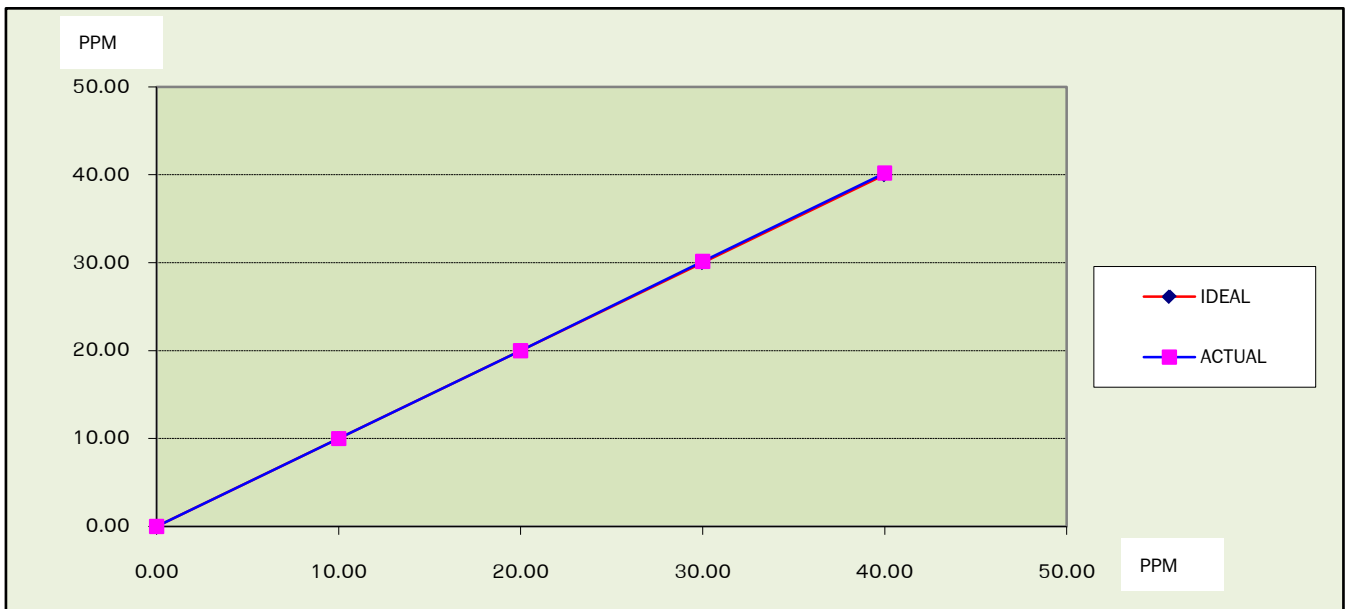
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA		<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM			<b>CYLINDER NO :</b> CC734373
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI			<b>CERTIFIED DATE :</b> 12/05/2020
<b>CERTIFIED BY :</b> AIRGAS			<b>EXPIRED DATE :</b> 12/05/2028

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.0000	0.0	0.00
<b>2</b>	20.00	20.0000	0.0	0.00
<b>3</b>	30.00	30.1500	0.1	0.50
<b>4</b>	40.00	40.2000	0.2	0.50
<b>AVERAGE (%)</b>				0.25



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 1/04/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 1/04/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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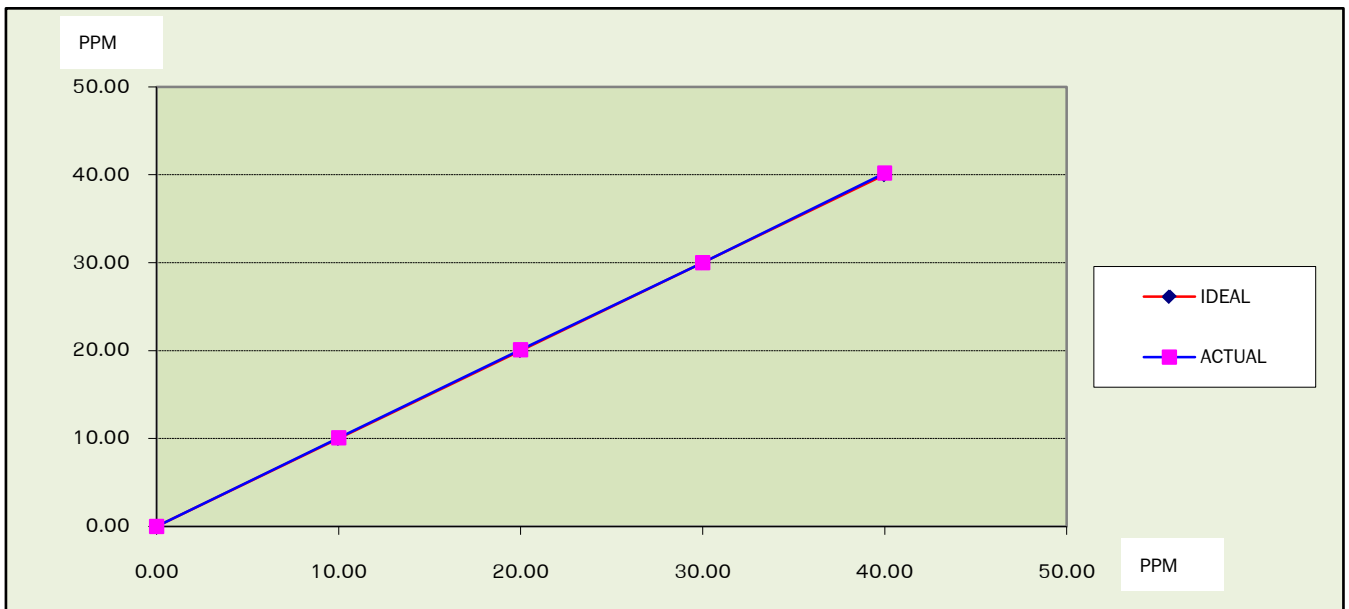
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA	<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226	
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM		<b>CYLINDER NO :</b> CC734373	
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI		<b>CERTIFIED DATE :</b> 12/05/2020	
<b>CERTIFIED BY :</b> AIRGAS		<b>EXPIRED DATE :</b> 12/05/2028	

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.1000	0.1	1.00
<b>2</b>	20.00	20.1000	0.1	0.50
<b>3</b>	30.00	30.0000	0.0	0.00
<b>4</b>	40.00	40.2000	0.2	0.50
<b>AVERAGE (%)</b>				0.50



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 2/05/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 2/05/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญ์ กล้าน้อย 02-8681246 ต่อ 22

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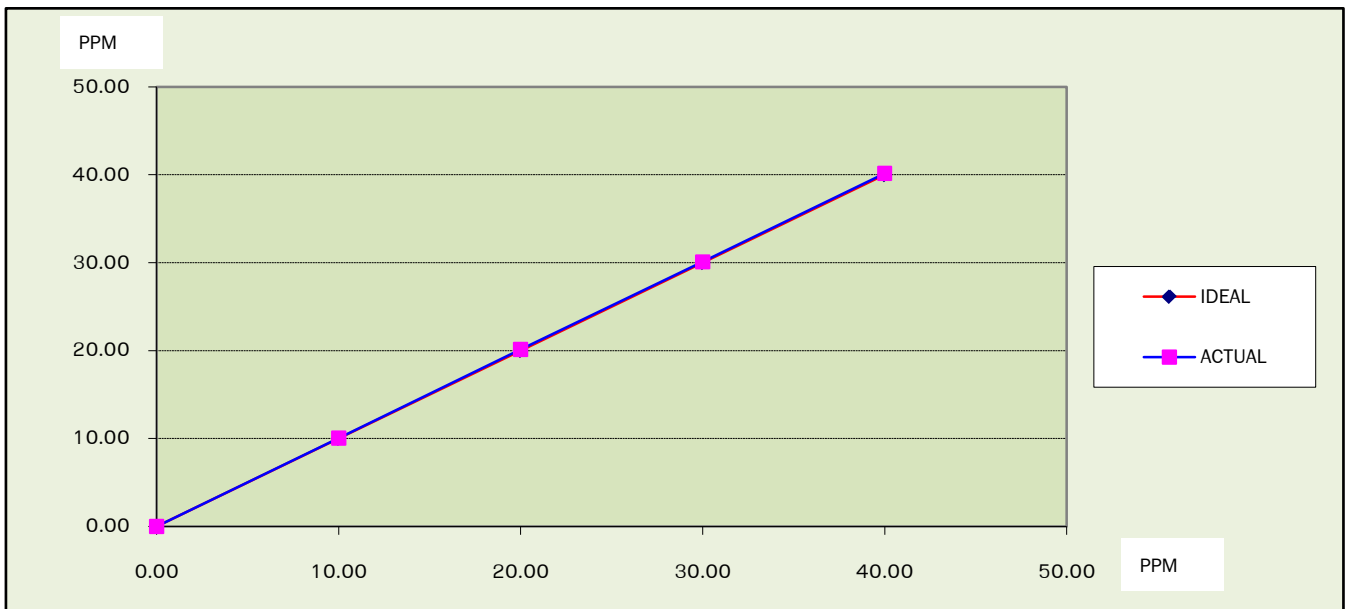
Tax ID: 0105553003058

### **CALIBRATION REPORT**

<b>EQRIPMENT NAME :</b> CO Analyzer			
<b>MANUFACTURER :</b> HORIBA	<b>MODEL :</b> APMA-370	<b>SERIAL NO :</b> 226	
<b>STANDARD GAS CONCENTRATION (PPM) :</b> 4,533 PPM		<b>CYLINDER NO :</b> CC734373	
<b>CYLINDER PRESSURE (PSI) :</b> 2,000 PSI		<b>CERTIFIED DATE :</b> 12/05/2020	
<b>CERTIFIED BY :</b> AIRGAS		<b>EXPIRED DATE :</b> 12/05/2028	

### **CALIBRATION RESULTS**

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
<b>ZERO</b>	0.00	0.0000	0.00	-
<b>1</b>	10.00	10.0500	0.1	0.50
<b>2</b>	20.00	20.1500	0.1	0.75
<b>3</b>	30.00	30.1000	0.1	0.33
<b>4</b>	40.00	40.1500	0.1	0.37
<b>AVERAGE (%)</b>				0.49



**CALIBRATED BY :** Parinya Klumnoi

**DATE :** 2/06/2025

**CHECKED BY :** Tawatchai Chongvutichai

**DATE :** 2/06/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญ์ กล้าน้อย 02-8681246 ต่อ 22

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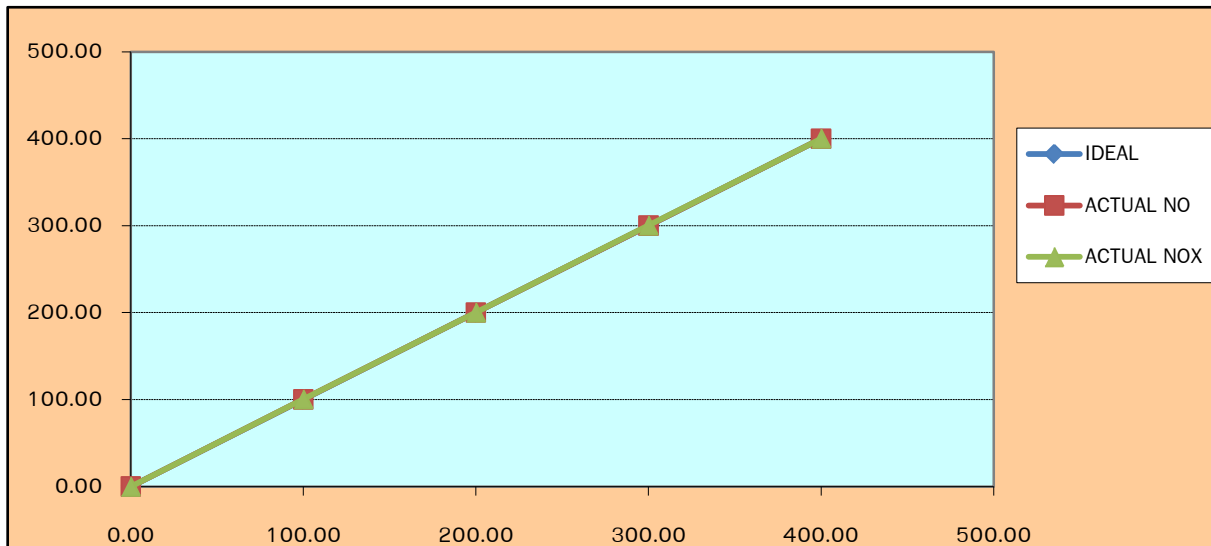
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.20	0.20	0.20	100.40	0.40	0.40
2	200.00	200.10	0.10	0.05	200.20	0.20	0.10
3	300.00	300.10	0.10	0.03	300.20	0.20	0.07
4	400.00	400.10	0.10	0.03	400.20	0.20	0.05
				0.08			0.15



CALIBRATED BY : Parinya Klumnoi

DATE : 6/01/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 6/01/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

67/35-36, 3<sup>rd</sup> Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax: (66) 0-2868-0860



OKLA TESTING & CONSULTING SERVICE CO., LTD. (Head office)

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Website: www.okla-testing.com

J-NAC Group

Tel: (66) 02 868 1246

FAX: (66) 02 868 0860

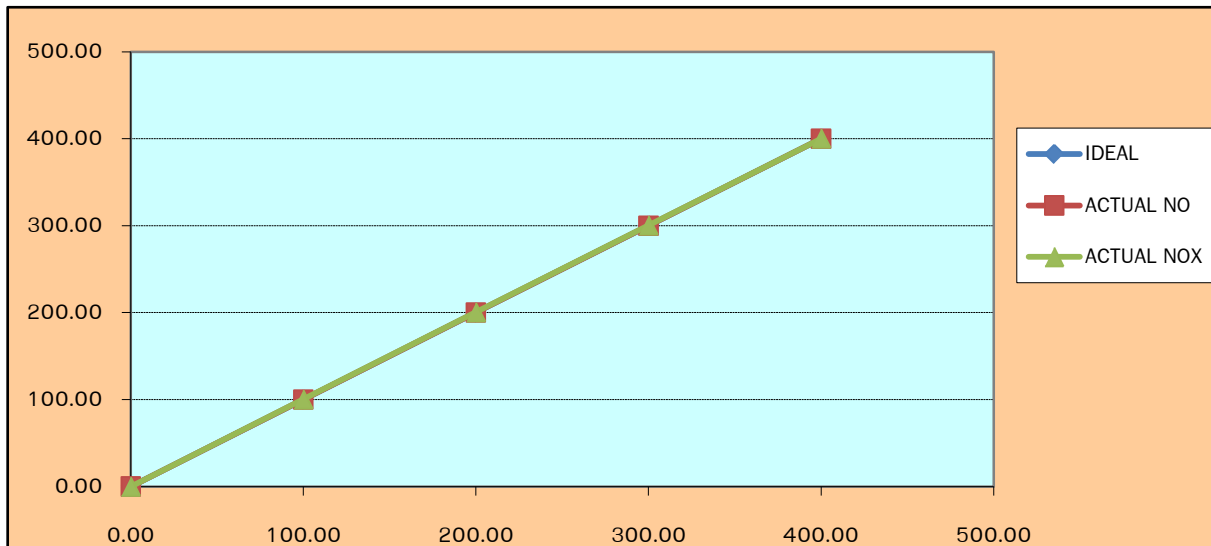
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.00	0.00	0.00	100.20	0.20	0.20
2	200.00	200.20	0.20	0.10	200.40	0.40	0.20
3	300.00	300.00	0.00	0.00	300.20	0.20	0.07
4	400.00	400.00	0.00	0.00	400.20	0.20	0.05
				0.02			0.13



CALIBRATED BY : Parinya Klumnoi

DATE : 3/02/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/02/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

67/35-36, 3<sup>rd</sup> Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax: (66) 0-2868-0860



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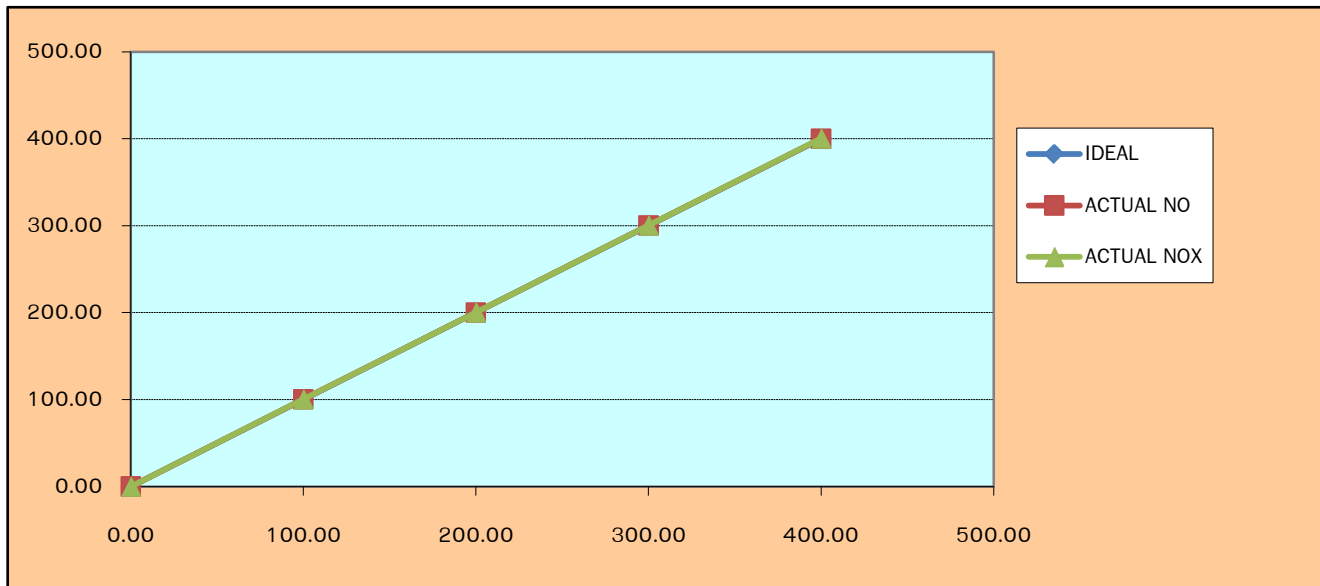
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.30	0.30	0.30	100.50	0.50	0.50
2	200.00	200.10	0.10	0.05	200.30	0.30	0.15
3	300.00	300.20	0.20	0.07	300.40	0.40	0.13
4	400.00	400.10	0.10	0.03	400.30	0.30	0.08
				0.11			0.21



CALIBRATED BY : Parinya Klumnoi

DATE : 3/03/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/03/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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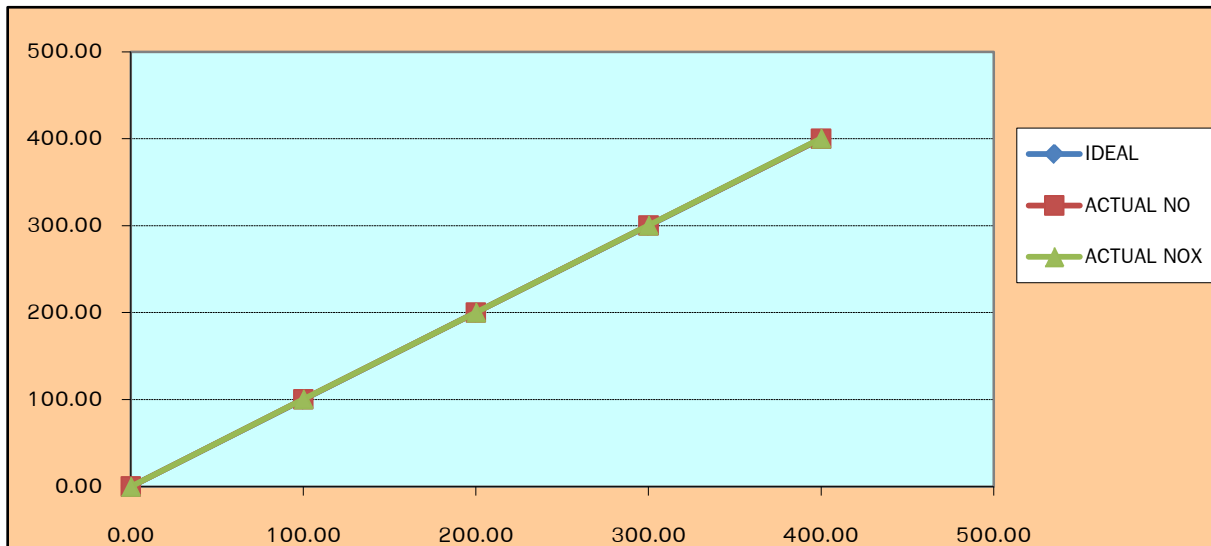
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.30	0.30	0.30	100.50	0.50	0.50
2	200.00	200.10	0.10	0.05	200.30	0.30	0.15
3	300.00	300.20	0.20	0.07	300.40	0.40	0.13
4	400.00	400.10	0.10	0.03	400.30	0.30	0.08
				0.11			0.21



CALIBRATED BY : Parinya Klumnoi

DATE : 1/04/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 1/04/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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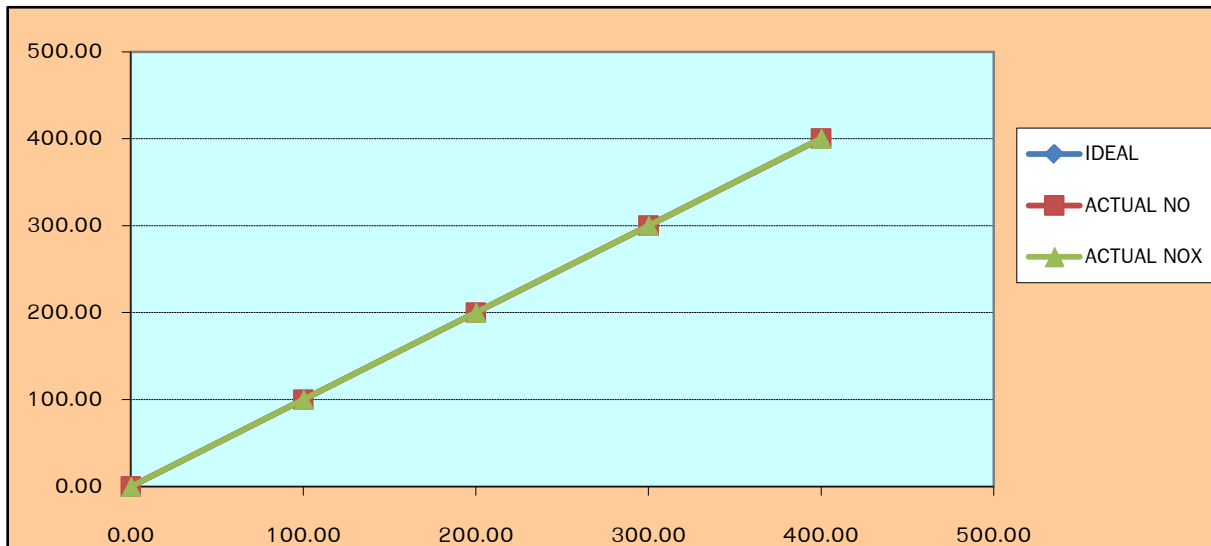
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.10	0.10	0.10	100.10	0.10	0.10
2	200.00	200.20	0.20	0.10	200.20	0.20	0.10
3	300.00	300.10	0.10	0.03	300.10	0.10	0.03
4	400.00	400.40	0.40	0.10	400.40	0.40	0.10
				0.08			0.08



CALIBRATED BY : Parinya Klumnoi

DATE : 2/05/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/05/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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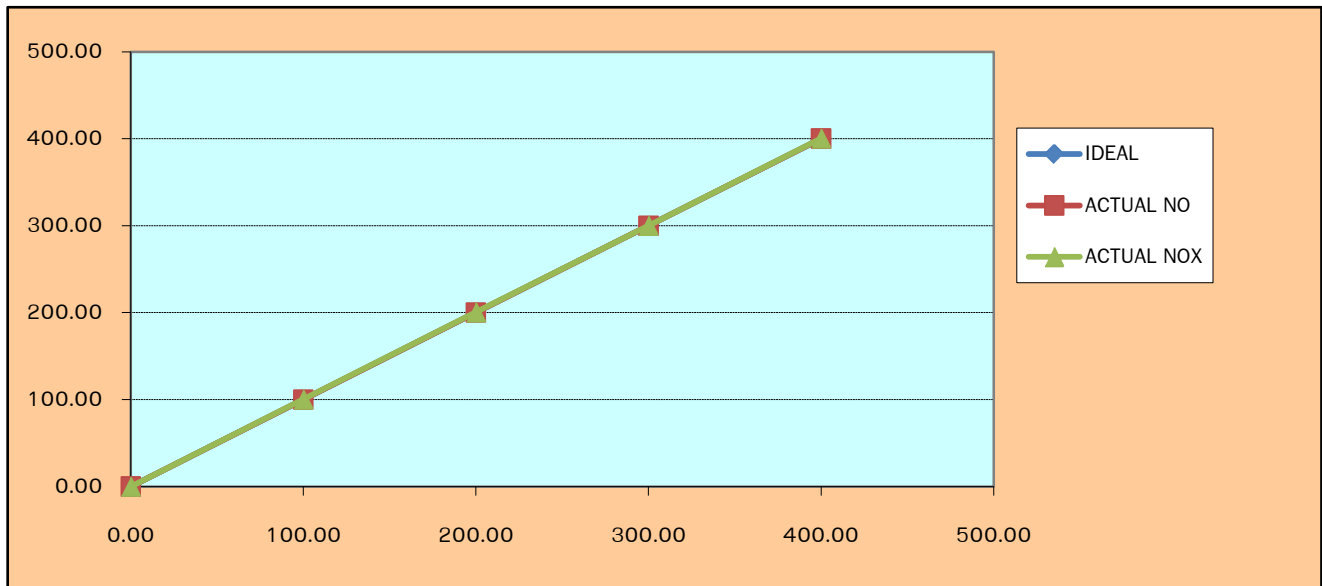
Tax ID: 010553003058

### CALIBRATION REPORT

EQUIPMENT NAME : NOx Analyzer			
MANUFACTURER : HORIBA	MODEL : APNA-370	SERIAL NO : 36WA70V3	
STANDARD GAS CONCENTRATION (PPM) : 44.78 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (psig) : 1000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS						
	IDEAL	ACTUAL NO	ERROR NO	%ERROR NO	ACTUAL NO <sub>x</sub>	ERROR NO <sub>x</sub>	%ERROR NO <sub>x</sub>
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	100.00	100.10	0.10	0.10	100.20	0.20	0.20
2	200.00	200.20	0.20	0.10	200.40	0.40	0.20
3	300.00	300.00	0.00	0.00	300.00	0.00	0.00
4	400.00	400.20	0.20	0.05	400.40	0.40	0.10
				0.06			0.13



CALIBRATED BY : Parinya Klumnoi

DATE : 2/06/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/06/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

67/35-36, 3<sup>rd</sup> Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax: (66) 0-2868-0860



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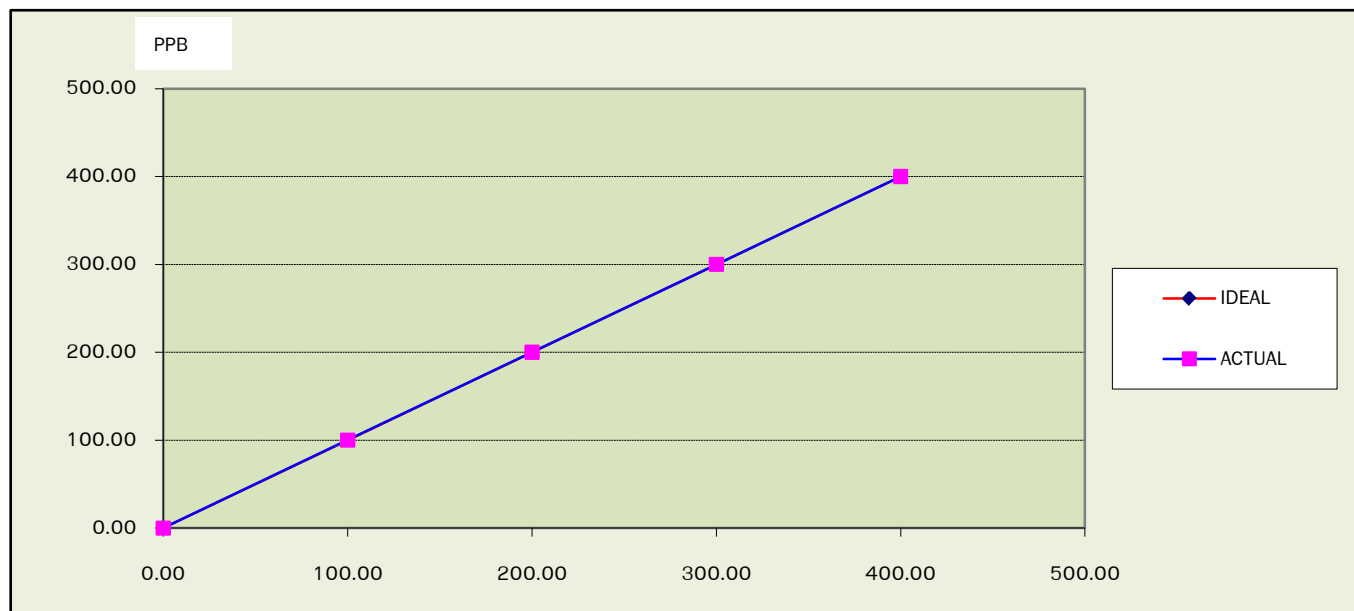
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.2000	0.2	0.20
2	200.00	200.2000	0.2	0.10
3	300.00	300.1000	0.1	0.03
4	400.00	400.2000	0.2	0.05
AVERAGE (%)				0.10



CALIBRATED BY : Parinya Klumnoi

DATE : 6/1/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 6/1/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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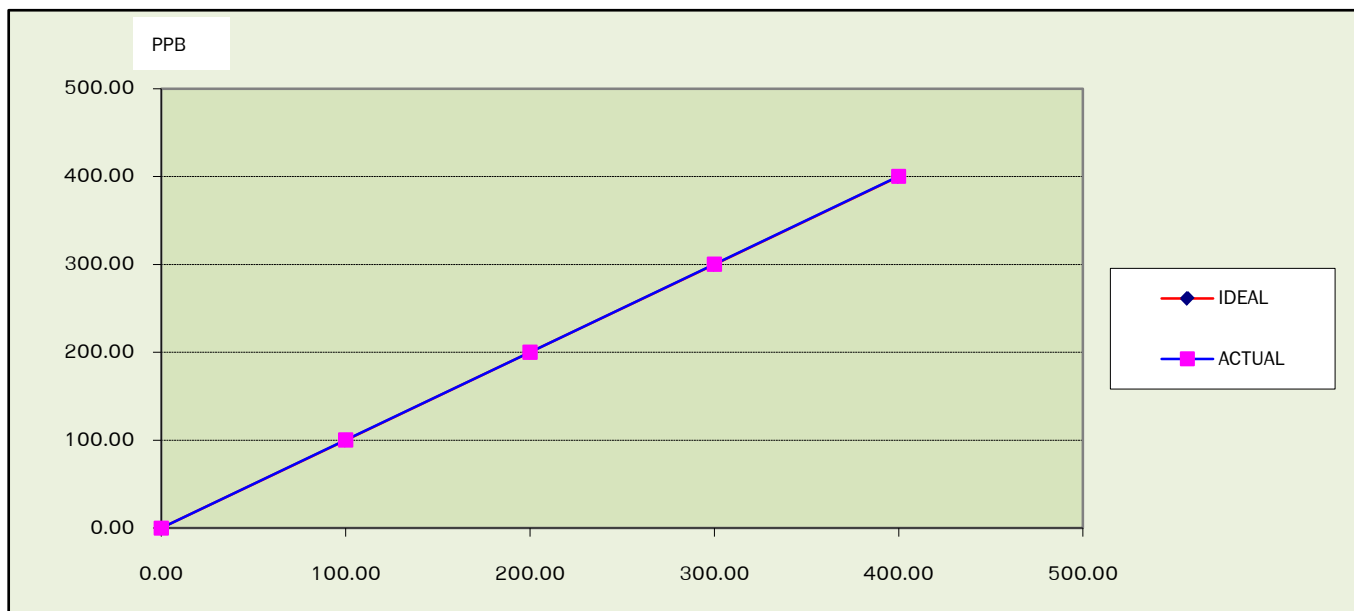
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.3000	0.3	0.30
2	200.00	200.1000	0.1	0.05
3	300.00	300.2000	0.2	0.07
4	400.00	400.3000	0.3	0.08
AVERAGE (%)				0.12



CALIBRATED BY : Parinya Klumnoi

DATE : 3/2/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/2/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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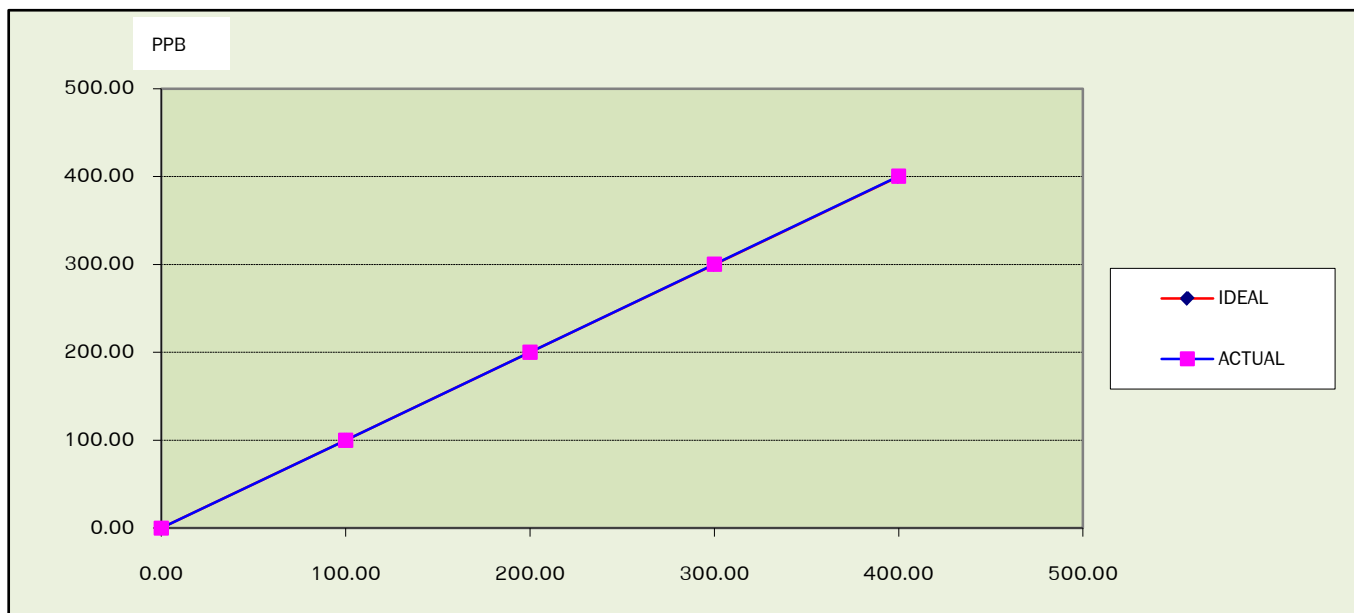
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.1000	0.1	0.10
2	200.00	200.2000	0.2	0.10
3	300.00	300.3000	0.3	0.10
4	400.00	400.4000	0.4	0.10
AVERAGE (%)				0.10



CALIBRATED BY : Parinya Klumnoi

DATE : 3/3/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/3/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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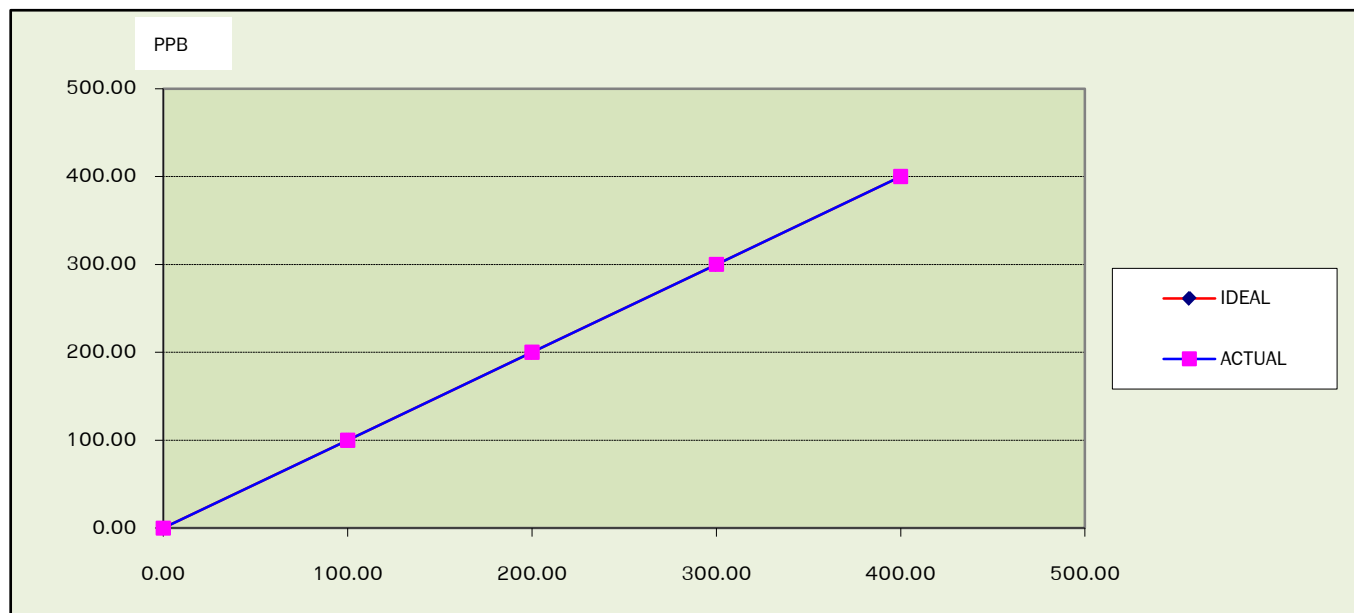
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.1000	0.1	0.10
2	200.00	200.1000	0.1	0.05
3	300.00	300.1000	0.1	0.03
4	400.00	400.1000	0.1	0.03
AVERAGE (%)				0.05



CALIBRATED BY : Parinya Klumnoi

DATE : 1/4/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 1/4/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

67/35-36, 3<sup>rd</sup> Petkasem 7/1 Rd., Thapra, Bangkokyai, Bangkok 10600 Thailand Tel: (66) 0-28681246 Fax: (66) 0-2868-0860



OKLA TESTING & CONSULTING SERVICE CO., LTD. (Head office)

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67/35-36, 3<sup>rd</sup> Floor., Phetkasem 7/1 Rd., Wat Tha Pra, Bangkokyai, Bangkok, THAILAND 10600

Tel: (66) 02 868 1246

67/35-36 ชั้น 3 เพชรเกษม ซอย 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

FAX: (66) 02 868 0860

E-MAIL: sales@okla-testing.com

Website: www.okla-testing.com

J-NAC Group

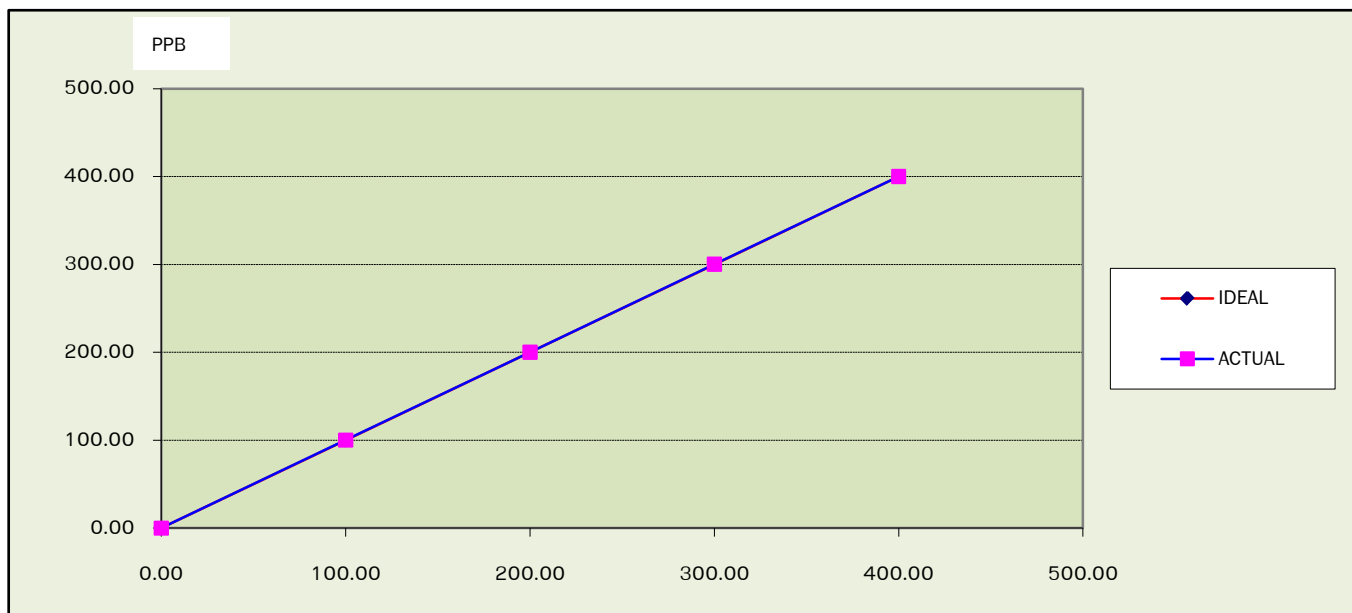
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.2000	0.2	0.20
2	200.00	200.1000	0.1	0.05
3	300.00	300.3000	0.3	0.10
4	400.00	400.2000	0.2	0.05
AVERAGE (%)				0.10



CALIBRATED BY : Parinya Klumnoi

DATE : 2/5/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/5/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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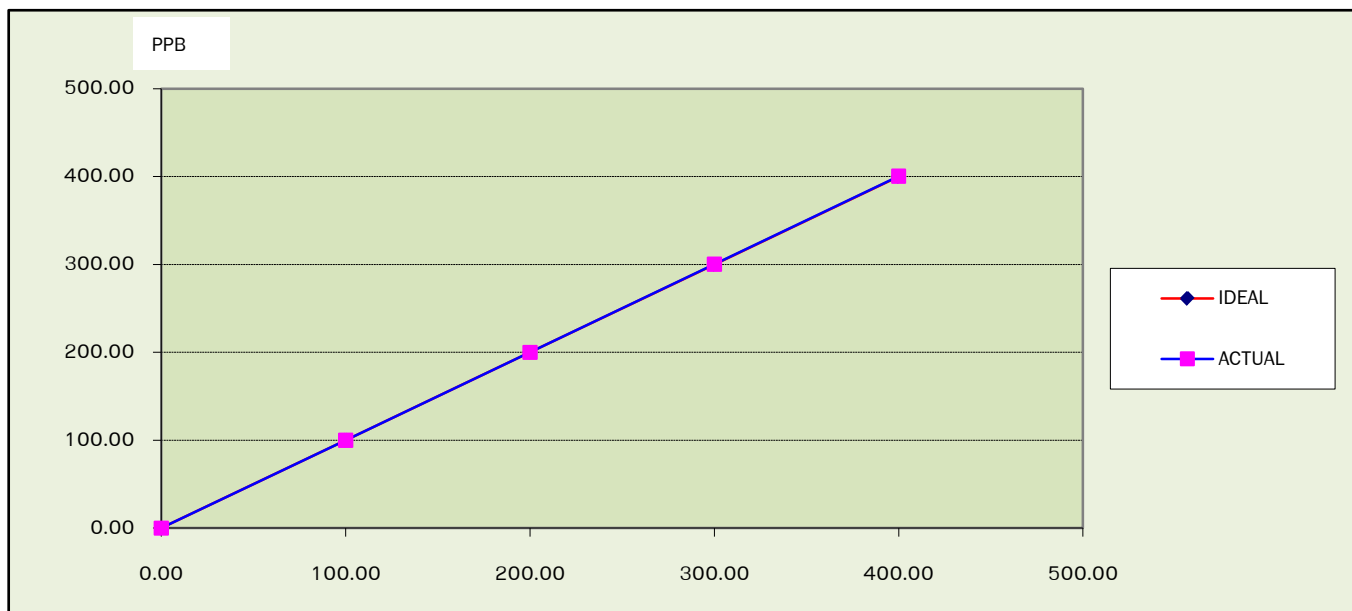
Tax ID: 0105553003058

### CALIBRATION REPORT

EQUIPMENT NAME : SO <sub>2</sub> Analyzer			
MANUFACTURER : Horiba	MODEL : APSA-370	SERIAL NO : 5FBMA08V	
STANDARD GAS CONCENTRATION (PPM) 45.25 PPM		CYLINDER NO : EB0124972	
CYLINDER PRESSURE (PSI) : 1,000 PSI		CERTIFIED DATE : 24/09/2022	
CERTIFIED BY : Airgas		EXPIRED DATE : 24/09/2025	

### CALIBRATION RESULTS

POINT NO	CALIBRATION RESULTS			
	IDEAL	ACTUAL	ERROR	%ERROR
ZERO	0.00	0.0000	0.00	-
1	100.00	100.1000	0.1	0.10
2	200.00	200.0000	0.0	0.00
3	300.00	300.2000	0.2	0.07
4	400.00	400.4000	0.4	0.10
AVERAGE (%)				0.07



CALIBRATED BY : Parinya Klumnoi

DATE : 2/6/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/6/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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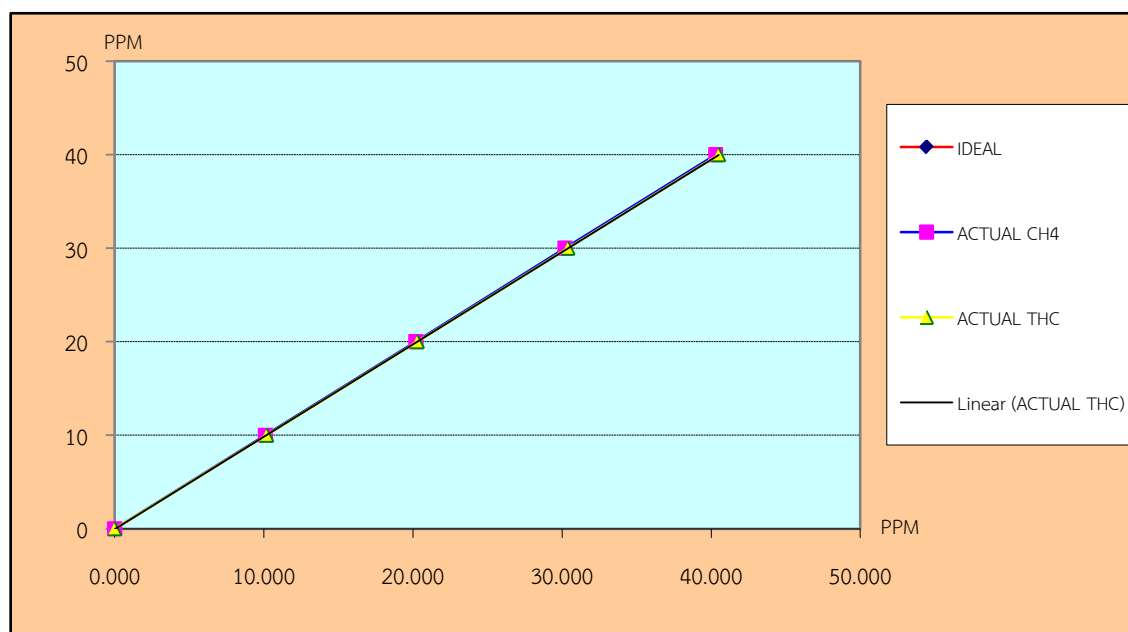
Tax ID: 0105553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.100	0.100	1.00	10.200	0.200	2.00
2	20.000	20.200	0.200	1.00	20.300	0.300	1.50
3	30.000	30.200	0.200	0.67	30.400	0.400	1.33
4	40.000	40.300	0.300	0.75	40.500	0.500	1.25
AVERAGE (%)				0.85			1.52



CALIBRATED BY : Parinya Klumnoi

DATE : 6/1/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 6/1/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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J-NAC Group

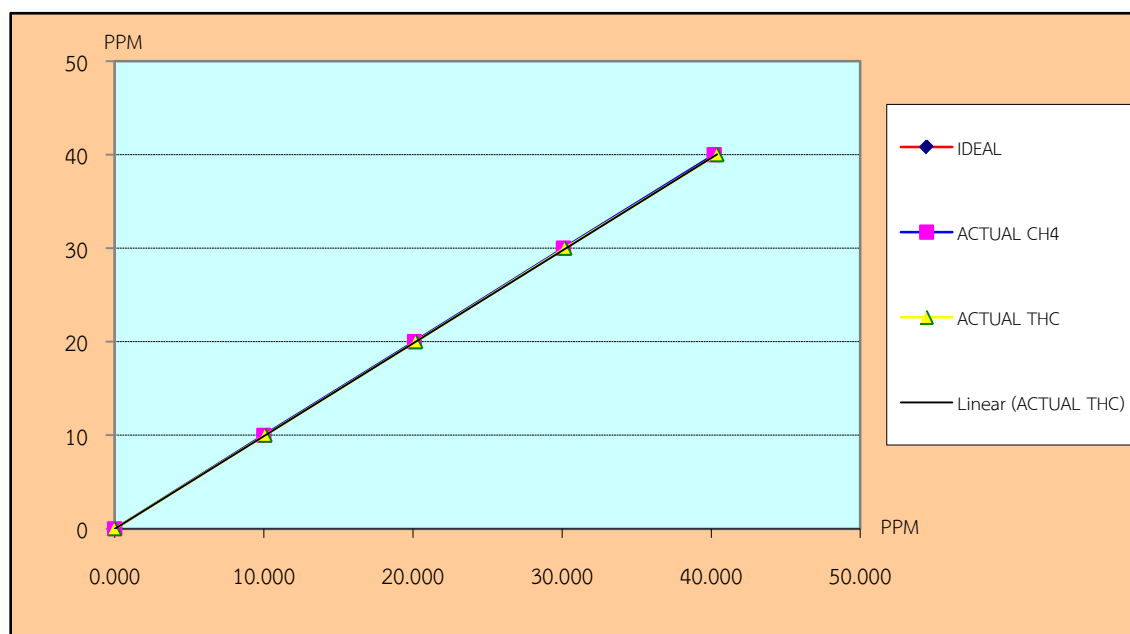
Tax ID: 010553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.000	0.000	0.00	10.100	0.100	1.00
2	20.000	20.100	0.100	0.50	20.200	0.200	1.00
3	30.000	30.100	0.100	0.33	30.200	0.200	0.67
4	40.000	40.200	0.200	0.50	40.400	0.400	1.00
AVERAGE (%)				0.33			0.92



CALIBRATED BY : Parinya Klumnoi

DATE : 3/2/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/2/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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Website: www.okla-testing.com

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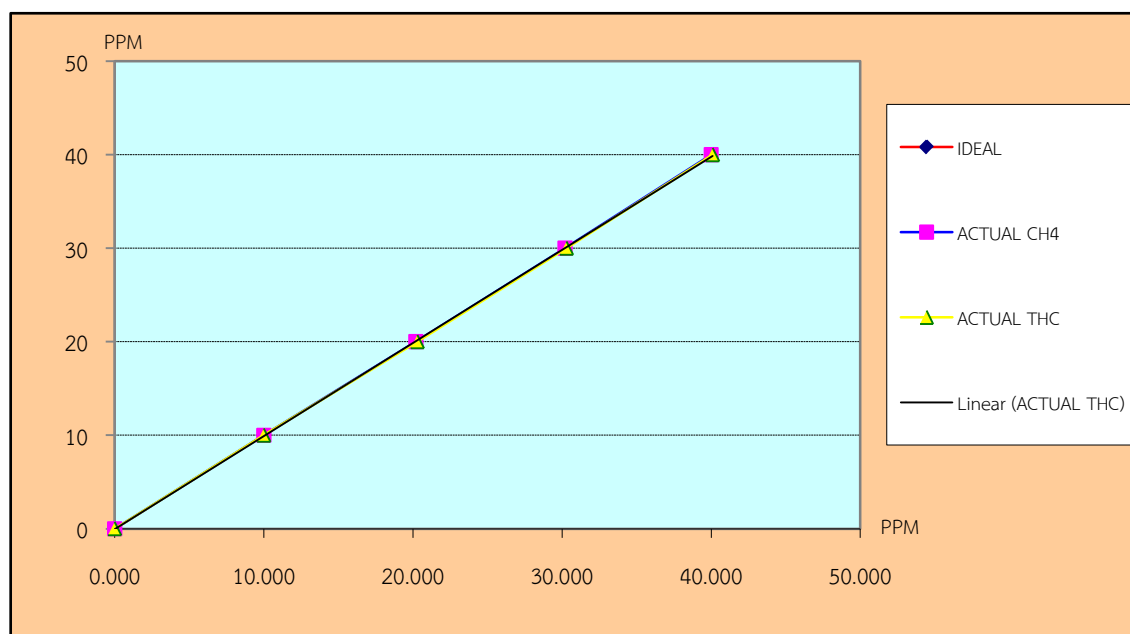
Tax ID: 0105553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.000	0.000	0.00	10.000	0.000	0.00
2	20.000	20.200	0.200	1.00	20.300	0.300	1.50
3	30.000	30.200	0.200	0.67	30.300	0.300	1.00
4	40.000	40.000	0.000	0.00	40.100	0.100	0.25
AVERAGE (%)				0.42			0.69



CALIBRATED BY : Parinya Klumnoi

DATE : 3/3/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 3/3/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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Website: www.okla-testing.com

J-NAC Group

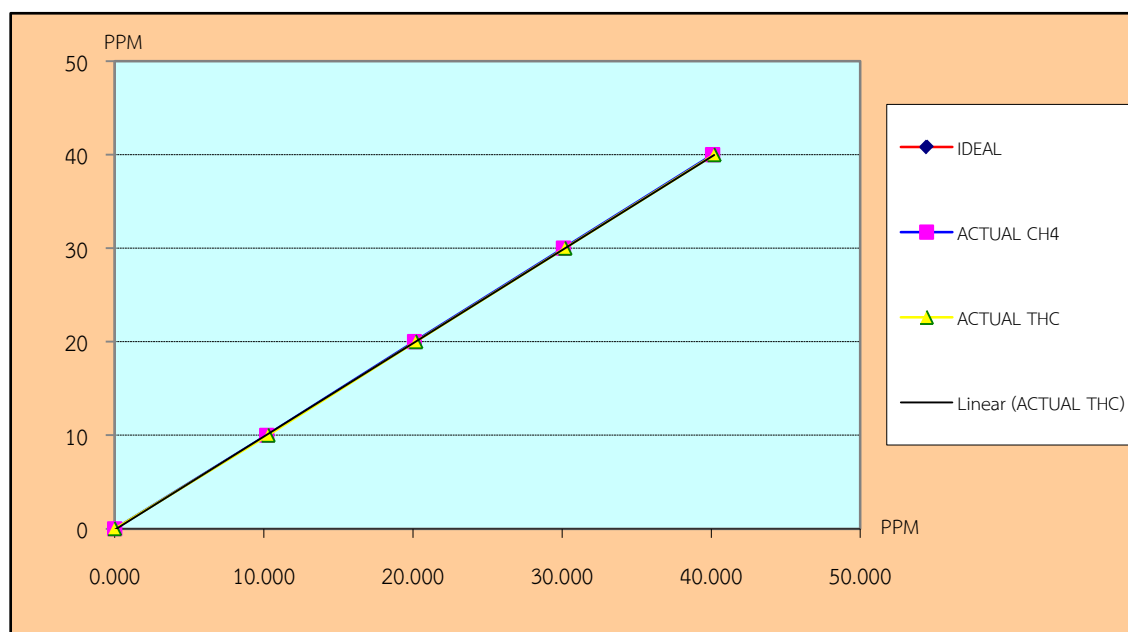
Tax ID: 0105553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.200	0.200	2.00	10.300	0.300	3.00
2	20.000	20.100	0.100	0.50	20.200	0.200	1.00
3	30.000	30.100	0.100	0.33	30.200	0.200	0.67
4	40.000	40.100	0.100	0.25	40.200	0.200	0.50
AVERAGE (%)				0.77			1.29



CALIBRATED BY : Parinya Klumnoi

DATE : 1/4/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 1/4/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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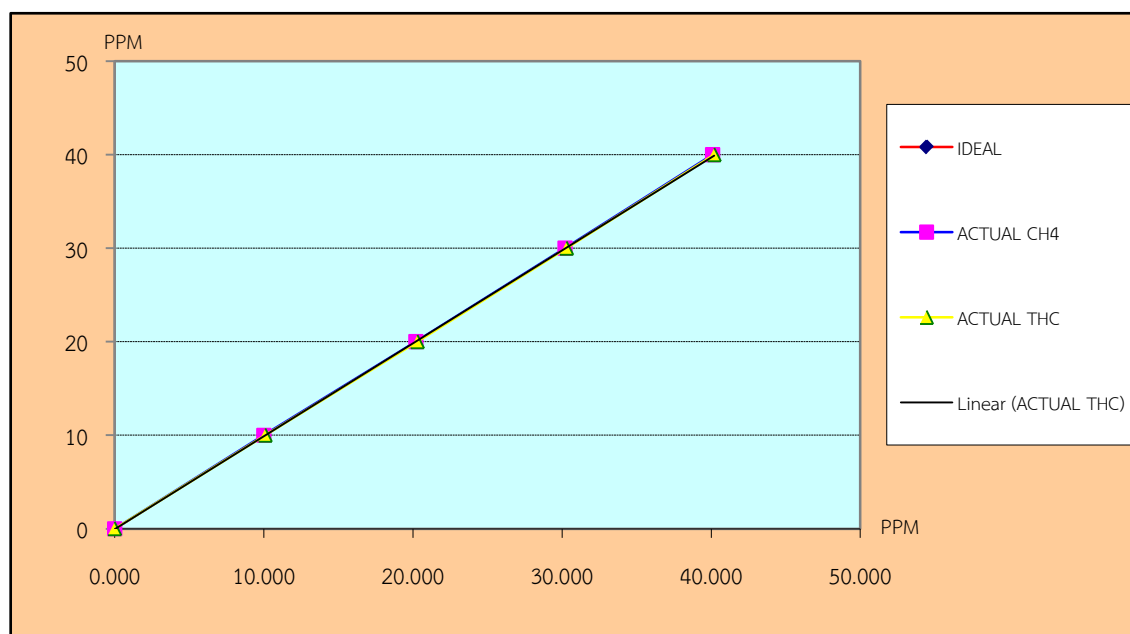
Tax ID: 010553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.000	0.000	0.00	10.100	0.100	1.00
2	20.000	20.200	0.200	1.00	20.300	0.300	1.50
3	30.000	30.200	0.200	0.67	30.300	0.300	1.00
4	40.000	40.100	0.100	0.25	40.200	0.200	0.50
AVERAGE (%)				0.48			1.00



CALIBRATED BY : Parinya Klumnoi

DATE : 2/5/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/5/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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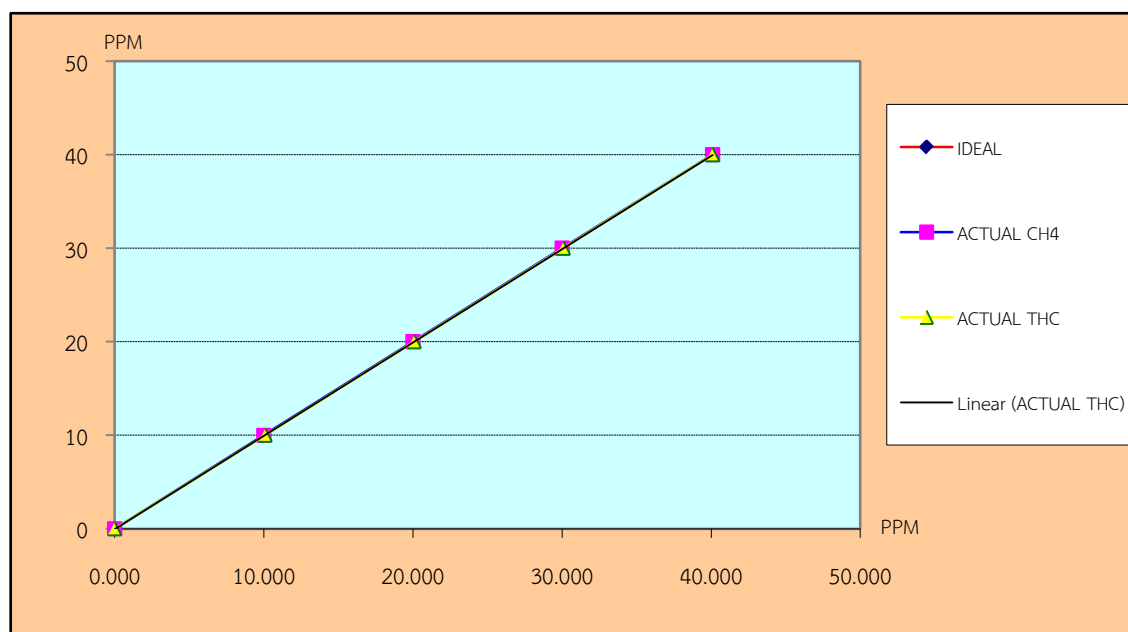
Tax ID: 010553003058

## TEST REPORT

EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL	: APHA-370
SERIAL NO	: LY1L4PRX		
STANDARD GAS CONCENTRATION (PPM)	: 506.1 PPM	CYLINDER NO	: CC734373
CYLINDER PRESSURE (psig)	: 1,000 PSI	CERTIFIED DATE	: 12/05/2020
CERTIFIED BY	: AIRGAS	EXPIRED DATE	: 12/05/2028

## TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.000	0.000	0.00	10.100	0.100	1.00
2	20.000	20.000	0.000	0.00	20.100	0.100	0.50
3	30.000	30.000	0.000	0.00	30.100	0.100	0.33
4	40.000	40.100	0.100	0.25	40.100	0.100	0.25
AVERAGE (%)				0.06			0.52



CALIBRATED BY : Parinya Klumnoi

DATE : 2/6/2025

CHECKED BY : Tawatchai Chongvutichai

DATE : 2/6/2025

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : นายปริญญา กล้าน้อย 02-8681246 ต่อ 22

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# QUALITY CALIBRATION CO., LTD.

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

www.qcalibration.com

CERTIFICATE No : 25E0737  
REFERENCE No : 75929-3

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : SOUND LEVEL METER  
MANUFACTURER : DELTAOHM  
MODEL : HD2010UC  
SERIAL No : 17030644674  
ID No : EM-SLM006  
SUBMITTED BY : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3 RD FLOOR., PHETKHEM 7/1 RD.,  
WAT THA PRA, BANGKOKYAI, BANGKOK,  
THAILAND 10600

CALIBRATED BY : CHARUKIT L.

CALIBRATION DATE : 23-Jan-25

APPROVED BY :   
PONGSAK J.

ISSUED DATE : 23-Jan-25

RECEIVED DATE : 22-Jan-25

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



F-G010 REV 03





# QUALITY CALIBRATION CO., LTD.

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www.qcalibration.com

CERTIFICATE No : 25E0737

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : SOUND LEVEL METER  
MANUFACTURER : DELTAOHM  
S/N : 17030644674  
RECEIVED DATE : 22-Jan-25  
AMBIENT TEMPERATURE : 23°C ± 3°C  
MODEL : HD2010UC  
ID No : EM-SLM006  
CALIBRATION DATE : 23-Jan-25  
RELATIVE HUMIDITY : 50 % RH ± 20% RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO IEC 61672-2 :2003-04 AGAINST MULTIFUNCTION SOUND CALIBRATOR. THIS INSTRUMENT WAS PERFORMED SELF-CALIBRATION BY CALIBRATOR FROM CUSTOMER AT 94 Hz BEFORE CALIBRATION.
2. REFERENCE STANDARD INSTRUMENTS :-

<u>INSTRUMENT</u>	<u>MODEL</u>	<u>SERIAL No</u>	<u>CERTIFICATE No</u>	<u>DUE DATE</u>
1) MULTIFUNCTION SOUND CALIBRATOR	1986	02023	24E6768	05-Jul-25

3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO :-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

#### 1. A-WEIGHTING ACOUSTIC FREQUENCY RESPONSE

FREQUENCY (Hz)	STANDARD EXPECTED READING (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
125.00	-16.10	-15.5	-0.6	0.50
250.00	-8.60	-8.1	-0.5	0.50
500.00	-3.20	-3.0	-0.2	0.50
1000.00	0.00	0.0	0.0	0.50
2000.00	1.20	0.5	0.7	0.50

#### 2. C-WEIGHTING ACOUSTIC FREQUENCY RESPONSE

FREQUENCY (Hz)	STANDARD EXPECTED READING (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
125.00	-0.20	0.2	-0.4	0.50
250.00	0.00	0.4	-0.4	0.50
500.00	0.00	0.1	-0.1	0.50
1000.00	0.00	0.0	0.0	0.50
2000.00	-0.20	-0.9	0.7	0.50

#### 3. SOUND LEVEL LINEARITY TEST AT 1000 Hz

STANDARD APPLIED (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
74	73.8	0.2	0.50
84	83.9	0.1	0.50
94	94.0	0.0	0.50
104	104.0	0.0	0.50
114	114.1	-0.1	0.50

UUC\* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



F-GC





# QUALITY CALIBRATION CO., LTD.

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

www.qcalibration.com

CERTIFICATE No : 25E0736  
REFERENCE No : 75929-2

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : SOUND LEVEL METER  
MANUFACTURER : DELTAOHM  
MODEL : HD2010UC  
SERIAL No : 17030644673  
ID No : EM-SLM007  
SUBMITTED BY : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3 RD FLOOR., PHETKHEM 7/1 RD.,  
WAT THA PRA, BANGKOKYAI, BANGKOK,  
THAILAND 10600

CALIBRATED BY : CHARUKIT L.

CALIBRATION DATE : 23-Jan-25

APPROVED BY :

ISSUED DATE : 23-Jan-25

RECEIVED DATE : 22-Jan-25

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



F-G010 REV 03



**QUALITY CALIBRATION CO., LTD.**

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

[www.qcalibration.com](http://www.qcalibration.com)

CERTIFICATE No : 25E0736

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : SOUND LEVEL METER  
MANUFACTURER : DELTAOHM  
S/N : 17030644673  
RECEIVED DATE : 22-Jan-25  
AMBIENT TEMPERATURE : 23°C ± 3°C  
MODEL : HD2010UC  
ID No : EM-SLM007  
CALIBRATION DATE : 23-Jan-25  
RELATIVE HUMIDITY : 50 % RH ± 20% RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO IEC 61672-2 :2003-04 AGAINST MULTIFUNCTION SOUND CALIBRATOR. THIS INSTRUMENT WAS PERFORMED SELF-CALIBRATION BY CALIBRATOR FROM CUSTOMER AT 94 Hz BEFORE CALIBRATION.
2. REFERENCE STANDARD INSTRUMENTS :-

<u>INSTRUMENT</u>	<u>MODEL</u>	<u>SERIAL No</u>	<u>CERTIFICATE No</u>	<u>DUE DATE</u>
1) MULTIFUNCTION SOUND CALIBRATOR	1986	02023	24E6768	05-Jul-25

3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO :-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

#### 1. A-WEIGHTING ACOUSTIC FREQUENCY RESPONSE

FREQUENCY (Hz)	STANDARD EXPECTED READING (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
125.00	-16.10	-15.6	-0.5	0.50
250.00	-8.60	-8.2	-0.4	0.50
500.00	-3.20	-3.0	-0.2	0.50
1000.00	0.00	-0.1	0.1	0.50
2000.00	1.20	0.5	0.7	0.50

#### 2. C-WEIGHTING ACOUSTIC FREQUENCY RESPONSE

FREQUENCY (Hz)	STANDARD EXPECTED READING (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
125.00	-0.20	0.2	-0.4	0.50
250.00	0.00	0.2	-0.2	0.50
500.00	0.00	0.1	-0.1	0.50
1000.00	0.00	-0.1	0.1	0.50
2000.00	-0.20	-0.8	0.6	0.50

#### 3. SOUND LEVEL LINEARITY TEST AT 1000 Hz

STANDARD APPLIED (dB)	UUC READING (dB)	CORRECTION (dB)	UNCERTAINTY OF MEASUREMENT (± dB)
74	73.8	0.2	0.50
84	83.9	0.1	0.50
94	94.0	0.0	0.50
104	104.0	0.0	0.50
114	114.1	-0.1	0.50

UUC\* : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR  $k=2$ , PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



F-C



# CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **13 August 2024**

CERTIFICATE NUMBER **220215**



**Cirrus Research plc  
Acoustic House  
Bridlington Road  
Hunmanby  
North Yorkshire  
YO14 0PH  
United Kingdom**

Page 1 of 2

Approved signatory

K.Besau

Electronically signed:

## Sound Level Meter : IEC 61672-3:2013

### Instrument information

Manufacturer: Cirrus Research plc  
Model: CR:171A  
Serial number: G305836  
Class: 1  
Firmware version: 5.8.3251

Notes:

### Test summary

Date of calibration: 05 August 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.  
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

**The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.**

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

### Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%.

# CERTIFICATE OF CALIBRATION

Certificate Number:  
**220215**

Page 2 of 2

## Environmental conditions

The following conditions were recorded at the time of the test:

<b>Before</b>	Pressure: 100.49 kPa	Temperature: 22.1 °C	Humidity: 46 %
<b>After</b>	Pressure: 100.47 kPa	Temperature: 22.4 °C	Humidity: 44.7 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	TTi	TGA1241	439193
Attenuator	Cirrus Research	ZE:952	80380
Environmental Monitor	Comet	T7510	21961307

## Additional instrument information

Instruction manual:

Reference level range: Single range

Pattern approval: No

Source of pattern approval: -

### Preamplifier

Model: MV:200F

Serial number: 14553F

### Microphone

Model: MK:224

Serial number: 218347D

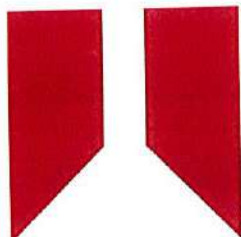
## Test results summary

Test	Result
Overload indication	Complies
Electrical noise-floor	Complies
Toneburst response	Complies
Linearity	Complies
Electrical Frequency weightings	Complies
Frequency and time weightings at 1 kHz	Complies
C-weighted peak	Complies
High level stability	Complies
Long-term stability	Complies

# CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 13 August 2024 CERTIFICATE NUMBER 220219



Cirrus Research plc  
Acoustic House  
Bridlington Road  
Hunmanby  
North Yorkshire  
YO14 0PH  
United Kingdom

Page 1 of 2

Approved signatory

K.Besau

Electronically signed:

## Octave-band filter : IEC 61260:1995

### Instrument information

Manufacturer: Cirrus Research plc  
Model: CR:171A  
Serial number: G305836  
Class: 1  
Firmware version: 5.8.3251

Notes:

### Test summary

Date of calibration: 05 August 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.  
Periodic tests were performed in accordance with procedures from IEC 61260:1995.

The filter submitted for testing successfully completed the Relative Attenuation test of IEC 61260 for the environmental conditions under which the test was performed.

### Notes

It provides traceability of measurement to the SI system of units and/or to units of measurement realised at a recognised national metrology institute. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%.



# CERTIFICATE OF CALIBRATION

Certificate Number:  
**220219**

Page 2 of 2

## Environmental conditions

The following conditions were recorded at the time of the test:

**Before**    Pressure: 100.49 kPa    Temperature: 22.1 °C    Humidity: 46.0 %  
**After**     Pressure: 100.47 kPa    Temperature: 22.4 °C    Humidity: 44.7 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	TTi	TGA1241	439193
Attenuator	Cirrus Research	ZE:952	80380
Environmental Monitor	Comet	T7510	21961307

## Filters Information

Filter class: 1  
Filter base: 2  
Reference attenuation: 0.0 dB

## Additional Instrument Information

Instruction manual:  
Pattern approval: No  
Source of pattern approval: -  
Reference level range: Single range

## Laboratory uncertainties

Requirement	Value (dB)
Relative Attenuation High	0.41
Relative Attenuation Mid	0.18
Relative Attenuation Low	0.12

# CERTIFICATE OF CALIBRATION

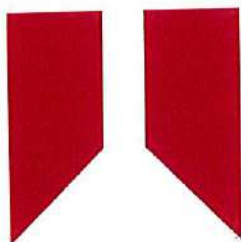
ISSUED BY

Cirrus Research plc

DATE OF ISSUE

13 August 2024

CERTIFICATE NUMBER 220231



**Cirrus Research plc**  
**Acoustic House**  
**Bridlington Road**  
**Hunmanby**  
**North Yorkshire**  
**YO14 0PH**  
**United Kingdom**

Page 1 of 2

Test engineer:

D.Swalwell

Electronically signed:



## Microphone

### Microphone capsule

Manufacturer: Cirrus Research plc

Model: MK:224

Serial Number: 218347D

### Calibration procedure

Open circuit: 53.5 mV/Pa

Sensitivity at 1 kHz: -25.4 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

### Environmental conditions

Pressure: 101.20 kPa

Temperature: 21.0 °C

Humidity: 52.0 %

# CERTIFICATE OF CALIBRATION

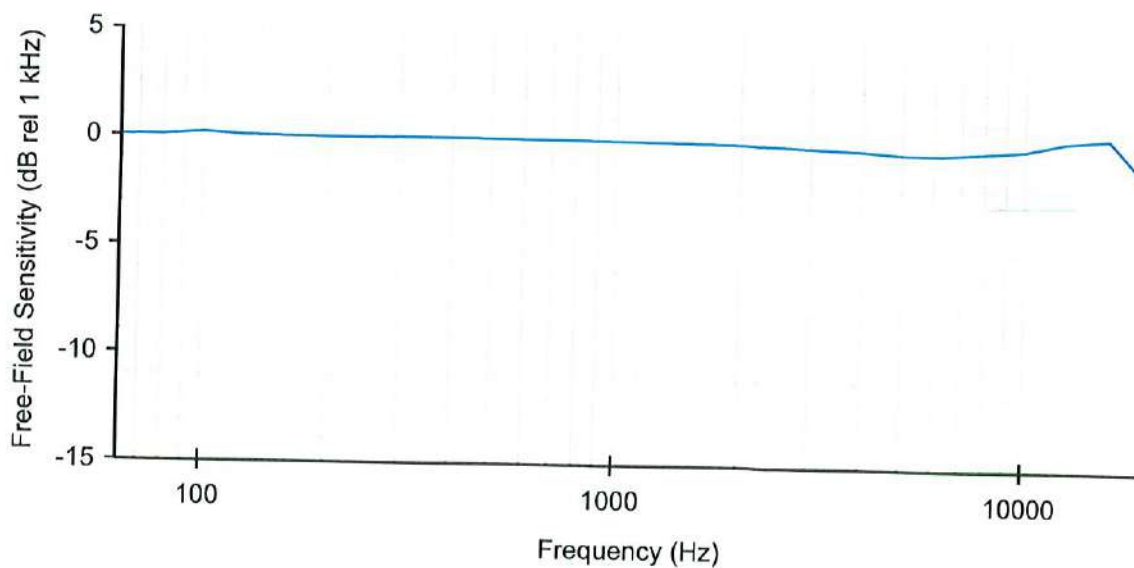
Certificate Number:  
**220231**

Page 2 of 2

## Free-Field Frequency Response : Tabular

Frequency (Hz)	Free-Field Sensitivity (dB rel 1 kHz)	Actuator Response (dB)
63	0.05	-0.16
80	0.05	-0.05
100	0.18	0.16
125	0.08	0.06
160	0.05	0.06
200	0.04	0.06
250	0.04	0.07
315	0.07	0.08
400	0.05	0.08
500	0.05	0.06
630	0.03	0.04
800	0.03	0.02
1 000	0.00	-0.02
1 250	-0.01	-0.07
1 600	-0.04	-0.17
2 000	-0.07	-0.29
2 500	-0.13	-0.49
3 150	-0.23	-0.81
4 000	-0.28	-1.22
5 000	-0.41	-1.81
6 300	-0.42	-2.55
8 000	-0.30	-3.52
10 000	-0.15	-4.85
12 500	0.25	-6.22
16 000	0.42	-7.43
20 000	-1.53	-10.59

## Free-Field Frequency Response : Graphical

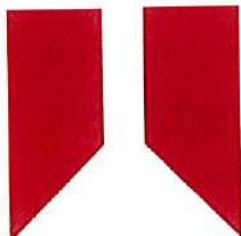


# CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 13 August 2024

CERTIFICATE NUMBER 220217



Cirrus Research plc  
Acoustic House  
Bridlington Road  
Hunmanby  
North Yorkshire  
YO14 0PH  
United Kingdom

Page 1 of 2

Approved signatory

K.Besau

Electronically signed:

## Sound Level Meter : IEC 61672-3:2013

### Instrument information

Manufacturer: Cirrus Research plc  
Model: CR:171A  
Serial number: G305858  
Class: 1  
Firmware version: 5.8.3251

Notes:

### Test summary

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.  
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

**The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.**

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

### Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%.



# CERTIFICATE OF CALIBRATION

Certificate Number:  
**220217**

Page 2 of 2

## Environmental conditions

The following conditions were recorded at the time of the test:

<b>Before</b>	Pressure: 100.37 kPa	Temperature: 22.4 °C	Humidity: 49.6 %
<b>After</b>	Pressure: 100.31 kPa	Temperature: 22.2 °C	Humidity: 47 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	KEYSIGHT	33511B	MY59003445
Attenuator	Cirrus Research	ZE:952	78134
Environmental Monitor	Comet	T7510	21961307

## Additional instrument information

Instruction manual:

Reference level range: Single range

Pattern approval: No

Source of pattern approval: -

### Preamplifier

Model: MV:200F

Serial number: 14519F

### Microphone

Model: MK:224

Serial number: 218359D

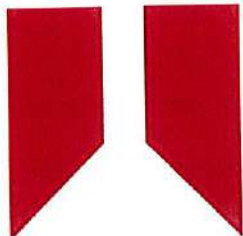
## Test results summary

Test	Result
Overload indication	Complies
Electrical noise-floor	Complies
Toneburst response	Complies
Linearity	Complies
Electrical Frequency weightings	Complies
Frequency and time weightings at 1 kHz	Complies
C-weighted peak	Complies
High level stability	Complies
Long-term stability	Complies

# CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 13 August 2024 CERTIFICATE NUMBER 220220



Cirrus Research plc  
Acoustic House  
Bridlington Road  
Hunmanby  
North Yorkshire  
YO14 0PH  
United Kingdom

Page 1 of 2

Approved signatory

K.Besau

Electronically signed:

## Octave-band filter : IEC 61260:1995

### Instrument information

Manufacturer: Cirrus Research plc  
Model: CR:171A  
Serial number: G305858  
Class: 1  
Firmware version: 5.8.3251

Notes:

### Test summary

Date of calibration: 25 July 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.  
Periodic tests were performed in accordance with procedures from IEC 61260:1995.

The filter submitted for testing successfully completed the Relative Attenuation test of IEC 61260 for the environmental conditions under which the test was performed.

### Notes

It provides traceability of measurement to the SI system of units and/or to units of measurement realised at a recognised national metrology institute. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%.



# CERTIFICATE OF CALIBRATION

Certificate Number:

220220

Page 2 of 2

## Environmental conditions

The following conditions were recorded at the time of the test:

**Before**    Pressure: 100.37 kPa    Temperature: 22.4 °C    Humidity: 49.6 %  
**After**     Pressure: 100.31 kPa    Temperature: 22.2 °C    Humidity: 47.0 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	KEYSIGHT	33511B	MY59003445
Attenuator	Cirrus Research	ZE:952	78134
Environmental Monitor	Comet	T7510	21961307

## Filters information

Filter class: 1  
Filter base: 2  
Reference attenuation: 0.0 dB

## Additional instrument information

Instruction manual:  
Pattern approval: No  
Source of pattern approval: -  
Reference level range: Single range

## Laboratory uncertainties

Requirement	Value (dB)
Relative Attenuation High	0.41
Relative Attenuation Mid	0.18
Relative Attenuation Low	0.12

# CERTIFICATE OF CALIBRATION

ISSUED BY

Cirrus Research plc

DATE OF ISSUE

13 August 2024

CERTIFICATE NUMBER 220234



**Cirrus Research plc**  
**Acoustic House**  
**Bridlington Road**  
**Hunmanby**  
**North Yorkshire**  
**YO14 0PH**  
**United Kingdom**

Page 1 of 2

Test engineer:

D.Swalwell

Electronically signed:



## Microphone

### Microphone capsule

Manufacturer: Cirrus Research plc

Model: MK:224

Serial Number: 218359D

### Calibration procedure

Open circuit: 53.6 mV/Pa

Sensitivity at 1 kHz: -25.4 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

### Environmental conditions

Pressure: 100.30 kPa

Temperature: 22.0 °C

Humidity: 33.0 %

# CERTIFICATE OF CALIBRATION

Certificate Number:

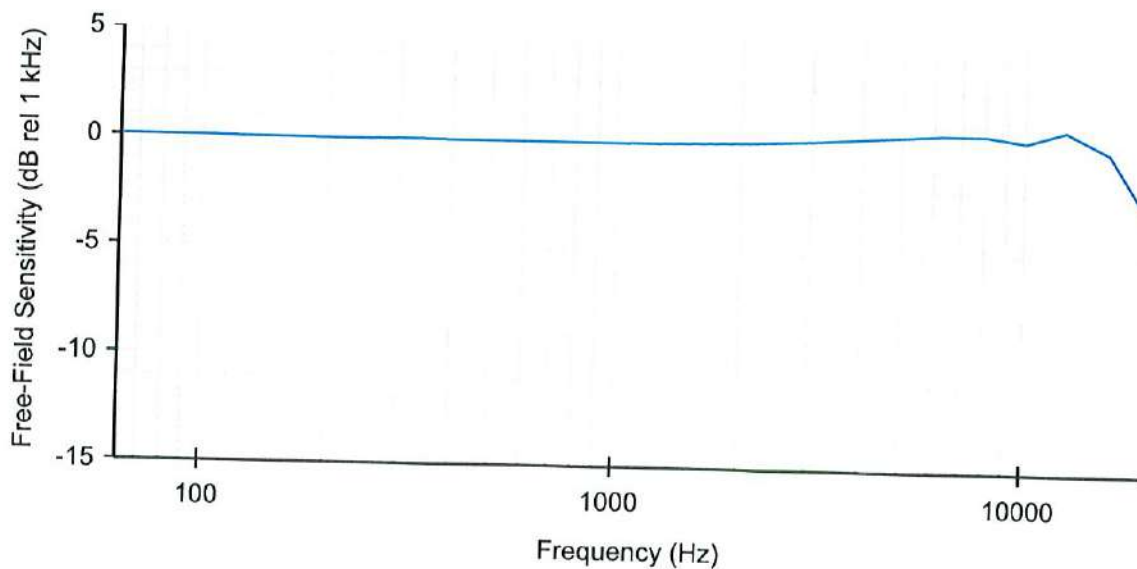
**220234**

Page 2 of 2

Free-Field Frequency Response : Tabular

Frequency (Hz)	Free-Field Sensitivity (dB rel 1 kHz)	Actuator Response (dB)
63	0.04	-0.20
80	0.04	-0.10
100	0.04	-0.04
125	0.01	-0.03
160	0.02	0.00
200	0.01	0.01
250	-0.01	0.00
315	0.04	0.02
400	0.00	0.01
500	0.00	0.00
630	-0.00	-0.00
800	-0.00	-0.01
1 000	0.00	-0.02
1 250	0.01	-0.03
1 600	0.05	-0.05
2 000	0.11	-0.08
2 500	0.17	-0.13
3 150	0.26	-0.25
4 000	0.39	-0.42
5 000	0.50	-0.74
6 300	0.63	-1.33
8 000	0.62	-2.45
10 000	0.35	-4.35
12 500	0.91	-5.60
16 000	-0.11	-8.06
20 000	-2.97	-12.02

Free-Field Frequency Response : Graphical



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 23/0468

## CALIBRATION CERTIFICATE

**Submitted by** : OKLA TESTING & CONSULTING SERVICE CO., LTD.

**Address** : 67/35-36, 3rd Fl, Soi Petchkasem 7/1, Wat Thaphra, Bangkok Yai, Bangkok 10600, Thailand.

**Calibrated at** : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.  
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

**Instrument Calibrated :**

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR:171A

Serial No. : G305836

Microphone : MK224 No.218347D

Preamplifier : MV:200F No.11902F

**Ambient Environment**

Temperature :  $(23 \pm 3) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 15) \%$

Ambient Pressure :  $(101.325 \pm 1.5) \text{ kPa}$

**Standards used :**

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Sound Calibrator Bruel&Kjaer 4231 S/N 3015154.
7. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

**Date of Receipt** : 18 Apr. 2025

**Date of Calibration** : 8 May 2025

1 / 9

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

**Head Office**

35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,  
Changwat Pathumthani 12120, Thailand  
Tel. (66) 0 2577 9036  
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**

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



**Request No.** 21-68/0324

**MTC No.** EEL. BP. 23/0468

8. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
9. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
10. Digital Multimeter Agilent 34401A S/N MY44005560.
11. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

**Calibration Procedure :**

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2013). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the 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.

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%.

**Date of Calibration :** 8 May 2025

2 / 9

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/Laboratory**

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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

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(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 23/0468

1. Absolute Sensitivity

Reference Aconstic Signal (dB)	Measured value (dB)		Deviation value(dB)	Acceptance limit class I(±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	Before adjust	After adjust				
93.94	93.2	93.7	-0.2	0.7	0.30	N/A

**Note:** The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 93.7 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
17.5	0.10	N/A

2.2 The microphone of the sound level meter was replaced by electrical signal input device

Frequency Weighting	Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-Weight	Under-range	-	N/A
C-Weight	16.3	0.10	N/A
Flat	27.6	0.10	N/A

**Note:** The under-range means that the indicator cannot display for setting the range 20-140 dB.

Date of Calibration : 8 May 2025

3 / 9

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### 3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response curve(dB)			Acceptance limit class 1 (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
125	0.4	0.1	0.1	±1.0	0.45	0.6
1 000	-0.5	-0.5	-0.5	±0.7	0.45	0.6
8 000	-2.5	-2.4	-2.4	±1.5;-2.5	0.45	0.7

### 4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response curve(dB)			Acceptance limit class 1 (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
63	0.5	0.1	0.1	±1.0	0.20	0.6
125	0.3	0.1	0.0	±1.0	0.20	0.6
250	0.2	0.1	0.0	±1.0	0.20	0.6
500	0.2	0.0	-0.1	±1.0	0.20	0.6
1 000	0.0	0.0	-0.1	±0.7	0.20	0.6
2 000	-0.1	0.0	-0.1	±1.0	0.20	0.6
4 000	-0.3	-0.1	-0.1	±1.0	0.20	0.6
8 000	-0.5	-0.3	-0.1	±1.5;-2.5	0.20	0.7
16 000	0.1	0.2	-0.3	±2.5;-16.0	0.20	1.0

Date of Calibration : 8 May 2025

4 / 9

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 23/0468

5. Long-term stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
Begin	114.0	0.0	0.1	0.10	0.1
End	114.0				

6. Frequency and time weightings at 1 kHz

6.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
A-weight	114.0	0.0	0.2	0.20	0.2
C-weight	114.0	0.0	0.2	0.20	0.2
Flat	114.0	0.0	0.2	0.20	0.2

6.2 Time weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
Fast	114.0	0.0	0.1	0.20	0.2
Slow	114.0	0.0	0.1	0.20	0.2
Lcq	114.0	0.0	0.1	0.20	0.2

Date of Calibration : 8 May 2025

5 / 9

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7. Level linearity on the reference level range

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
139	139.1	0.1	0.8	0.30	0.3
134	134.1	0.1	0.8	0.30	0.3
129	129.1	0.1	0.8	0.30	0.3
124	124.1	0.1	0.8	0.30	0.3
119	119.1	0.1	0.8	0.30	0.3
114	114.0	0.0	0.8	0.30	0.3
109	109.1	0.1	0.8	0.30	0.3
104	104.0	0.0	0.8	0.30	0.3
99	99.1	0.1	0.8	0.30	0.3
94	94.0	0.0	0.8	0.30	0.3
89	89.0	0.0	0.8	0.30	0.3
84	84.1	0.1	0.8	0.30	0.3
79	79.2	0.2	0.8	0.30	0.3
74	74.1	0.1	0.8	0.30	0.3
69	69.1	0.1	0.8	0.30	0.3
64	64.1	0.1	0.8	0.30	0.3
59	59.2	0.2	0.8	0.30	0.3
54	54.0	0.0	0.8	0.30	0.3

Date of Calibration : 8 May 2025

6 / 9

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**7. Level linearity on the reference level range (cont.)**

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
49	49.1	0.1	0.8	0.30	0.3
44	44.0	0.0	0.8	0.30	0.3
39	39.1	0.1	0.8	0.30	0.3
34	34.3	0.3	0.8	0.30	0.3
29	29.3	0.3	0.8	0.30	0.3
24	24.2	0.2	0.8	0.30	0.3

**8. Level linearity including the level range control**

At reference sound level on the reference level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
20-140	114.0	114.0	0.0	0.8	0.30	0.3

**Date of Calibration : 8 May 2025**

7 / 9

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 23/0468

8. Level linearity including the level range control

At reference level at 5 dB greater than the under-range on a level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1(±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
20-140	25	25.0	0.0	0.8	0.30	0.3

9. Tone burst response

Time Weighting	Toneburst Duration, Tb(ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1(dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	200	136.0	0.0	±0.5	0.20	0.3
	2	118.9	-0.1	+1.0; -1.5	0.20	0.3
	0.25	109.8	-0.2	+1.0; -3.0	0.20	0.3
Slow	200	129.5	-0.1	±0.5	0.20	0.3
	2	109.9	-0.1	+1.0; -3.0	0.20	0.3
SEL	200	130.0	0.0	±0.5	0.20	0.3
	2	109.9	-0.1	+1.0; -1.5	0.20	0.3
	0.25	100.9	-0.1	+1.0; -3.0	0.20	0.3

Date of Calibration : 8 May 2025

8 / 9

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Request No. 21-68/0324

MTC No. EEL. BP. 23/0468

10. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Complete cycle	135.4	135.7	0.3	2.0	0.20	0.35
Positive half cycle	134.4	134.3	-0.1	1.0	0.20	0.35
Negative half cycle	134.4	134.3	-0.1	1.0	0.20	0.35

11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Positive one-half cycle	Negative one-half cycle				
139.1	139.1	0.0	1.5	0.20	0.25

12. High-level stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	139.0	0.0	0.1	0.10	0.1
End	139.0				

Calibrated by



(Mr. Pannasit Phasingsri)

Approved by :



(Mr. Pawate Kiatyapa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 8 May 2025

Date of Issue : 16 May 2025

Ref : 2011268041801536001

End of Certificate

9 / 9

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

## CALIBRATION CERTIFICATE

**Submitted by** : OKLA TESTING & CONSULTING SERVICE CO., LTD.

**Address** : 67/35-36, 3rd Fl, Soi Petchkasem 7/1, Wat Thaphra, Bangkok Yai, Bangkok 10600, Thailand.

**Calibrated at** : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.  
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

**Instrument Calibrated :**

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR:171A

Serial No. : G305858

Microphone : MK224 No.218359D

Preamplifier : MV:200F No.14519F

**Ambient Environment**

Temperature :  $(23 \pm 3) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 15) \%$

Ambient Pressure :  $(101.325 \pm 1.5) \text{ kPa}$

**Standards used :**

1. Band Pass Filter Wavetek 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2633526.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Sound Calibrator Bruel&Kjaer 4231 S/N 3015154.
7. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

**Date of Receipt** : 18 Apr. 2025

**Date of Calibration** : 8 May 2025

1 / 9

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

**Request No.** 21-68/0324

**MTC No.** EEL. BP. 24/0468

8. Power Amplifier Brüel&Kjær 2706 S/N 1517650.
9. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
10. Digital Multimeter Agilent 34401A S/N MY44005560.
11. Programmable Attenuator Tamagawa TPA-303A S/N 2212.

**Calibration Procedure :**

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2013). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the 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.

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%.

**Date of Calibration :** 8 May 2025

2 / 9

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Measured value (dB)		Deviation value(dB)	Acceptance limit class 1(±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	Before adjust	After adjust				
93.94	91.1	93.7	-0.2	0.7	0.30	N/A

**Note:** The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 93.7 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
16.9	0.10	N/A

2.2 The microphone of the sound level meter was replaced by electrical signal input device

Frequency Weighting	Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-Weight	Under-range	-	N/A
C-Weight	15.1	0.10	N/A
Flat	28.0	0.10	N/A

**Note:** The under-range means that the indicator cannot display for setting the range 20-140 dB.

Date of Calibration : 8 May 2025

3 / 9

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### 3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response curve(dB)			Acceptance limit class 1 (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
125	0.3	0.1	0.1	±1.0	0.45	0.6
1 000	-0.3	-0.3	-0.3	±0.7	0.45	0.6
8 000	-1.8	-1.6	-1.4	±1.5;-2.5	0.45	0.7

### 4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response curve(dB)			Acceptance limit class 1 (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
63	0.4	0.1	0.1	±1.0	0.20	0.6
125	0.2	0.1	0.0	±1.0	0.20	0.6
250	0.2	0.0	0.0	±1.0	0.20	0.6
500	0.1	0.0	0.0	±1.0	0.20	0.6
1 000	0.0	0.0	0.0	±0.7	0.20	0.6
2 000	-0.1	0.0	0.0	±1.0	0.20	0.6
4 000	-0.4	-0.2	0.0	±1.0	0.20	0.6
8 000	-0.5	-0.4	-0.1	±1.5;-2.5	0.20	0.7
16 000	0.1	0.3	-0.3	±2.5;-16.0	0.20	1.0

Date of Calibration : 8 May 2025

4 / 9

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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

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



### 5. Long-term stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
Begin	114.0	0.0	0.1	0.10	0.1
End	114.0				

### 6. Frequency and time weightings at 1 kHz

#### 6.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
A-weight	114.0	0.0	0.2	0.20	0.2
C-weight	114.0	0.0	0.2	0.20	0.2
Flat	114.0	0.0	0.2	0.20	0.2

#### 6.2 Time weightings at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
Fast	114.0	0.0	0.1	0.20	0.2
Slow	114.0	0.0	0.1	0.20	0.2
Leq	114.0	0.0	0.1	0.20	0.2

Date of Calibration : 8 May 2025

5 / 9

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

#### Head Office

35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,  
Changwat Pathumthani 12120, Thailand  
Tel. (66) 0 2577 9036  
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#### Office/Laboratory

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

7. Level linearity on the reference level range

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
139	139.0	0.0	0.8	0.30	0.3
134	134.0	0.0	0.8	0.30	0.3
129	129.0	0.0	0.8	0.30	0.3
124	124.0	0.0	0.8	0.30	0.3
119	119.0	0.0	0.8	0.30	0.3
114	114.0	0.0	0.8	0.30	0.3
109	109.0	0.0	0.8	0.30	0.3
104	104.0	0.0	0.8	0.30	0.3
99	99.0	0.0	0.8	0.30	0.3
94	94.0	0.0	0.8	0.30	0.3
89	89.0	0.0	0.8	0.30	0.3
84	84.1	0.1	0.8	0.30	0.3
79	79.1	0.1	0.8	0.30	0.3
74	74.1	0.1	0.8	0.30	0.3
69	69.0	0.0	0.8	0.30	0.3
64	64.1	0.1	0.8	0.30	0.3
59	59.0	0.0	0.8	0.30	0.3
54	54.1	0.1	0.8	0.30	0.3

Date of Calibration : 8 May 2025

6 / 9

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FM.BL.MTC.002 Rev.5

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

7. Level linearity on the reference level range (cont.)

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
49	49.0	0.0	0.8	0.30	0.3
44	44.1	0.1	0.8	0.30	0.3
39	39.0	0.0	0.8	0.30	0.3
34	34.0	0.0	0.8	0.30	0.3
29	29.0	0.0	0.8	0.30	0.3
24	24.0	0.0	0.8	0.30	0.3

8. Level linearity including the level range control

At reference sound level on the reference level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 ( $\pm$ dB)	Uncertainty ( $\pm$ dB)	Maximum-permitted uncertainty of measurement ( $\pm$ dB)
20-140	114.0	114.0	0.0	0.8	0.30	0.3

Date of Calibration : 8 May 2025

7 / 9

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FM.BL.MTC.002 Rev.5

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

**8. Level linearity including the level range control**

At reference level at 5 dB greater than the under-range on a level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1(±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
20-140	25	25.0	0.0	0.8	0.30	0.3

**9. Tone burst response**

Time Weighting	Toneburst duration, Tb(ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1(dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	200	136.0	0.0	±0.5	0.20	0.3
	2	118.9	-0.1	+1.0; -1.5	0.20	0.3
	0.25	109.8	-0.2	+1.0; -3.0	0.20	0.3
Slow	200	129.5	-0.1	±0.5	0.20	0.3
	2	109.9	-0.1	+1.0; -3.0	0.20	0.3
SEL	200	130.0	0.0	±0.5	0.20	0.3
	2	109.9	-0.1	+1.0; -1.5	0.20	0.3
	0.25	100.9	-0.1	+1.0; -3.0	0.20	0.3

Date of Calibration : 8 May 2025

8 / 9

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FM.BL.MTC.002 Rev.5

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0324

MTC No. EEL. BP. 24/0468

**10. Peak C sound level**

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Complete cycle	135.4	135.7	0.3	2.0	0.20	0.35
Positive half cycle	134.4	134.3	-0.1	1.0	0.20	0.35
Negative half cycle	134.4	134.3	-0.1	1.0	0.20	0.35

**11. Overload indication**

Measured value (dB)		Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Positive one-half cycle	Negative one-half cycle				
139.1	139.1	0.0	1.5	0.20	0.25

**12. High-level stability**

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 1 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	139.0	0.0	0.1	0.10	0.1
End	139.0				

Calibrated by

(Mr. Pannasit Phasingsri)

Approved by :

(Mr. Prawate Kluaypa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 8 May 2025

Date of Issue : 16 May 2025

Ref : 2011268041801536002

End of Certificate

9 / 9

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

**Head Office**

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(66) 08 1889 6827

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : VIBROCK  
MODEL / TYPE : V9000  
SERIAL NO. : 2341  
CLID. NO. : 252200818  
JOB CONTROL NO. : 250401038738  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD.,  
WATTHAPRA, BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 01 April 2025

DATE OF ISSUED : 07 April 2025

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

Calibrated By : Suwit Phuanbusabong  
Calibration Engineer

Approved By : Mongkol Yotsoontorn  
Authorized Signatory  
07 April 2025

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

Certificate No. Q25038738

F3-011-05/12-23

page 1 of 3





## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **VIBROCK**  
**MODEL / TYPE** : **V9000**  
**SERIAL NO.** : **2341**  
**DATE OF CALIBRATION** : **02 April 2025**

---

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity** :  $(55 \pm 15) \% \text{RH}$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter and Accelerometer with Conditioning Amplifier which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Digital Multimeter, Hewlett Packard Model 34401A S/N. 3146A75935.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2626 S/N. 705491, 1741406.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0143-24, Due Date 06 December 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0051-24, Due Date 13 December 2025.

### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2,00$  which for a normal distribution corresponds to a coverage probability of approximately 95 % .  
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

**Certificate No. Q25038738**

**F3-011-05/12-23**

page 2 of 3



@clccalibration

**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	160 Hz	peak	10.00	9.86	+0.14	1.1
20	160 Hz		20.00	19.19	+0.81	0.9
40	160 Hz		40.00	38.82	+1.18	0.9
60	160 Hz		60.00	57.99	+2.01	0.9
80	160 Hz		80.00	76.45	+3.55	0.9
100	160 Hz		100.00	95.33	+4.67	0.9

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 2 of 68

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

**CLC**

**### End of Certificate ###**

**Certificate No. Q25038738**

**F3-011-05/12-23**

page 3 of 3



@clccalibration

## CERTIFICATE OF CALIBRATION FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : VIBROCK  
MODEL / TYPE : V9000  
SERIAL NO. : 2342  
CLID. NO. : 252200819  
JOB CONTROL NO. : 250401038737  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE


CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3RD FLOOR, PHETKASEM 7/1 RD.,  
WATTHAPRA, BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 01 April 2025

DATE OF ISSUED : 07 April 2025

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

Calibrated By : Suwit Phuanbusabong  
Calibration Engineer

Approved By :   
Authorized Signatory  
07 April 2025

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

Certificate No. Q25038737

F3-011-05/12-23

page 1 of 3



@clccalibration

## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **VIBROCK**  
**MODEL / TYPE** : **V9000**  
**SERIAL NO.** : **2342**  
**DATE OF CALIBRATION** : **02 April 2025**

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity** :  $(55 \pm 15) \% \text{RH}$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter and Accelerometer with Conditioning Amplifier which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Digital Multimeter, Hewlett Packard Model 34401A S/N. 3146A75935.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2626 S/N. 705491, 1741406.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0143-24, Due Date 06 December 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0051-24, Due Date 13 December 2025.

### UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2,00$  which for a normal distribution corresponds to a coverage probability of approximately 95 % .  
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

**Certificate No. Q25038737**

**F3-011-05/12-23**

page 2 of 3



@clccalibration



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	160 Hz	peak	10.00	9.89	+0.11	1.1
20	160 Hz		20.00	19.81	+0.19	0.9
40	160 Hz		40.00	38.73	+1.27	0.9
60	160 Hz		60.00	58.32	+1.68	0.9
80	160 Hz		80.00	77.57	+2.43	0.9
100	160 Hz		100.00	97.65	+2.35	0.9

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 2 of 68

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

**### End of Certificate ###**

**Certificate No. Q25038737**

**F3-011-05/12-23**

page 3 of 3



@clccalibration

Certificate No. : HIT-2513-0439

Page : 1 of 2

**CERTIFICATE OF CALIBRATION**

**Equipment :** Dissolved Oxygen and BOD Meter

**Meter Model :** HI5421-02      **Serial No. :** 04240005101

**Probe Model :** HI76438      **Serial No. :** KC1N66J5P

**Manufacturer :** Hanna Instruments      **Made in :** Romania

**Condition As-Received :** Used Product      **Reference :** RE250379

**Ambient Temperature :**  $(25 \pm 2)^{\circ}\text{C}$       **Relative Humidity :**  $(50 \pm 15)\% \text{ RH}$

**Customer name :** Okla Testing & Consulting Service Co., Ltd.  
67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,  
Bangkok Yai, Bangkok 10600 Thailand

**Received date :** 3 March 2025


**Calibrate date :** 20 March 2025

**Issue date :** 24 March 2025

**Calibrated Location :** Hanna Instruments (Thailand) Ltd.

**Calibration Procedure :** This calibrator was conducted by using in-house: calibration procedure  
CP-11 by using certified reference material (CRM).

**Calibrated by :** ☒ Mr. Pichit Petthong  
☐ Mr. Channarong Soinak

**Approved by :**   
Mr. Anan Suwanchaisakul  
Authorized Signatory

This certificate was certified only for the instrument we calibrated.

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

\*\* This certificate may not be reproduced other than in full, except with the prior written \*\*

approval of the head of Hanna Instrument (Thailand)

### Condition of this calibration result

1. Reference Standard Instruments : This certification is traceable to the international unit of thru Technology Promotion Association (Thailand-Japan).

Instruments	Model	Serial No.	Certificate No.
Thermometer with sensor	HI98509	39643D	24T1281
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171

2. Reference Standard Materials : DO calibration standard traceable to Hanna Instrument Ltd.

Buffer Solution	Manufacture	Certified Value	Lot Number	Exp. date
Zero Oxygen Solution	Hanna	0.0 ± 0.1 @25°C	S0028/23	March 2028

### Calibration Result

Inspection the accuracy of the Dissolved Oxygen (DO) Meter by using the following certificate reference material value.

Unit Under Calibration	CRM Standard DO	Actual value Reading	Error value Reading	Uncertainty of Measurement ( ± )
DO Electrode S/N KC1N66J5P	0.0 mg/L	0.00 mg/L	0.00 mg/L	N/A
	8.3 mg/L	8.26 mg/L	-0.04 mg/L	0.33 mg/L

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

**\*\* End of certificate \*\***



Certificate No. : HIT-2513-0438

Page : 1 of 2

**CERTIFICATE OF CALIBRATION**

**Equipment :** pH/mV and EC/TDS/Salinity/Resistivity Meter

**Meter Model :** HI5521-02 **Serial No. :** 04160019101

**Probe Model :** HI1131B **Serial No. :** 11271C0N

**Resolution (pH) :** 0.01 **Resolution (mV) :** 0.1

**Manufacturer :** Hanna Instruments **Made in :** Romania

**Condition As-Received :** Used Product **Reference :** RE250378

**Ambient Temperature :**  $(25 \pm 2)^{\circ}\text{C}$  **Relative Humidity :**  $(50 \pm 15)\% \text{ RH}$

**Customer name :** Okla Testing & Consulting Service Co., Ltd.  
67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,  
Bangkok Yai, Bangkok 10600 Thailand

**Received date :** 3 March 2025


**Calibrate date :** 24 March 2025

**Issue date :** 24 March 2025

**Calibrated Location :** Hanna Instruments (Thailand) Ltd.

**Calibration Procedure :** This calibrator was conducted by using in-house: calibration procedure  
CP-01, CP-02 by using certified reference material (CRM).

**Calibrated by :** ☒ Mr. Pichit Petthong  
☐ Mr. Channarong Soinak

**Approved by :**   
Mr. Anan Suwanchaisakul

Authorized Signatory

This certificate was certified only for the instrument we calibrated.

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

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approval of the head of Hanna Instrument (Thailand)



### Condition of this calibration result

1. Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

Instruments	Model	Serial No.	Certificate No.	Traceable
Documenting Process Calibrator	Fluke 753	43160061	25E299	Technology Promotion Association (Thailand-Japan)
Thermometer with sensor	HI98509	36943D	24T1281	
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171	

2. Reference Standard Materials : pH calibration standard traceable thru CPA chem Ltd.

Buffer Solution	Manufacture	Certified Value	Lot Number	Exp. date
pH 4.0	CPA chem	$4.008 \pm 0.006 @ 25^{\circ}\text{C}$	996963	16 May 2025
pH 7.0	CPA chem	$6.987 \pm 0.007 @ 25^{\circ}\text{C}$	1015026	19 July 2025
pH 10.0	CPA chem	$10.010 \pm 0.009 @ 25^{\circ}\text{C}$	996965	16 May 2025

### Calibration Result :

1. Performing standard curve by Simulator at: -177.5, 0.0, 177.5 mV

(Measurement Electrical Potential) After Adjust Result.

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement ( $\pm$ mV)
	pH	mV	pH	mV	
pH Meter S/N 04160019101	4.01	177.5	4.01	177.5	0.097
	7.01	0.0	7.01	0.0	0.058
	10.01	-177.5	10.01	-177.5	0.097

2. Performing three buffer standard curve by using buffer nominal : pH 4,7,10 After Adjustment.

Unit Under Calibration	Standard pH Buffer Solution	Actual Reading (pH)	Actual Reading (mV)	Uncertainty of Measurement ( $\pm$ pH)
pH Electrode S/N 11271C0N	4.008	4.01	173.8	0.009
	6.987	6.98	4.5	0.010
	10.010	10.01	-170.6	0.014

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

**\*\* End of certificate \*\***


Certificate No. : HIT-2510-0369

Page : 1 of 2

**CERTIFICATE OF CALIBRATION**

<b>Equipment :</b>	pH/mV and EC/TDS/Salinity/Resistivity Meter		
<b>Meter Model :</b>	HI5521-02	<b>Serial No. :</b>	04160019101
<b>Probe Model :</b>	HI7662-W	<b>Serial No. :</b>	0615024N
<b>Resolution :</b>	0.1 °C	<b>Temperature Range :</b>	(-20 to 120)°C
<b>Manufacturer :</b>	Hanna Instruments	<b>Made in :</b>	Romania
<b>Condition As-Received :</b>	Used Product	<b>Reference :</b>	RE250379
<b>Ambient Temperature :</b>	( 25 ± 2 ) °C	<b>Relative Humidity :</b>	( 50 ± 15 ) % RH
<b>Customer name :</b>	Okla Testing & Consulting Service Co., Ltd. 67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra, Bangkok Yai, Bangkok 10600 Thailand		
<b>Received date :</b>	3 March 2025		
<b>Calibrate date :</b>	5 March 2025		
<b>Issue date :</b>	6 March 2025		
<b>Calibrated Location :</b>	Hanna Instruments (Thailand) Ltd.		
<b>Calibration Procedure :</b>	This calibrator was conducted by using in-house: calibration procedure CP-05 by using reference standard instruments.		

**Calibrated by :** ☒ Mr. Pichit Petthong  
☐ Mr. Channarong Soinak

**Approved by :**   
Mr. Anan Suwanchaisakul  
Authorized Signatory

This certificate was certified only for the instrument we calibrated.

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

\*\* This certificate may not be reproduced other than in full, except with the prior written \*\*  
approval of the head of Hanna Instrument (Thailand)

### Condition of this calibration result

Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

Instruments	Model	Serial No.	Certificate No.	Traceable
Documenting Process Calibrator with sensor	Fluke 753	43160061	25I123	Technology Promotion Association (Thailand-Japan).
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171	

### Calibration Result :

Function : Temperature measurement

This equipment was connected with Temperature Sensor.

Probe : Stainless steel temperature probe and 1 m (3.3') cable.

Nominal Value (°C)	Standard Setting (°C)	UUC Reading (°C)	Error Value (°C)	Uncertainty (±°C)
20.0	20.00	20.0	0.00	0.18
25.0	25.00	25.0	0.00	0.18
30.0	30.00	30.0	0.00	0.18

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

**\*\* End of certificate \*\***





JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd  
63/14-15, 67/35-36  
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Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TISI-TIS 17025  
CALIBRATION 0367

Temperature measurement laboratory  
Calibration services department.



## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-116-67

Page 1 of 2 Pages

**MEASUREMENT ITEM** : Digital Thermometer with Temperature Sensor  
**MANUFACTURER** : EUTECH  
**MODEL/TYPE** : ECO SCAN TEMPS  
**SERIAL NUMBER** : 816366  
**ID NUMBER** : -  
**CONDITION AS-RECEIVED** : Used item  
**CUSTOMER** : OKLA Testing and Consulting Service Co.,Ltd.  
67/35-36 Floor 3, Soi Petchkasem 7/1,  
Petchkasem Rd, Watthapra, Bangkokyai, Bangkok 10600.

**RECEIVED DATE** : 01 Jul 2024  
**MEASUREMENT DATE** : 03 Jul 2024  
**ISSUE DATE** : 04 Jul 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature :  $23.0 \pm 3.0$  °C  
Relative Humidity :  $55.0 \pm 15.0$  %RH

**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.

### Calibration procedure:

The temperature calibration was done by In-House calibration method as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

### Traceability:

The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0047-24, Certificate number: ER-0101-23

### Reference Used During Calibration:

1. Standard Temperature Probe  
Model: STS-100 A500, Serial No.: 667682-09,  
Due date: 26 Mar 2025
2. Digital Temperature Indicator  
Model: DTI-1000-A MK II, Serial No.: 671407-00591 Due date: 14 Sep 2024

### 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'

### Calibrated by:

- ☐ Mr. Sorawit Thachalad  
☒ Miss Jitraporn Lertsomphol  
☐ Miss Ruangrumpai Phoommit



Approved signatory: .....

Mr. Parinya Booncharoen  
Calibration Department Manager





JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number CDT-116-67

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 30 °C

**Function:**

Table 3: This equipment was connected with Thermocouple sensor type K.  
Dimension: Diameter 3 mm. Length 116 mm.

<u>Immersion Depth</u> (mm)	<u>Standard Reading</u> (°C)	<u>UUC Reading</u> (°C)	<u>Error</u> (°C)	<u>Uncertainty</u> (°C)
110	20.047	20.1	0.0	0.26
110	25.043	25.0	0.0	0.26
110	30.034	30.0	0.0	0.26

UUC\*: Unit Under Calibration

\*\*\*End of Certificate of Calibration\*\*\*





**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Calibration Cert. # 3884.01  
ISO/IEC 17025

# Certificate of Calibration

**Certificate No.** : MM25-1336

**Page** : 1 of 3

**Customer** : บริษัท โอกลา เทสต์ติ้ง แอนด์คอนซัลติ้ง เซอร์วิส จำกัด

**Address** : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

**Description** : Electronic Balance

**Manufacturer** : Sartorius

**Model** : BSA224S-CW

**Serial No.** : 35790699

**Identification No.** : N/A

**Calibration Place** : On Site Calibration was Carried out at th  
Laboratory Enironmental, Okla Testing &  
Consulting Service Co.,Ltd.

**Order No.** : 0562/25

**Received date** : Feb 19, 2025

**Calibration date** : Feb 19, 2025

**Environment Condition :**

**Temperature** : (25+/-10) °C

**Humidity** : (50+/-30) %RH

**Atm. Pressure** : (1010+/-10) hPa

**Calibration Method** : Calibration were conducted using In-house calibration procedure CP-MM-001

According to comparison with Standard Weight Set E1.

The calibration methods based on UKAS - LAB 14 : 2022

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Standard Weight Set	NC-001-0.2K-E1-ASS	0022	PL-512	Oct 10, 2026

The effect that the result relate only to the items calibrated. If was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through  
National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



**Calibrated by** : Mr.Suppason Kcawkum

**Approved by** : ( Miss.Valailuck Janyanitas )

**Issue date** : Feb 25, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd





**Inctech Metrological Center Co.Ltd.**

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,

Saimai, Bangkok 10220, Thailand

Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

Calibration Cert. # 3884.01  
ISO/IEC 17025

Certificate No. : MM25-1336

Page : 3 of 3

Calibration Result : Before Adjustment 00.000

Function : Departure of indication from nominal value

Standard Weight Value ( g )	UUC* Reading ( g )	UUC* Correction ( g )	Uncertainty of Measurement ( +/- g )
0.00000	0.0000	0.00000	0.000058
0.01000	0.0100	-0.00003	0.000058
0.05000	0.0501	-0.00007	0.000058
0.10000	0.1005	-0.00047	0.000058
0.20000	0.2002	-0.00020	0.000059
0.50000	0.5003	-0.00030	0.000059
1.00000	1.0000	0.00000	0.000059
10.00001	10.0005	-0.00049	0.000064
49.99999	50.0008	-0.00081	0.000090
99.99998	100.0014	-0.00142	0.00014
149.99997	150.0021	-0.00210	0.00027
199.99996	200.0023	-0.00234	0.00027

UUC\* = Unit Under Calibration

Calibration Result : After Adjustment 00.000

Standard Weight Value ( g )	UUC* Reading ( g )	UUC* Correction ( g )	Uncertainty of Measurement ( +/- g )
0.00000	0.0000	0.00000	0.000058
0.01000	0.0100	0.00000	0.000058
0.05000	0.0500	0.00000	0.000058
0.10000	0.1001	0.00010	0.000058
0.20000	0.2000	0.00000	0.000059
0.50000	0.5002	0.00020	0.000059
1.00000	1.0000	0.00000	0.000059
10.00001	10.0001	0.00009	0.000064
49.99999	50.0002	0.00025	0.000090
99.99998	100.0001	0.00015	0.00014
149.99997	150.0005	0.00057	0.00027
199.99996	200.0000	0.00007	0.00027

UUC\* = Unit Under Calibration





# Certificate of Calibration

Certificate No. : MT25-2374

Page : 1 of 2

**Customer** : บริษัท โอกลา เทสติ้ง แอนด์คอนซัลติ้ง เซอร์วิส จำกัด

**Address** : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

**Description** : Hot Air Oven

**Manufacturer** : KWF

**Model** : SOV70B

**Serial No.** : KWF2021021902

**Identification No.** : OKLA-LAB-013/170621

**Calibration Place** : On site calibration was carried out at th Laboratory  
Environmental, Okla Testing & Consulting Service Co.,Ltd.

**Order No.** : 0562/25

**Received date** : Feb 19, 2025

**Calibration date** : Feb 19, 2025

**Environment Condition :**

**Temperature** : ( 25+/-10 ) °C

**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

**Reference Standard Instruments :**

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through  
National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



**Calibrated by :** Mr.Nattaphong Phogard

**Approved by :** (Mr.Panuwat Phuklan )

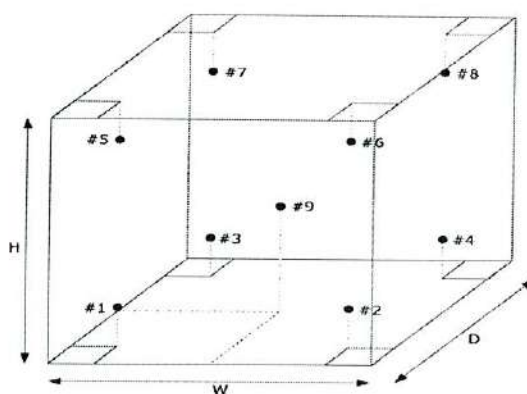
**Issue date :** Feb 24, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

**Certificate No. : MT25-2374**
**Page : 2 of 2**
**Function : Temperature measurement**
**Result : Without adjustment**
**Calibration point : 104, 180 °C**
**Resolution : 1 °C**

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	104.039	104.963	105.217	104.164	104.451	104.033	104.570	105.168	104.635	0.82
180	180.431	181.588	180.850	180.819	180.829	180.240	180.081	180.682	180.685	1.3

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
104.0	104.3 to 104.6	0.45	1.1	1.8
180.0	180.4 to 180.6	1.0	1.7	3.2



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**Front view**
**UUC\*** = Unit under calibration

**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

**Overall Variation** = Difference of temperature value between the maximum and minimum any time.

**Stability** = One half of the maximum difference of measured temperatures at any one probe.





# Certificate of Calibration

Certificate No. : MT25-2372

Page : 1 of 2

**Customer** : บริษัท โอกลา เทสติ้ง แอนด์คอนซัลติ้ง เซอร์วิส จำกัด  
**Address** : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

**Description** : Incubator  
**Manufacturer** : S-Cool  
**Model** : SM61M  
**Serial No.** : 18021147  
**Identification No.** : OKLA-LAB-011/190  
**Calibration Place** : On site calibration was carried out at th Laboratory  
Environmental, Okla Testing & Consulting Service Co.,Ltd.

**Order No.** : 0562/25  
**Received date** : Feb 19, 2025  
**Calibration date** : Feb 19, 2025  
**Environment Condition :**  
**Temperature** : ( 25+/-10 ) °C  
**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

## Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



**Calibrated by :** Mr.Nattaphong Phogard

**Approved by :** (Mr.Panuwat Phuklan )

**Issue date :** Feb 24, 2025

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**Certificate No. :** MT25-2372

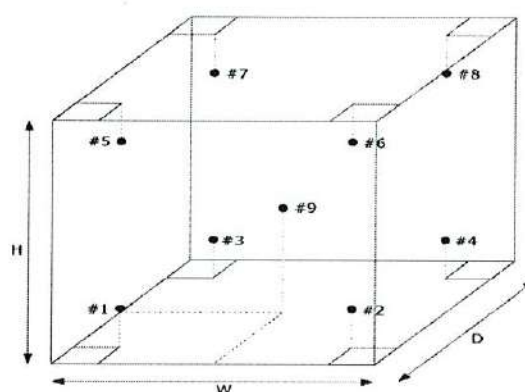
**Page :** 2 of 2

**Function :** Temperature measurement  
**Calibration point :** 20 °C

**Result :** Without adjustment  
**Resolution :** 0.1 °C

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	19.570	19.223	19.044	19.241	19.733	19.622	19.052	19.328	19.518	0.31

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
20.0	20.0	0.10	0.56	0.80



- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**Front view**

**UUC\*** = Unit under calibration

**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

**Overall Variation** = Difference of temperature value between the maximum and minimum any time.

**Stability** = One half of the maximum difference of measured temperatures at any one probe.





# Certificate of Calibration

**Certificate No.** : MT25-2373

**Page** : 1 of 2

**Customer** : บริษัท โอกลา เทสติ้ง แอนด์คอนซัลติ้ง เซอร์วิส จำกัด  
**Address** : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600

**Description** : Freezer ( Refrigerator )  
**Manufacturer** : Sanden  
**Model** : SPB-0500  
**Serial No.** : SPB0500-231007454  
**Identification No.** : N/A  
**Calibration Place** : On site calibration was carried out at th Laboratory  
Environmental, Okla Testing & Consulting Service Co.,Ltd.

**Order No.** : 0562/25  
**Received date** : Feb 19, 2025  
**Calibration date** : Feb 19, 2025  
**Environment Condition :**  
**Temperature** : ( 25+/-10 ) °C  
**Humidity** : ( 50+/-30 ) %RH

**Calibration Method** : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

**Reference Standard Instruments :**

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

**Traceability** : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand ( NIMT )

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%



**Calibrated by :** Mr.Nattaphong Phogard

**Approved by**   
( Mr.Panuwat Phuklan )

**Issue date :** Feb 24, 2025

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Certificate No. : MT25-2373

Page : 2 of 2

Function : Temperature measurement

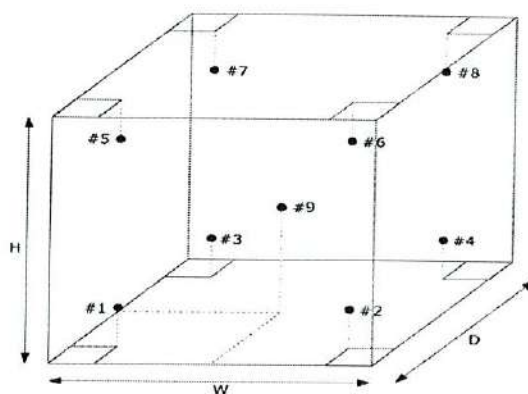
Result : Without adjustment

Calibration point : 4 °C

Resolution : 0.1 °C

Calibration point ( °C )	Temperature of UUC* at each position ( °C )									Uncertainty of measurement ( +/- °C )
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
4	3.611	4.126	3.430	4.142	3.751	4.393	3.436	3.890	4.103	0.41

Setting temperature ( °C )	Indicating Temperature ( °C )	Measured stability ( +/- °C )	Measured uniformity ( °C )	Overall variation ( °C )
4.0	4.0	0.27	0.94	1.3



**Front view**

- #1 Lower Left Front
- #2 Lower Right Front
- #3 Lower Left Rear
- #4 Lower Right Rear
- #5 Upper Left Front
- #6 Upper Right Front
- #7 Upper Left Rear
- #8 Upper Right Rear
- #9 Geometric Center

**UUC\*** = Unit under calibration

**Uniformity** = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

**Overall Variation** = Difference of temperature value between the maximum and minimum any time.

**Stability** = One half of the maximum difference of measured temperatures at any one probe.





JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd  
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Bangkok 10600 (Thailand)  
Tel: +6608680812  
Mobile: +66863999453  
E-mail: jnac-calibration@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TISI-TIS 17025  
CALIBRATION 0367

Relative humidity and Air Temperature measurement laboratory  
Calibration services department.

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-061-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Digital Thermo Hygrometer  
MANUFACTURER : KEPLER Instrument  
MODEL/TYPE : KTH-02  
SERIAL NUMBER : 234011889  
ID NUMBER : -  
CONDITION AS-RECEIVED : Used item  
CUSTOMER : Okla Testing and consulting services Co., Ltd.  
67/35-36, 3rd Fl, Phetkasem soi 7/1, Wat Thapra,  
Bangkokyai, Bangkok, Thailand 10600.

RECEIVED DATE : 16 Dec 2024  
MEASUREMENT DATE : 19 Dec 2024  
ISSUE DATE : 19 Dec 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature	: $23.0 \pm 3.0$	°C
Relative Humidity	: $55.0 \pm 15.0$	%RH

**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.

### Calibration procedure:

The Relative humidity and Air Temperature calibration was done by In-House calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled Mirror hygrometer with Temperature sensor and standard Humidity generator chamber.

### Traceability:

The measurements are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT). Certificate number: TH-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

### 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'

### Calibrated by:

- ☐ Mr. Sorawit Thachalad  
☒ Miss Jittraporin Lertsomphol  
☐ Miss Ruangrumpai Phoommit



### Approved signatory:

Mr. Parinya Booncharoen  
Calibration Department Manager



JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number: CRT-061-67

Page 2 of 2 Pages

**Measurement Results:**

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Table 1:** The results of calibration of air temperature are reported in table below.

**Calibration Range:** 20 °C to 30 °C

<u>Determined</u> (°C)	<u>Standard Reading</u> (°C)	<u>UUC Reading</u> (°C)	<u>Error</u> (°C)	<u>Uncertainty</u> ±(°C)
20.00	20.06	20.6	0.5	0.31
25.00	25.04	25.3	0.3	0.31
30.00	30.04	29.6	-0.4	0.31

**Table 2:** The results of calibration of relative humidity at 23 °C are reported in table below.

**Calibration Range:** 35%RH to 70%RH

<u>Air Temperature</u> (°C)	<u>Standard Reading</u> (%RH)	<u>UUC Reading</u> (%RH)	<u>Error</u> (%RH)	<u>Uncertainty</u> ±(%RH)
23.04	34.74	36	1	1.0
23.04	44.71	43	-2	1.3
23.00	59.68	58	-2	1.8
23.03	69.61	66	-4	1.8

UUC\*: Unit Under Calibration

\*\*\*End of Certificate of Calibration\*\*\*







JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.  
63/14-15, 67/35-36  
Petchkasem 7,7/1, Rd. Watthapra, Bangkokyai,  
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Tel: +6608680812  
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E-mail: jnac-calibration@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TISI-TIS 17025  
CALIBRATION 0367

Relative humidity and Air Temperature measurement laboratory  
Calibration services department.

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-062-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Digital Thermo Hygrometer  
MANUFACTURER : KEPLER Instrument  
MODEL/TYPE : KTH-02  
SERIAL NUMBER : 234011890  
ID NUMBER : -  
CONDITION AS-RECEIVED : Used item  
CUSTOMER : Okla Testing and consulting services Co., Ltd.  
67/35-36, 3rd Fl, Phetkasem soi 7/1, Wat Thapra,  
Bangkokyai, Bangkok, Thailand 10600.

RECEIVED DATE : 16 Dec 2024  
MEASUREMENT DATE : 19 Dec 2024  
ISSUE DATE : 19 Dec 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature :  $23.0 \pm 3.0$  °C  
Relative Humidity :  $55.0 \pm 15.0$  %RH

**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.

### Calibration procedure:

The Relative humidity and Air Temperature calibration was done by In-House calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled Mirror hygrometer with Temperature sensor and standard Humidity generator chamber.

### Traceability:

The measurements are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT). Certificate number: TH-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

### 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'

### Calibrated by:

- ☐ Mr. Sorawit Thachalad  
☒ Miss Jittraporn Lertsomphol  
☐ Miss Ruangrumpai Phoommit



### Approved signatory: .....

Mr. Parinya Booncharoen  
Calibration Department Manager



JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number: CRT-062-67

Page 2 of 2 Pages

**Measurement Results:**

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Table 1:** The results of calibration of air temperature are reported in table below.

**Calibration Range:** 20 °C to 30 °C

<u>Determined</u> (°C)	<u>Standard Reading</u> (°C)	<u>UUC Reading</u> (°C)	<u>Error</u> (°C)	<u>Uncertainty</u> ±(°C)
20.00	20.06	20.2	0.1	0.31
25.00	25.04	25.4	0.4	0.31
30.00	30.04	30.3	0.3	0.31

**Table 2:** The results of calibration of relative humidity at 23 °C are reported in table below.

**Calibration Range:** 35%RH to 70%RH

<u>Air Temperature</u> (°C)	<u>Standard Reading</u> (%RH)	<u>UUC Reading</u> (%RH)	<u>Error</u> (%RH)	<u>Uncertainty</u> ±(%RH)
23.03	34.75	34	-1	1.0
23.03	44.71	43	-2	1.3
23.05	59.61	58	-2	1.8
23.04	69.59	67	-3	1.8

UUC\*: Unit Under Calibration

\*\*\*End of Certificate of Calibration\*\*\*



## Certificate of Calibration

**Certificate No.** : 68-300112-8

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Burette  
Manufacturer : ISOLAB Class : A  
Capacity : 25 ml Graduation : 0.05 ml  
ID No. : EM-MBR10002/17

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1014.5 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Wipa Tovadee

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241003	67-200410-2	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300112-8

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Delivery Time : 38.96 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
5	5.0000
15	14.9944
25	24.9967

Uncertainty of measurement with in  $\pm$  0.0066 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-2

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Cylinder  
Manufacturer : DURAN Class : A  
Capacity : 100 ml Graduation : 1 ml  
ID No. : CY100/01

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.6 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadce )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-2

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Nominal Volume ( ml )	Measuring Volume ( ml )
50	50.22
100	100.30

Uncertainty of measurement with in  $\pm$  0.063 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- oOo -





## Certificate of Calibration

**Certificate No.** : 68-300113-1

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Cylinder  
Manufacturer : FAVORIT Class : A  
Capacity : 50 ml Graduation : 1 ml  
ID No. : CY50/01

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.6 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-1

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Nominal Volume ( ml )	Measuring Volume ( ml )
50	50.32

Uncertainty of measurement with in  $\pm$  0.054 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-3

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Watthapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Cylinder

Manufacturer : Borosil

Class : A

Capacity : 500 ml

Graduation : 5 ml

ID No. : 0334-58

**Environment** : Ambient Temperature : ( 20 ± 3 ) °C

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1009.6 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.

Cert. No.

Due Date

Traceability

241002

67-200410-1

02 Jun 2025

National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-3

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Nominal Volume ( ml )	Measuring Volume ( ml )
500	499.63

Uncertainty of measurement with in  $\pm$  0.12 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-1

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Measuring Pipette  
Manufacturer : GLASSCO Class : A  
Capacity : 1 ml Graduation : 0.01 ml  
ID No. : EM-MER01001/19

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.1 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Areerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-1

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Delivery Time : 5.22 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
0.1	0.1012
0.5	0.4994
1	0.9903

Uncertainty of measurement with in  $\pm$  0.0026 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-2

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Watthapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Measuring Pipette  
Manufacturer : GLASSCO Class : A  
Capacity : 5 ml Graduation : 0.05 ml  
ID No. : EM-MER01001/18

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.1 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Areerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-2

**Page :** 2 of 2

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

**Delivery Time :** 9.60 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
0.5	0.5022
2.5	2.4836
5	4.9838

Uncertainty of measurement with in  $\pm$  0.0027 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-3

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Watthapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Measuring Pipette  
Manufacturer : GLASSCO Class : A  
Capacity : 10 ml Graduation : 0.1 ml  
ID No. : EM-MER01001/17

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.1 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-3

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Delivery Time : 11.06 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
1	1.0027
5	4.9761
10	9.9770

Uncertainty of measurement with in  $\pm$  0.0039 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300112-6

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Watthapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Volumetric Pipette  
Manufacturer : GLASSCO Class : A  
Capacity : 20 ml  
ID No. : EM-VPP20201/17

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.2 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Areerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300112-6

**Page :** 2 of 2

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Delivery Time : 14.98 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
20	19.9818

Uncertainty of measurement with in  $\pm$  0.0064 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-4

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Volumetric Flask  
Manufacturer : SCI Class : A  
Capacity : 100 ml  
ID No. : EM-VPP02501/17

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1010.3 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-4

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Nominal Volume ( ml )	Measuring Volume ( ml )
100	99.981

Uncertainty of measurement with in  $\pm$  0.018 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -





## Certificate of Calibration

**Certificate No.** : 68-300113-5

**Page** : 1 of 2

**Submitted by** : Okla Testing & Consulting Service Co.,Ltd.  
67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wattapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment** : Volumetric Flask  
Manufacturer : Borosil Class : A  
Capacity : 500 ml  
ID No. : EM-VPP02501/18

**Environment** : Ambient Temperature :  $(20 \pm 3)$  °C  
Relative Humidity :  $(50 \pm 10)$  %  
Air Pressure : 1009.9 mbar.

**Date of Received** : 05 February 2025

**Date of Calibration** : 10 February 2025

**Date of Issue** : 10 February 2025

**Calibrated by** : Arcerat Sombun

**Calibration Method** : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-300113-5

**Page : 2 of 2**

**Result of Calibration :** This result of true Volume is referred to standard temperature at 20 °C

**UUC Condition As-Received :** Good

Nominal Volume ( ml )	Measuring Volume ( ml )
500	500.04

Uncertainty of measurement with in  $\pm$  0.075 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$  ,  
providing a level of confidence of approximately 95%

- o0o -

