

ภาคผนวก

ภาคผนวกที่	1	ผลการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
ภาคผนวกที่	2	เอกสารขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ภาคผนวกที่	3	ใบรับรองความสามารถห้องปฏิบัติการวิเคราะห์
ภาคผนวกที่	4	สรุปเอกสารการสอบเทียบอุปกรณ์เครื่องมือ
ภาคผนวกที่	5	เอกสาร Detection Limit ของรายการทดสอบ
ภาคผนวกที่	6	สถานภาพการดำเนินการปัจจุบัน ของโครงการขยายกำลังการผลิตโรงงาน ผลิตแผ่นเหล็กรีดเย็นและเคลือบผิว (ครั้งที่ 1)
ภาคผนวกที่	7	หนังสือนำส่งรายงานให้หน่วยงานอนุญาต ฉบับประจำเดือนกรกฎาคม-ธันวาคม 2567
ภาคผนวกที่	8	เอกสารการขึ้นทะเบียนเจ้าหน้าที่ความปลอดภัยประจำโรงงาน
ภาคผนวกที่	9	แผนการซ่อมบำรุงรักษา (Preventive Maintenance) ประจำปี 2568
ภาคผนวกที่	9-1	รายงานการตรวจสอบระบบแผงเซลล์แสงอาทิตย์
ภาคผนวกที่	10	นโยบายหน่วยงานรับผิดชอบด้านความปลอดภัย และผู้ควบคุมมลพิษ
ภาคผนวกที่	11	การติดตั้งเทคโนโลยีระบบคอมพิวเตอร์ เพื่อคำนวณในการลดปริมาณของเสีย
ภาคผนวกที่	12	หนังสือแจ้งผลการพิจารณาการขออนุญาตให้นำสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว ออกนอกบริเวณโรงงาน
ภาคผนวกที่	13	ระบบการควบคุม และการตรวจสอบการจัดการกากของเสียโครงการ
ภาคผนวกที่	14	สรุปปริมาณของเสียแต่ละชนิด
ภาคผนวกที่	15	Noise Contour Map
ภาคผนวกที่	16	โครงการอนุรักษ์การได้ยิน
ภาคผนวกที่	17	ช่องทางการจราจร สำหรับการขับรถเข้าภายในพื้นที่โครงการ
ภาคผนวกที่	18	เอกสารการจ้างแรงงานท้องถิ่น
ภาคผนวกที่	19	การบริหารจัดการกรณีเกิดข้อร้องเรียน
ภาคผนวกที่	20	แผนผังประชาสัมพันธ์โครงการ
ภาคผนวกที่	21	เอกสาร/ภาพถ่ายการทำกิจกรรมเพื่อชุมชน และสังคม
ภาคผนวกที่	22	โครงการส่งเสริมด้านสุขภาพ
ภาคผนวกที่	23	การดำเนินงานด้านความปลอดภัย
ภาคผนวกที่	24	การอบรมด้านอาชีวอนามัยและความปลอดภัย
ภาคผนวกที่	25	การอบรมพนักงานเข้าใหม่
ภาคผนวกที่	26	นโยบายด้านสุขภาพ ความปลอดภัย สิ่งแวดล้อมและชุมชน

ภาคผนวก (ต่อ)

ภาคผนวกที่	27	รายงานการซ่อมแผนควบคุมภาวะฉุกเฉิน ประจำปี 2567
ภาคผนวกที่	28	ระบบการจำแนกประเภทและการติดฉลากสารเคมี GHS
ภาคผนวกที่	29	การอบรมด้านความปลอดภัยผู้รับเหมา
ภาคผนวกที่	30	แผนรองรับกรณีเกิดสารเคมีรั่วไหล
ภาคผนวกที่	31	บันทึกสถิติอุบัติเหตุ ประจำเดือนมกราคม-มิถุนายน 2568 และบันทึกสถิติอุบัติเหตุย้อนหลัง 3 ปี
ภาคผนวกที่	32	ระเบียบการปฏิบัติการการบริหารจัดการการเปลี่ยนแปลง
ภาคผนวกที่	33	ผลการตรวจสอบสภาพพนักงาน ประจำปี 2567 และผลการตรวจสอบสภาพย้อนหลัง 3 ปี
ภาคผนวกที่	33-1	แผนการตรวจสอบสภาพพนักงาน ประจำปี 2568
ภาคผนวกที่	34	แผนผังการจัดระดับเหตุฉุกเฉินของโครงการ
ภาคผนวกที่	35	การควบคุมการขนส่งวัตถุอันตรายและผลิตภัณฑ์
ภาคผนวกที่	36	แผนการตรวจสอบอุปกรณ์ดับเพลิง
ภาคผนวกที่	37	แผน Preventive Maintenance เต้าอบสี
ภาคผนวกที่	38	เอกสารตรวจสอบความปลอดภัยของเต้าอบสี
ภาคผนวกที่	39	Lay Out การปลูกแทรกต้นไม้ยืนต้นในพื้นที่สีเขียว
ภาคผนวกที่	40	สรุปผลการสำรวจทัศนคติชุมชน ประจำปี 2567
ภาคผนวกที่	41	แผนผังที่ตั้งบ่อน้ำฝนของโครงการ

ภาคผนวกที่ 1

ผลการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม

ผลการทดสอบคุณภาพอากาศในปล่องระบาย

Request No. LA68-0402

Report No. 6804-0056

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Pickle Line Fume Stack PKL (S1)

SAMPLING DATE : 27/03/2025

SAMPLE NO. : 01208

RECEIVED DATE : 02/04/2025

SAMPLING TIME : 10:05-11:05

TESTED DATE : 02-05/04/2025

REPORTED DATE : 09/04/2025

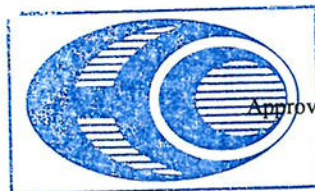
STACK DESCRIPTION

Height :	21.50	m	Type of Process :	Exhaust
Diameter :	0.90	m	Type of Fuel :	-
Temperature :	56.00	°C	Oxygen Content :	20.85 %
Air Velocity :	3.70	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	2.06	m ³ /s	Stack Pressure :	756.88 mmHg
Moisture Content :	-	%	Atmospheric Temperature :	35.00 °C

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Hydrogen Chloride	Adsorption, Ion Chromatography	10:05-11:05	0.281	200 , 15 ²	mg/m ³
(HCl)	(U.S.EPA Method 26A)		0.188	134 , 10 ²	ppm
			0.0006	0.06 ²	g/s

REMARK:

- ¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Parameter Outside The Scope of The Registration of The Department of Industrial Works.
- Sampling By Mr. Audoumsub Jenjobjing



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

Thongchai Boonsak

(Mr. Thongchai Boonsak)

09/04/2025

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COPY

Request No. LA68-0402

Report No. 6804-0058

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Cold Mill Stack CRM (S2)
 SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01210
 RECEIVED DATE : 02/04/2025 SAMPLING TIME : 09:45-10:23
 TESTED DATE : 02-03/04/2025 REPORTED DATE : 09/04/2025
 STACK DESCRIPTION @

Height :	24.50	m	Type of Process :	Exhaust
Diameter :	1.60	m	Type of Fuel :	-
Temperature :	40.00	°C	Oxygen Content :	20.90 %
Air Velocity :	16.26	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	30.08	m ³ /s	Stack Pressure :	757.86 mmHg
Moisture Content :	3.08	%	Atmospheric Temperature :	36.00 °C

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Total Suspended Particulate	Isokinetic, Gravimetric	09:45-10:23	0.3	240, 15 ²	mg/m ³
(TSP)	(U.S. EPA Method 5)		0.0090 [@]	0.50 ²	g/s

REMARK:

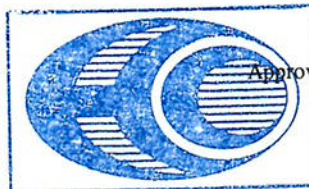
- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Audoumsub Jenjobjing (จ-003-จ-0009)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

09/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

09/04/2025

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Request No. LA68-0354

Report No. 6804-0090

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakomsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Alkali Cleaning Stack MCL 2 (S7)
 SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01168
 RECEIVED DATE : 31/03/2025 SAMPLING TIME : 10:40-11:10
 TESTED DATE : 31/03/2025 – 19/04/2025 REPORTED DATE : 21/04/2025

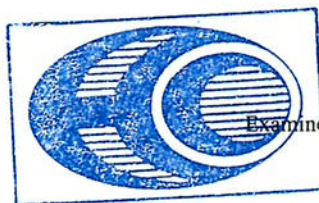
STACK DESCRIPTION

Height :	40.30	m	Type of Process :	Exhaust
Diameter :	0.80	m	Type of Fuel :	-
Temperature :	35.00	°C	Oxygen Content :	20.80 %
Air Velocity :	3.64	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	1.70	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Sodium Hydroxide ³	Acid-Base Titration	10:40-11:10	2.749	10	mg/m ³
(NaOH)			1.680	6	ppm
			0.0047	0.04	g/s

REMARK:

- 1.¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 2.² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- 3.³ Sampling By Eastern Thai Consulting 1992 Co., Ltd. Sampling By Mr. Warakorn Vitayasewee
 Analysed By The Environmental Center Suan Dusit University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By

Thongchai Boonsak

(Mr. Thongchai Boonsak)

21/04/2025

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Request No. LA68-0354

Report No. 6804-0092

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : Furnace Stack MCL 2 (S8)
SAMPLING DATE : 26/03/2025
RECEIVED DATE : 31/03/2025
TESTED DATE : 31/03/2025 – 01/04/2025
STACK DESCRIPTION @

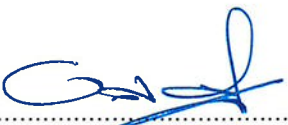
Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	192.00	°C	Oxygen Content :	12.80 %
Air Velocity :	6.01	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	5.63	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.50	%		

PARAMETER*	TEST METHOD	TIME	RESULT ³		STD ¹	UNIT
			12.80 % O ₂	7 % O ₂		
Total Suspended Particulate	Isokinetic, Gravimetric	09:20-09:55	0.7	1.2	240 , 20 ²	mg/m ³
(TSP)	(U.S. EPA Method 5)		0.0039 [@]	-	0.15 ²	g/s

REMARK:

- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Warakorn Vitayasewee (จ-003-ค-0021)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....



(Miss Apiradee Chuen-arom)


(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....



(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0354

Report No. 6804-0094

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Furnace Stack MCL 2 (S8)

SAMPLING DATE : 26/03/2025

RECEIVED DATE : 31/03/2025

TESTED DATE : 31/03/2025 – 01/04/2025

SAMPLE NO. : 01172

SAMPLING TIME : 09:40-09:50

REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	192.00	°C	Oxygen Content :	12.80 %
Air Velocity :	6.01	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	5.63	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.50	%		

PARAMETER	TEST METHOD	TIME	RESULT ³		STD ¹	UNIT
			12.80 % O ₂	7 % O ₂		
Carbon Monoxide	Non-Dispersive Infrared	09:40-09:50	76.5	131.3	790 , 350 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		66.8	114.6	690 , 306 ²	ppm
			0.4307 [@]	-	2.56 ²	g/s

REMARK:

- ¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Warakorn Vitayasewee (ว-003-ค-0021)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....



(Miss Apiradee Chuen-arom)

(ว-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....



(Mr. Thongchai Boonsak)

(ว-003-ค-0012)

17/04/2025

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Request No. LA68-0354

Report No. 6804-0093

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Furnace Stack MCL 2 (S8)
 SAMPLING DATE : 26/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 08/04/2025
 STACK DESCRIPTION @

Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	192.00	°C	Oxygen Content :	12.80 %
Air Velocity :	6.01	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	5.63	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.50	%		

PARAMETER	TEST METHOD	TIME	RESULT ³		STD ¹	UNIT
			12.80 % O ₂	7 % O ₂		
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:30-09:35	8.1	13.9	376 , 95 ²	mg/m ³
	Acid (U.S. EPA Method 7)		4.3	7.4	200 , 51 ²	ppm
			0.0456 [@]	-	0.70 ²	g/s

REMARK:

- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Warakorn Vitayasewee (จ-003-ค-0021)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0353

Report No. 6804-0064

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Passivation & Resin Combine Stack MCL 2 (S9)

SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01145

RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:30-09:55

TESTED DATE : 31/03/2025 – 04/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION

Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.00	m	Type of Fuel :	Natural Gas
Temperature :	116.00	°C	Oxygen Content :	20.50 %
Air Velocity :	8.72	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	4.99	m ³ /s	Atmospheric Temperature :	34.00 °C
Moisture Content :	4.25	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Phosphoric Acid ³ (H ₃ PO ₄)	Ion Chromatrography	09:30-09:55	0.01	0.01	mg/m ³
			0.002	0.002	ppm
			0.00005	0.00007	g/s

REMARK:

- ^{1/} มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ^{2/} Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- ^{3/} Sampling By Eastern Thai Consuting 1992 Co., Ltd. Mr. Teerapong Naulin

Analysed By The Office of Public Health and Environmental Technology Services, Faculty of Public Health, Mahidol University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By

Thongchai Boonsak

(Mr. Thongchai Boonsak)

17/04/2025

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WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Request No. LA68-0353

Report No. 6804-0065

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Passivation & Resin Combine Stack MCL 2 (S9)
 SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01146
 RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:20-10:00
 TESTED DATE : 31/03/2025 – 09/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION

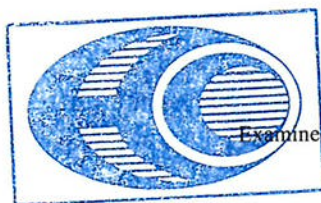
Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.00	m	Type of Fuel :	Natural Gas
Temperature :	116.00	°C	Oxygen Content :	20.50 %
Air Velocity :	8.72	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	4.99	m ³ /s	Atmospheric Temperature :	34.00 °C
Moisture Content :	4.25	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Chromic Acid ³	Spectrophotometer	09:20-10:00	0.0025	0.01	mg/m ³
			0.00001	0.00007	g/s

REMARK:

- 1.¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 2.² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- 3.³ Sampling By Eastern Thai Consulting 1992 Co., Ltd. Mr. Teerapong Naulin

Analysed By The Office of Public Health and Environmental Technology Services, Faculty of Public Health, Mahidol University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By

Thongchai Boonsak

(Mr. Thongchai Boonsak)

17/04/2025

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Request No. LA68-0353

Report No. 6804-0066

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Passivation & Resin Combine Stack MCL 2 (S9)
 SAMPLING DATE : 26/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 03/04/2025
 STACK DESCRIPTION®

Height :	39.30	m	Type of Process :	Combustion
Diameter :	1.00	m	Type of Fuel :	Natural Gas
Temperature :	116.00	°C	Oxygen Content :	20.50 %
Air Velocity :	8.72	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	4.99	m ³ /s	Atmospheric Temperature :	34.00 °C
Moisture Content :	4.25	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:30-09:35	<2.0	376 , 25 ²	mg/m ³
	Acid (U.S. EPA Method 7)		<1.0	200 , 13 ²	ppm
			<0.0100 [®]	0.16 ²	g/s

REMARK:

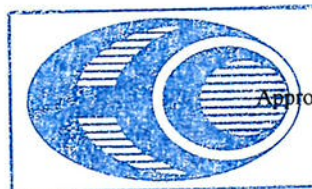
- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Teerapong Naulin(จ-003-ค-0014)
- [®] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0353

Report No. 6804-0073

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Passivation Stack MCL 2 (S10)
 SAMPLING DATE : 26/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 03/04/2025
 STACK DESCRIPTION@

Height :	31.00	m	Type of Process :	Combustion
Diameter :	0.55	m	Type of Fuel :	Natural Gas
Temperature :	45.00	°C	Oxygen Content :	20.76 %
Air Velocity :	9.04	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	1.94	m ³ /s	Atmospheric Temperature :	35.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen	Absorption, Phenoldisulfonic	09:50-09:55	4.9	376 , 7 ²	mg/m ³
(NO _x as NO ₂)	Acid (U.S. EPA Method 7)		2.6	200 , 3 ²	ppm
			0.0095 [@]	0.02 ²	g/s

REMARK:

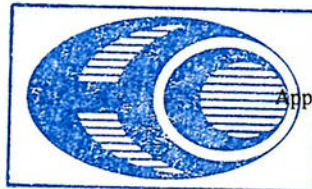
- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Teerapong Naulin(ว-003-ค-0014)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(ว-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(ว-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0106

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Alkali Cleaning Stack CPL (S11)

SAMPLING DATE : 26/03/2025

SAMPLE NO. : 01185

RECEIVED DATE : 02/04/2025

SAMPLING TIME : 09:20-09:50

TESTED DATE : 02-19/04/2025

REPORTED DATE : 22/04/2025

STACK DESCRIPTION

Height :	24.00	m	Type of Process :	Exhaust
Diameter :	0.25	m	Type of Fuel :	-
Temperature :	46.00	°C	Oxygen Content :	20.90 %
Air Velocity :	4.87	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ² :	0.21	m ³ /s	Atmospheric Temperature :	31.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Potassium Hydroxide ³	Acid-Base Titration	09:20-09:50	< 0.100	2	mg/m ³
(KOH)			< 0.0001	0.0043	g/s

REMARK:

- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
 - ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
 - ³ Sampling By Eastern Thai Consulting 1992 Co., Ltd. Mr. Metee Sukprasert
- Analysed By The Environmental Center Suan Dusit University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By

Thongchai Boonsak

(Mr. Thongchai Boonsak)

22/04/2025

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Request No. LA68-0401

Report No. 6804-0108

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : ROPT Oven Stack CPL (S12)
 SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01187
 RECEIVED DATE : 02/04/2025 SAMPLING TIME : 09:30-10:05
 TESTED DATE : 02-04/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	24.00	m	Type of Process :	Combustion
Diameter :	0.50	m	Type of Fuel :	Natural Gas
Temperature :	251.00	°C	Oxygen Content :	18.67 %
Air Velocity :	13.89	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ² :	1.48	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.10	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Chromium	Isokinetic, Digestion, ICP	09:30-10:05	< 0.005	1	mg/m ³
	(U.S. EPA Method 29)		< 0.00001 [@]	0.0013	g/s

REMARK:

- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....


(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....


(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0109

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : ROPT Oven Stack CPL (S12)
 SAMPLING DATE : 26/03/2025
 RECEIVED DATE : 02/04/2025
 TESTED DATE : 02-04/04/2025
 STACK DESCRIPTION @

Height :	24.00	m	Type of Process :	Combustion
Diameter :	0.50	m	Type of Fuel :	Natural Gas
Temperature :	251.00	°C	Oxygen Content :	18.67 %
Air Velocity :	13.89	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	1.48	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.10	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:40-09:45	<2.0	376 , 50 ²	mg/m ³
	Acid (U.S. EPA Method 7)		<1.0	200 , 27 ²	ppm
			<0.0030 [@]	0.06 ²	g/s

REMARK:

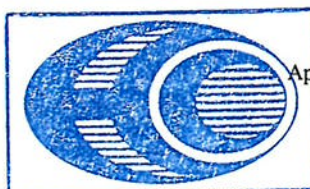
- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0110

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut, A. Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : ROPT Oven Stack CPL (S12)
 SAMPLING DATE : 26/03/2025
 RECEIVED DATE : 02/04/2025
 TESTED DATE : 02-05/04/2025
 STACK DESCRIPTION[@]

Height :	24.00	m	Type of Process :	Combustion
Diameter :	0.50	m	Type of Fuel :	Natural Gas
Temperature :	251.00	°C	Oxygen Content :	18.67 %
Air Velocity :	13.89	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	1.48	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.10	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Carbon Monoxide	Non-Dispersive Infrared	09:35-09:45	1.9	790 , 100 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		1.7	690 , 87 ²	ppm
			0.0028 [@]	0.13 ²	g/s

REMARK:

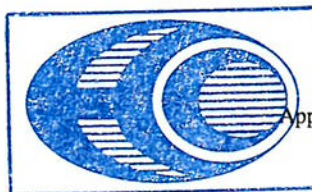
- 1.¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0118

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : RTO Stack CPL (S13)

SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01197

RECEIVED DATE : 02/04/2025 SAMPLING TIME : 10:10-10:35

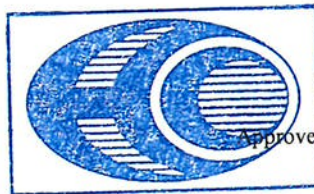
TESTED DATE : 02-05/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION

Height :	24.00	m	Type of Process :	Combustion
Diameter :	1.70	m	Type of Fuel :	Natural Gas
Temperature :	129.00	°C	Oxygen Content :	20.49 %
Air Velocity :	4.25	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ² :	6.90	m ³ /s	Atmospheric Temperature :	33.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Toluene	Adsorption, Gas Chromatography	10:10-10:35	< 2.07	5.0	mg/m ³
	(U.S. EPA Method 18)		< 0.55	1.3	ppm
			< 0.0143	0.08	g/s

- REMARK:**
- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
 - ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
 - Sampling By Mr. Metee Sukprasert
 - Parameter Outside The Scope of The Registration of The Department of Industrial Works.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

Thongchai Boonsak

(Mr. Thongchai Boonsak)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0119

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : RTO Stack CPL (S13)

SAMPLING DATE : 26/03/2025

SAMPLE NO. : 01198

RECEIVED DATE : 02/04/2025

SAMPLING TIME : 10:10-10:35

TESTED DATE : 02-05/04/2025

REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	24.00	m	Type of Process :	Combustion
Diameter :	1.70	m	Type of Fuel :	Natural Gas
Temperature :	129.00	°C	Oxygen Content :	20.49 %
Air Velocity :	4.25	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ² :	6.90	m ³ /s	Atmospheric Temperature :	33.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Xylene	Adsorption, Gas Chromatographic	10:10-10:35	5.11	70	mg/m ³
	(U.S. EPA Method 18)		1.18	16	ppm
			0.0353 [@]	1.16	g/s

REMARK:

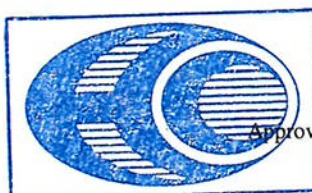
- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0120

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : RTO Stack CPL (S13)
SAMPLING DATE : 26/03/2025
RECEIVED DATE : 02/04/2025
TESTED DATE : 02-04/04/2025
STACK DESCRIPTION @

Height :	24.00	m	Type of Process :	Combustion
Diameter :	1.70	m	Type of Fuel :	Natural Gas
Temperature :	129.00	°C	Oxygen Content :	20.49 %
Air Velocity :	4.25	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	6.90	m ³ /s	Atmospheric Temperature :	33.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	10:15-10:20	< 2.0	376 , 25 ²	mg/m ³
	Acid (U.S. EPA Method 7)		< 1.0	200 , 13 ²	ppm
			< 0.0138 [@]	0.42 ²	g/s

REMARK:

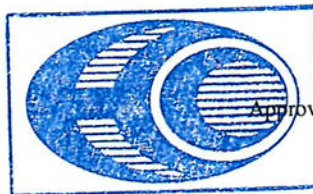
- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

Thongchai Boonsak

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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COPY

Request No. LA68-0401

Report No. 6804-0121

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : RTO Stack CPL (S13)

SAMPLING DATE : 26/03/2025 SAMPLE NO. : 01200

RECEIVED DATE : 02/04/2025 SAMPLING TIME : 10:10-10:20

TESTED DATE : 02-05/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	24.00	m	Type of Process :	Combustion
Diameter :	1.70	m	Type of Fuel :	Natural Gas
Temperature :	129.00	°C	Oxygen Content :	20.49 %
Air Velocity :	4.25	m/s	Barometric Pressure :	757.00 mmHg
Dry Basic Flow rate ³ :	6.90	m ³ /s	Atmospheric Temperature :	33.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Carbon Monoxide	Non-Dispersive Infrared	10:10-10:20	4.0	790 , 300 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		3.5	690 , 262 ²	ppm
			0.0276 [@]	4.98 ²	g/s

REMARK:

- 1.¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

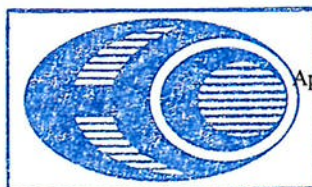
Examined By.....



(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....



(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0122

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakongsongkruarat, Muang , Rayong
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : WWTP Sludge Dryer (S14)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 02/04/2025
 TESTED DATE : 02-03/04/2025
 STACK DESCRIPTION @

Height :	12.00	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	130.00	°C	Oxygen Content :	20.20 %
Air Velocity :	7.52	m/s	Barometric Pressure :	753.25 mmHg
Dry Basic Flow rate ³ :	1.49	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.24	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Total Suspended Particulate	Isokinetic, Gravimetric	09:00-09:35	0.2	240 , 200 ²	mg/m ³
(TSP)	(U.S. EPA Method 5)		0.0003 [@]	0.44 ²	g/s

REMARK:

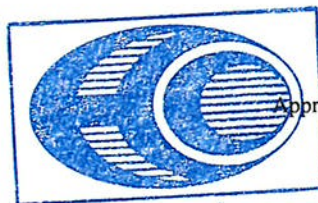
- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0123

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang , Rayong

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : WWTP Sludge Dryer (S14)

SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01202

RECEIVED DATE : 02/04/2025 SAMPLING TIME : 09:15-09:25

TESTED DATE : 02-08/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	12.00	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	130.00	°C	Oxygen Content :	20.20 %
Air Velocity :	7.52	m/s	Barometric Pressure :	753.25 mmHg
Dry Basic Flow rate ³ :	1.49	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.24	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:15-09:25	9.5	376 , 15 ²	mg/m ³
	Acid (U.S. EPA Method 7)		5.0	200 , 8 ²	ppm
			0.0142 [@]	0.03 ²	g/s

REMARK:

- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0401

Report No. 6804-0124

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakongsongkruarat, Muang , Rayong

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : WWTP Sludge Dryer (S14)

SAMPLING DATE : 27/03/2025

RECEIVED DATE : 02/04/2025

TESTED DATE : 02-05/04/2025

SAMPLE NO. : 01203

SAMPLING TIME : 09:05-09:15

REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	12.00	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	130.00	°C	Oxygen Content :	20.20 %
Air Velocity :	7.52	m/s	Barometric Pressure :	753.25 mmHg
Dry Basic Flow rate ³ :	1.49	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	4.24	%		

PARAMETER*	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Carbon Monoxide	Non-Dispersive Infrared	09:05-09:15	1.1	790 , 119 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		1.0	690 , 104 ²	ppm
			0.0016 [@]	0.26 ²	g/s

REMARK:

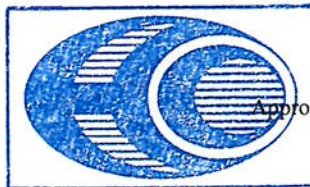
- 1.¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Metee Sukprasert (จ-003-ค-0035)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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COPY

Request No. LA68-0354

Report No. 6804-0098

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Cleaning Fume Exhaust Scrubber Stack MCL 3 (S15)
 SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01176
 RECEIVED DATE : 31/03/2025 SAMPLING TIME : 10:30-11:00
 TESTED DATE : 31/03/2025 – 19/04/2025 REPORTED DATE : 21/04/2025

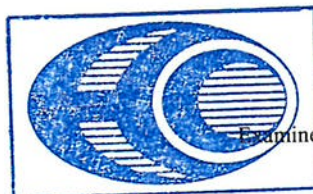
STACK DESCRIPTION

Height :	20.00	m	Type of Process :	Exhaust
Diameter :	0.75	m	Type of Fuel :	-
Temperature :	40.00	°C	Oxygen Content :	20.80 %
Air Velocity :	8.06	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	3.27	m ³ /s	Atmospheric Temperature :	32.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Sodium Hydroxide ³	Acid-Base Titration	10:30-11:00	1.375	10	mg/m ³
(NaOH)			0.840	6	ppm
			0.0045	0.065	g/s

REMARK:

- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- ³ Sampling By Eastern Thai Consulting 1992 Co., Ltd. Sampling By Mr. Warakorn Vitayasewee
Analysed By The Environmental Center Suan Dusit University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By

Thongchai Boonsak

(Mr. Thongchai Boonsak)

21/04/2025

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Request No. LA68-0354

Report No. 6804-0100

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Furnace Stack MCL 3 (S16)

SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01178

RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:00-09:35

TESTED DATE : 31/03/2025 – 03/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	50.00	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	200.00	°C	Oxygen Content :	12.20 %
Air Velocity :	8.98	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	8.27	m ³ /s	Atmospheric Temperature :	31.00 °C
Moisture Content :	4.52	%		

PARAMETER	TEST METHOD	TIME	RESULT ³		STD ¹	UNIT
			12.20 % O ₂	7 % O ₂		
Total Suspended Particulate	Isokinetic, Gravimetric	09:00-09:35	0.8	1.3	240 , 30 ²	mg/m ³
(TSP)	(U.S. EPA Method 5)		0.0066 [@]	-	0.079 ²	g/s

REMARK:

- ¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Warakorn Vitayasewee (ว-003-ค-0021)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....
(Miss Apiradee Chuen-arom)
(ว-003-ค-0007)
17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....
(Mr. Thongchai Boonsak)
(ว-003-ค-0012)
17/04/2025

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Request No. LA68-0354

Report No. 6804-0101

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Furnace Stack MCL 3 (S16)

SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01179

RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:10-09:15

TESTED DATE : 31/03/2025 – 04/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	50.00	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	200.00	°C	Oxygen Content :	12.20 %
Air Velocity :	8.98	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	8.27	m ³ /s	Atmospheric Temperature :	31.00 °C
Moisture Content :	4.52	%		

PARAMETER	TEST METHOD	TIME	RESULT ³		STD ^{1/}	UNIT
			12.20 % O ₂	7 % O ₂		
Oxides of Nitrogen	Absorption, Phenoldisulfonic	09:10-09:15	29.2	46.7	376 , 160 ²	mg/m ³
(NO _x as NO ₂)	Acid (U.S. EPA Method 7)		15.5	24.8	200 , 85 ²	ppm
			0.2415 [@]	-	0.422 ²	g/s

REMARK:

- 1.^{1/} Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.^{2/} มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.^{3/} Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Warakorn Vitayasewee (จ-003-ค-0021)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0354

Report No. 6804-0102

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Furnace Stack MCL 3 (S16)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 01/04/2025
 STACK DESCRIPTION @

Height :	50.00	m	Type of Process :	Combustion
Diameter :	1.40	m	Type of Fuel :	Natural Gas
Temperature :	200.00	°C	Oxygen Content :	12.20 %
Air Velocity :	8.98	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	8.27	m ³ /s	Atmospheric Temperature :	31.00 °C
Moisture Content :	4.52	%		

PARAMETER*	TEST METHOD	TIME	RESULT ³		STD ¹	UNIT
			12.20 % O ₂	7 % O ₂		
Carbon Monoxide	Non-Dispersive Infrared	09:20-09:30	65.5	104.6	790 , 350 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		57.2	91.4	690 , 306 ²	ppm
			0.5417 [@]	-	0.924 ²	g/s

REMARK:

- ¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Warakorn Vitayasewee (ว-003-ก-0021)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(ว-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

Thongchai Boonsak

(Mr. Thongchai Boonsak)

(ว-003-ค-0012)

17/04/2025

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 WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. LA68-0353

Report No. 6804-0075

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Oven Stack MCL 3 (S17)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 08/04/2025
 SAMPLE NO. : 01155/1
 SAMPLING TIME : 09:10-09:15
 REPORTED DATE : 17/04/2025

STACK DESCRIPTION[@]

Height :	52.50	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	56.00	°C	Oxygen Content :	18.85 %
Air Velocity :	2.64	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	0.65	m ³ /s	Atmospheric Temperature :	31.40 °C
Moisture Content :	4.12	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:10-09:15	<2.0	376 , 45 ²	mg/m ³
	Acid (U.S. EPA Method 7)		<1.0	200 , 23 ²	ppm
			<0.0013 [@]	0.023 ²	g/s

REMARK:

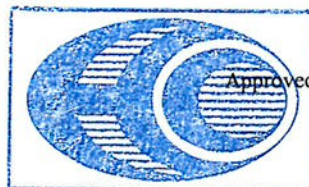
- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Teerapong Naulin(จ-003-ค-0014)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

Thongchai Boonsak

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0353

Report No. 6804-0077

TEST REPORT


CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Oven Stack MCL 3 (S17)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 01/04/2025
 STACK DESCRIPTION @

Height :	52.50	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	56.00	°C	Oxygen Content :	18.85 %
Air Velocity :	2.64	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	0.65	m ³ /s	Atmospheric Temperature :	31.40 °C
Moisture Content :	4.12	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Carbon Monoxide	Non-Dispersive Infrared	09:10-09:20	7.7	790 , 350 ²	mg/m ³
(CO)	(U.S. EPA Method 10)		6.7	690 , 305 ²	ppm
			0.0050 [@]	0.175 ²	g/s

REMARK:

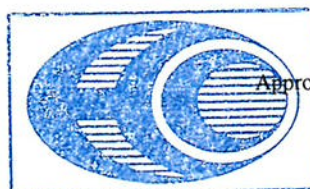
- ¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- ² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Teerapong Naulin(จ-003-ค-0014)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....


(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....


(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
 THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
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Request No. LA68-0353

Report No. 6804-0074

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Oven Stack MCL 3 (S17)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 09/04/2025
 SAMPLE NO. : 01154
 SAMPLING TIME : 08:50-09:50
 REPORTED DATE : 17/04/2025

STACK DESCRIPTION

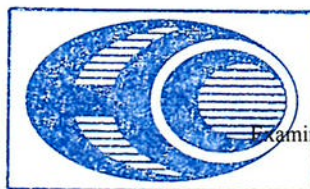
Height :	52.50	m	Type of Process :	Combustion
Diameter :	0.60	m	Type of Fuel :	Natural Gas
Temperature :	56.00	°C	Oxygen Content :	18.85 %
Air Velocity :	2.64	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	0.65	m ³ /s	Atmospheric Temperature :	31.40 °C
Moisture Content :	4.12	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Chromic Acid ³	Spectrophotometer	08:50-09:50	0.0031	0.01	mg/m ³
			0.000002	0.000005	g/s

REMARK:

- 1.¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 2.² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- 3.³ Sampling By Eastern Thai Consulting 1992 Co., Ltd. Mr. Teerapong Naulin

Analysed By The Office of Public Health and Environmental Technology Services, Faculty of Public Health, Mahidol University.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By



(Mr. Thongchai Boonsak)

17/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Request No. LA68-0353

Report No. 6804-0081

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Painting stack MCL 3 (S18)

SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01160

RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:10-09:35

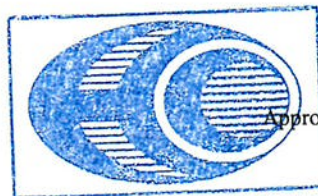
TESTED DATE : 31/03/2025 – 05/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION

Height :	52.50	m	Type of Process :	Combustion
Diameter :	1.80	m	Type of Fuel :	Natural Gas
Temperature :	89.00	°C	Oxygen Content :	20.00 %
Air Velocity :	3.92	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	7.84	m ³ /s	Atmospheric Temperature :	35.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Toluene	Adsorption, Gas Chromatography	09:10-09:35	< 2.07	5.0	mg/m ³
	(U.S. EPA Method 18)		< 0.55	1.3	ppm
			< 0.0162	0.05	g/s

- REMARK:**
- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
 - ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
 - Parameter Outside The Scope of The Registration of The Department of Industrial Works.
 - Sampling By Mr. Teerapong Naulin



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....



(Mr. Tongchai Boonsak)

17/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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Request No. LA68-0353

Report No. 6804-0082

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : No.2 Soil G 9 Prakornsongkhorad Rd., T. Maptaphut , A. Muang , Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Painting stack MCL 3 (S18)

SAMPLING DATE : 27/03/2025 SAMPLE NO. : 01161

RECEIVED DATE : 31/03/2025 SAMPLING TIME : 09:10-09:35

TESTED DATE : 31/03/2025 – 05/04/2025 REPORTED DATE : 17/04/2025

STACK DESCRIPTION @

Height :	52.50	m	Type of Process :	Combustion
Diameter :	1.80	m	Type of Fuel :	Natural Gas
Temperature :	89.00	°C	Oxygen Content :	20.00 %
Air Velocity :	3.92	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ² :	7.84	m ³ /s	Atmospheric Temperature :	35.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ²	STD ¹	UNIT
Xylene	Adsorption, Gas Chromatographic (U.S. EPA Method 18)	09:10-09:35	< 2.05	70	mg/m ³
			< 0.47	16	ppm
			< 0.0161 [@]	0.70	g/s

REMARK:

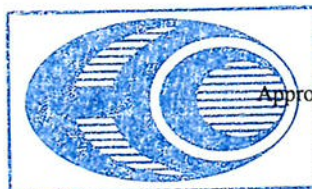
- ¹ มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- ² Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Teerapong Naulin(ว-003-ค-0014)
- [@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(ว-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(ว-003-ค-0012)

17/04/2025

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COPY

Request No. LA68-0353

Report No. 6804-0083

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Painting stack MCL 3 (S18)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 04/04/2025
 STACK DESCRIPTION @

Height :	52.50	m	Type of Process :	Combustion
Diameter :	1.80	m	Type of Fuel :	Natural Gas
Temperature :	89.00	°C	Oxygen Content :	20.00 %
Air Velocity :	3.92	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	7.84	m ³ /s	Atmospheric Temperature :	35.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Oxides of Nitrogen (NO _x as NO ₂)	Absorption, Phenoldisulfonic	09:20-09:25	<2.0	376 , 20 ²	mg/m ³
	Acid (U.S. EPA Method 7)		<1.0	200 , 10 ²	ppm
			<0.0157 [@]	0.20 ²	g/s

REMARK:

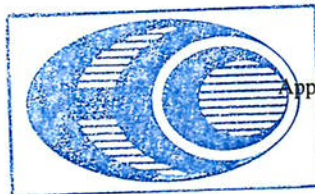
- 1.¹ Notification Of Ministry Of Science, Technology And Environmental B.E.2544 (2001)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Teerapong Naulin(จ-003-ค-0014)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

Approved By.....



(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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Request No. LA68-0353

Report No. 6804-0085

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : No.2 Soil G 9 Prakornsongkhroard Rd., T. Maptaphut , A. Muang , Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Painting stack MCL 3 (S18)
 SAMPLING DATE : 27/03/2025
 RECEIVED DATE : 31/03/2025
 TESTED DATE : 31/03/2025 – 01/04/2025
 STACK DESCRIPTION @

Height :	52.50	m	Type of Process :	Combustion
Diameter :	1.80	m	Type of Fuel :	Natural Gas
Temperature :	89.00	°C	Oxygen Content :	20.00 %
Air Velocity :	3.92	m/s	Barometric Pressure :	756.25 mmHg
Dry Basic Flow rate ³ :	7.84	m ³ /s	Atmospheric Temperature :	35.00 °C
Moisture Content :	-	%		

PARAMETER	TEST METHOD	TIME	RESULT ³	STD ¹	UNIT
Carbon Monoxide (CO)	Non-Dispersive Infrared (U.S. EPA Method 10)	09:20-09:30	6.0	790 , 350 ²	mg/m ³
			5.2	690 , 305 ²	ppm
			0.0470 [@]	3.00 ²	g/s

REMARK:

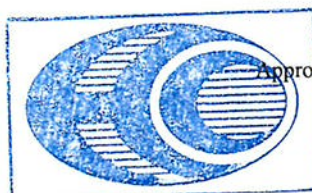
- 1.¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- 2.² มาตรฐานที่กำหนดไว้ในรายงานการประเมินผลกระทบสิ่งแวดล้อมฉบับสมบูรณ์
- 3.³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
4. Sampling By Mr. Teerapong Naulin(จ-003-ค-0014)
- 5.[@] These Data Outside The Scope of The Registration of The Department of Industrial Works.

Examined By.....

(Miss Apiradee Chuen-arom)

(จ-003-ค-0007)

17/04/2025



บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

Approved By.....

(Mr. Thongchai Boonsak)

(จ-003-ค-0012)

17/04/2025

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ผลการทดสอบคุณภาพอากาศในบรรยากาศ

Request No. LA68-R0415

Report No. R6804-0641 - R6804-0647

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : วัดมาบชลูด

RECEIVED DATE : 01/04/2025 SAMPLE NO. : 06093-06099

DETERMINATION METHOD : Non-Dispersive Infrared REPORTED DATE : 21/04/2025

INSTRUMENT : API Model T300 S/N 5402

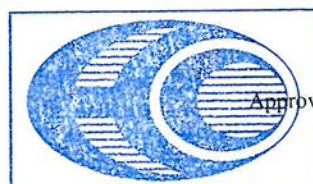
PARAMETER*	SAMPLING DATE	TIME	RESULT	STANDARD ^{/1}	UNIT
Carbon monoxide (CO)	25/03/2025	10:00-18:00	1.01	9.0	ppm
	26/03/2025	10:00-18:00	0.94	9.0	ppm
	27/03/2025	10:00-18:00	0.55	9.0	ppm
	28/03/2025	10:00-18:00	0.44	9.0	ppm
	29/03/2025	10:00-18:00	0.38	9.0	ppm
	30/03/2025	10:00-18:00	0.36	9.0	ppm
	31/03/2025	10:00-18:00	0.42	9.0	ppm

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 10 B.E. 2538 (1995)

Standard for 8-hr Average

* Parameter Outside The Scope of The Registration of The Department of Industrial Works

(Measurement By Mr. Seksan Pluemwong)



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....

(MS. THANATPORN KLINSOPON)

21/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. ATR6804003

Report No. 6804-0074 - 6804-0080

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดมาบชลุค
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040074 - A68040080
TESTED DATE : 03/04/2025-21/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Zinc (Zn)	Filtration,ICP-OES Method	25-26/03/2025	< 0.0001	mg/m ³
		26-27/03/2025	< 0.0001	mg/m ³
		27-28/03/2025	0.0006	mg/m ³
		28-29/03/2025	< 0.0001	mg/m ³
		29-30/03/2025	< 0.0001	mg/m ³
		30-31/03/2025	< 0.0001	mg/m ³
		31/03/2025-01/04/2025	< 0.0001	mg/m ³

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsopon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Request No. ATR6804003

Report No. 6804-0067 - 6804-0073

TEST REPORT

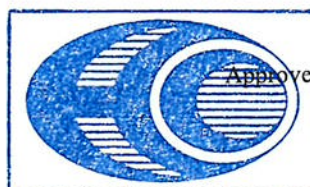
CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakomsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดมาบชูด
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040067 - A68040073
TESTED DATE : 03/04/2025-05/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	STD ¹	UNIT
Total Suspended Particulate (TSP)	Gravimetric Method	25-26/03/2025	0.062	0.33	mg/m ³
		26-27/03/2025	0.076	0.33	mg/m ³
		27-28/03/2025	0.063	0.33	mg/m ³
		28-29/03/2025	0.064	0.33	mg/m ³
		29-30/03/2025	0.055	0.33	mg/m ³
		30-31/03/2025	0.054	0.33	mg/m ³
		31/03/2025-01/04/2025	0.039	0.33	mg/m ³

REMARK:¹ Notification of The National Environmental Board Volume 24 B.E.2547 (2004) Standard for 24-hr Average.

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.

(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsopon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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COPY

Request No. ATR6804003

Report No. 6804-0081 - 6804-0087

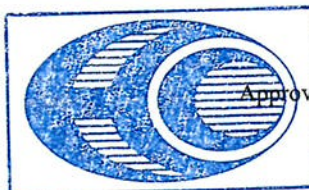
TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดมาบชูด
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040081 - A68040087
TESTED DATE : 03/04/2025-21/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Aluminium (Al)	Filtration, ICP-OES	25-26/03/2025	< 0.0001	mg/m ³
	/NIOSH 7300	26-27/03/2025	< 0.0001	mg/m ³
		27-28/03/2025	0.0002	mg/m ³
		28-29/03/2025	< 0.0001	mg/m ³
		29-30/03/2025	< 0.0001	mg/m ³
		30-31/03/2025	< 0.0001	mg/m ³
		31/03/2025-01/04/2025	< 0.0001	mg/m ³

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsoon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. ATR6804003

Report No. 6804-0088 - 6804-0094

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดมาบขลุค
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040088 - A68040094
TESTED DATE : 03/04/2025-05/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Hydrogen chloride (HCl)	Ion Chromatography Method (OSHA ID 174sg)	25-26/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		26-27/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		27-28/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		28-29/03/2025	0.029	mg/m ³
			0.019	ppm
		29-30/03/2025	0.038	mg/m ³
			0.025	ppm
		30-31/03/2025	0.130	mg/m ³
			0.087	ppm
31/03/2025-01/04/2025	0.076	mg/m ³		
	0.051	ppm		

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsopon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Request No. LA68-R0415

Report No. R6804-0627 - R6804-0633

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : วัดหนองแฟบ

RECEIVED DATE : 01/04/2025 SAMPLE NO. : 06079-06085

DETERMINATION METHOD : Non-Dispersive Infrared REPORTED DATE : 21/04/2025

INSTRUMENT : API Model T300 S/N 5401

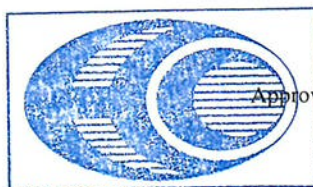
PARAMETER*	SAMPLING DATE	TIME	RESULT	STANDARD ^{/1}	UNIT
Carbon monoxide (CO)	25/03/2025	10:00-18:00	1.92	9.0	ppm
	26/03/2025	10:00-18:00	1.87	9.0	ppm
	27/03/2025	10:00-18:00	1.90	9.0	ppm
	28/03/2025	10:00-18:00	1.89	9.0	ppm
	29/03/2025	10:00-18:00	1.84	9.0	ppm
	30/03/2025	10:00-18:00	1.85	9.0	ppm
	31/03/2025	10:00-18:00	1.85	9.0	ppm

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 10 B.E. 2538 (1995)

Standard for 8-hr Average

* Parameter Outside The Scope of The Registration of The Department of Industrial Works

(Measurement By Mr. Seksan Pluemwong)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MS. THANATPORN KLINSOPON)

21/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. ATR6804003

Report No. 6804-0039 - 6804-0045

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดหนองแฟบ
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040039 - A68040045
TESTED DATE : 03/04/2025-05/04/2025 REPORTED DATE : 22/04/2025

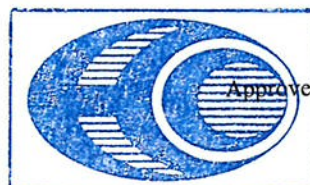
PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	STD ¹	UNIT
Total Suspended Particulate (TSP)	Gravimetric Method	25-26/03/2025	0.071	0.33	mg/m ³
		26-27/03/2025	0.066	0.33	mg/m ³
		27-28/03/2025	0.062	0.33	mg/m ³
		28-29/03/2025	0.051	0.33	mg/m ³
		29-30/03/2025	0.048	0.33	mg/m ³
		30-31/03/2025	0.035	0.33	mg/m ³
		31/03/2025-01/04/2025	0.040	0.33	mg/m ³

REMARK:

¹ Notification of The National Environmental Board Volume 24 B.E.2547 (2004) Standard for 24-hr Average.

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.

(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsopon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Request No. ATR6804003

Report No. 6804-0046 - 6804-0052

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดหนองแฟบ
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040046 - A68040052
TESTED DATE : 03/04/2025-21/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Zinc (Zn)	Filtration,ICP-OES Method	25-26/03/2025	< 0.0001	mg/m ³
		26-27/03/2025	< 0.0001	mg/m ³
		27-28/03/2025	< 0.0001	mg/m ³
		28-29/03/2025	< 0.0001	mg/m ³
		29-30/03/2025	< 0.0001	mg/m ³
		30-31/03/2025	0.0006	mg/m ³
		31/03/2025-01/04/2025	< 0.0001	mg/m ³

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsoon)

22/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Request No. ATR6804003

Report No. 6804-0053 - 6804-0059

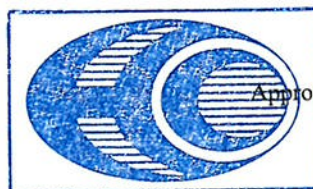
TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : วัดหนองแฟบ
RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040053 - A68040059
TESTED DATE : 03/04/2025-21/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Aluminium (Al)	Filtration, ICP-OES /NIOSH 7300	25-26/03/2025	< 0.0001	mg/m ³
		26-27/03/2025	< 0.0001	mg/m ³
		27-28/03/2025	< 0.0001	mg/m ³
		28-29/03/2025	< 0.0001	mg/m ³
		29-30/03/2025	< 0.0001	mg/m ³
		30-31/03/2025	0.0002	mg/m ³
		31/03/2025-01/04/2025	< 0.0001	mg/m ³

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
(Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsoon)

22/04/2025

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Request No. ATR6804003

Report No. 6804-0060 - 6804-0066

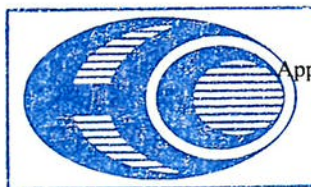
TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : วัดหนองแฟบ
 RECEIVED DATE : 03/04/2025 SAMPLE NO. : A68040060 - A68040066
 TESTED DATE : 03/04/2025-05/04/2025 REPORTED DATE : 22/04/2025

PARAMETER*	TEST METHOD	SAMPLING DATE	RESULT	UNIT
Hydrogen chloride (HCl)	Ion Chromatography Method (OSHA ID 174sg)	25-26/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		26-27/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		27-28/03/2025	0.046	mg/m ³
			0.031	ppm
		28-29/03/2025	0.021	mg/m ³
			0.014	ppm
		29-30/03/2025	< 0.015	mg/m ³
			< 0.010	ppm
		30-31/03/2025	0.029	mg/m ³
			0.019	ppm
		31/03/2025-01/04/2025	0.043	mg/m ³
			0.029	ppm

REMARK:

* Parameter Outside The Scope of The Registration of The Department of Industrial Works.
 (Sampling By Mr. Apiwat Klangpetch)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Miss Thanatporn Klinsoon)

22/04/2025

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COPY

Request No. LA68-R0415

Report No. R6804-0620 - R6804-0626

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : วัดหนองแฟบ
PARAMETER* : Nitrogen Dioxide
DETERMINATION METHOD : Chemiluminescence
INSTRUMENT : API Model T200 S/N 6757

SAMPLE NO. : 06072-06078
SAMPLING DATE : 25/03/2025-01/04/2025
RECEIVED DATE : 01/04/2025
REPORTED DATE : 21/04/2025

TIME / DATE	25-26/03/2025	26-27/03/2025	27-28/03/2025	28-29/03/2025	29-30/03/2025	30-31/03/2025	31/03/2025 - 01/04/2025	UNIT
10:00 - 11:00 ²	0.006	0.002	0.004	0.003	0.003	0.002	0.009	ppm
11:00 - 12:00	0.003	0.005	0.005	0.003	0.004	0.002	0.010	ppm
12:00 - 13:00	0.003	0.005	0.005	0.003	0.003	0.006	0.008	ppm
13:00 - 14:00	0.002	0.004	0.003	0.003	0.003	0.001	0.005	ppm
14:00 - 15:00	0.002	0.003	0.003	0.003	0.003	0.003	0.003	ppm
15:00 - 16:00	0.004	0.004	0.004	0.003	0.003	0.002	0.007	ppm
16:00 - 17:00	0.004	0.003	0.003	0.003	0.002	0.001	0.004	ppm
17:00 - 18:00	0.003	0.001	0.002	0.003	0.002	0.003	0.005	ppm
18:00 - 19:00	0.003	0.003	0.002	0.004	0.002	0.002	0.006	ppm
19:00 - 20:00	0.003	0.003	0.003	0.004	0.002	0.003	0.011	ppm
20:00 - 21:00	0.002	0.003	0.003	0.004	0.002	0.003	0.007	ppm
21:00 - 22:00	0.002	0.001	0.002	0.003	0.002	0.003	0.013	ppm
22:00 - 23:00	0.001	0.002	0.001	0.002	0.001	0.002	0.015	ppm
23:00 - 00:00	0.001	0.001	0.001	0.001	0.001	0.005	0.009	ppm
00:00 - 01:00	0.001	0.001	0.001	0.001	0.001	0.011	0.008	ppm
01:00 - 02:00	0.001	0.001	0.001	0.001	0.001	0.011	0.007	ppm
02:00 - 03:00	0.001	<0.001	<0.001	0.001	<0.001	0.010	0.008	ppm
03:00 - 04:00	0.001	0.001	<0.001	0.001	<0.001	0.007	0.007	ppm
04:00 - 05:00	0.001	0.001	0.001	0.001	0.001	0.006	0.006	ppm
05:00 - 06:00	0.001	0.001	0.001	0.001	0.001	0.002	0.008	ppm
06:00 - 07:00	0.001	0.001	0.001	0.001	0.001	0.008	0.011	ppm
07:00 - 08:00	0.002	0.002	0.003	0.002	0.001	0.009	0.010	ppm
08:00 - 09:00	0.003	0.004	0.004	0.003	0.003	0.008	0.008	ppm
09:00 - 10:00	0.002	0.004	0.003	0.003	0.002	0.009	0.009	ppm
Maximum 1 hr.	0.006	0.005	0.005	0.004	0.004	0.011	0.015	ppm
Average 24 hr.	0.002	0.002	0.002	0.002	0.002	0.005	0.008	ppm
Standard (1 hr.) ¹	0.17	0.17	0.17	0.17	0.17	0.17	0.17	ppm

REMARK : ¹ Notification of The National Environmental Board Volume 33 B.E. 2552 (2009)² Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MS. THANATPORN KLINSOPON)

21/04/2025

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Request No. LA68-R0415

Report No. R6804-0634 - R6804-0640

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : วัดมาบขลุ่ย
 PARAMETER* : Nitrogen Dioxide
 DETERMINATION METHOD : Chemiluminescence
 INSTRUMENT : API Model T200 S/N 7874

SAMPLE NO. : 06086-06092
 SAMPLING DATE : 25/03/2025-01/04/2025
 RECEIVED DATE : 01/04/2025
 REPORTED DATE : 21/04/2025

TIME / DATE	25-26/03/2025	26-27/03/2025	27-28/03/2025	28-29/03/2025	29-30/03/2025	30-31/03/2025	31/03/2025 - 01/04/2025	UNIT
10:00 - 11:00 ²	0.003	0.004	0.005	0.003	0.005	0.001	0.009	ppm
11:00 - 12:00	0.002	0.004	0.003	0.006	0.007	0.002	0.007	ppm
12:00 - 13:00	0.003	0.003	0.003	0.003	0.008	0.008	0.010	ppm
13:00 - 14:00	0.003	0.003	0.003	0.004	0.008	0.004	0.007	ppm
14:00 - 15:00	0.004	0.004	0.004	0.006	0.013	0.003	0.005	ppm
15:00 - 16:00	0.006	0.006	0.003	0.007	0.006	0.002	0.003	ppm
16:00 - 17:00	0.006	0.004	0.003	0.004	0.002	0.001	0.003	ppm
17:00 - 18:00	0.006	0.005	0.005	0.005	0.002	0.001	0.004	ppm
18:00 - 19:00	0.008	0.006	0.006	0.005	0.002	0.001	0.004	ppm
19:00 - 20:00	0.006	0.008	0.012	0.006	0.003	0.002	0.005	ppm
20:00 - 21:00	0.005	0.009	0.009	0.008	0.002	0.004	0.007	ppm
21:00 - 22:00	0.004	0.004	0.007	0.011	0.003	0.009	0.011	ppm
22:00 - 23:00	0.009	0.003	0.006	0.011	0.004	0.010	0.011	ppm
23:00 - 00:00	0.003	0.003	0.003	0.008	0.011	0.009	0.008	ppm
00:00 - 01:00	0.003	0.002	0.010	0.004	0.015	0.009	0.006	ppm
01:00 - 02:00	0.004	0.002	0.002	0.003	0.008	0.006	0.007	ppm
02:00 - 03:00	0.002	0.002	0.002	0.003	0.009	0.007	0.007	ppm
03:00 - 04:00	0.001	0.002	0.002	0.005	0.006	0.007	0.006	ppm
04:00 - 05:00	0.001	0.003	0.003	0.005	0.004	0.007	0.007	ppm
05:00 - 06:00	0.002	0.003	0.002	0.006	0.004	0.009	0.007	ppm
06:00 - 07:00	0.002	0.003	0.002	0.004	0.004	0.009	0.006	ppm
07:00 - 08:00	0.003	0.004	0.004	0.005	0.002	0.008	0.007	ppm
08:00 - 09:00	0.003	0.005	0.003	0.009	0.002	0.010	0.007	ppm
09:00 - 10:00	0.003	0.006	0.002	0.009	0.001	0.008	0.006	ppm
Maximum 1 hr.	0.009	0.009	0.012	0.011	0.015	0.010	0.011	ppm
Average 24 hr.	0.004	0.004	0.004	0.006	0.005	0.006	0.007	ppm
Standard (1 hr.) ¹	0.17	0.17	0.17	0.17	0.17	0.17	0.17	ppm

REMARK : ¹ Notification of The National Environmental Board Volume 33 B.E. 2552 (2009)² Start Time

* Parameter Outside The Scope of The Registration of The Department of Industrial Works
 (Measurement By Mr. Seksan Pluemwong)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By: 

(MS. THANATPORN KLINSOPON)

21/04/2025

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Wind Speed & Wind Direction

Request No. LA68-R0415

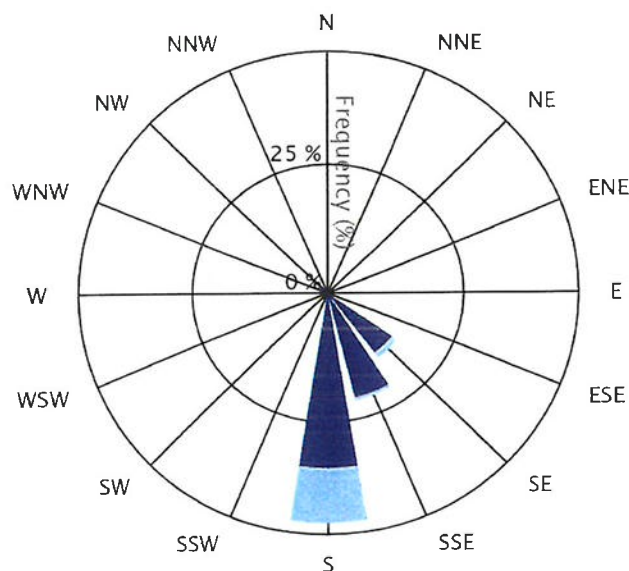
NS BlueScope (Thailand) Limited

Sample No. 06121

Sampling Source : วัดหนองแฟบ

Sampling Date : March 25 - April 1, 2025

Calm 14.3 %


 0.4-1.9
 2.0-3.9
 4.0-5.9
 6.0-7.9
 8.0-9.9
 > 9.9 (m/s)

WD/WS	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						Total
	0.4-1.9 m/s	2.0-3.9 m/s	4.0-5.9 m/s	6.0-7.9 m/s	8.0-9.9 m/s	> 9.9 m/s	
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	14.3	1.2	0.0	0.0	0.0	0.0	15.5
SSE	20.8	0.6	0.0	0.0	0.0	0.0	21.4
S	33.9	10.7	0.0	0.0	0.0	0.0	44.6
SSW	0.6	0.0	0.0	0.0	0.0	0.0	0.6
SW	0.6	0.0	0.0	0.0	0.0	0.0	0.6
WSW	0.6	0.0	0.0	0.0	0.0	0.0	0.6
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	1.8	0.0	0.0	0.0	0.0	0.0	1.8
NNW	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Total	73.2	12.5	0.0	0.0	0.0	0.0	

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Wind Speed & Wind Direction

Request No. LA68-R0415

NS BlueScope (Thailand) Limited

Sample No. 06121

Sampling Source : วัดหนองแฟบ

Sampling Date : March 25 - April 1, 2025

Time	March 25-26, 2025		March 26-27, 2025		March 27-28, 2025		March 28-29, 2025		March 29-30, 2025		March 30-31, 2025		March 31 - April 1, 2025	
	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction
10:00-11:00	1.8	SSE	2.2	S	2.2	S	1.8	S	1.3	SE	0.9	SSW	0.4	NW
11:00-12:00	1.8	S	2.2	S	2.2	S	1.3	S	1.8	SSE	0.4	S	0.9	NW
12:00-13:00	1.8	S	2.2	S	2.2	S	1.8	SSE	1.8	SSE	0.9	S	3.6	SE
13:00-14:00	1.8	S	2.2	S	2.2	S	1.8	SSE	1.8	SE	0.9	SSE	1.8	SSE
14:00-15:00	2.2	S	2.2	S	2.7	S	2.2	SSE	2.2	SE	1.3	SSE	1.3	S
15:00-16:00	1.8	SE	2.2	S	2.2	S	1.8	S	1.8	SSE	1.8	S	0.9	S
16:00-17:00	1.8	SE	1.8	S	2.2	S	1.8	SSE	1.8	SSE	0.9	S	0.0	-
17:00-18:00	1.8	SE	1.8	S	1.8	S	1.3	S	1.8	S	1.3	S	0.4	S
18:00-19:00	1.8	SSE	1.3	SSE	1.8	S	1.3	S	1.3	S	0.4	SW	0.4	WSW
19:00-20:00	1.8	SSE	1.8	SE	1.8	SE	0.9	S	0.9	S	0.4	S	0.0	-
20:00-21:00	1.8	SSE	1.8	SE	1.8	SE	0.4	S	0.9	S	0.9	S	0.0	-
21:00-22:00	1.3	SSE	1.3	S	1.8	SE	1.3	SE	1.3	SSE	0.4	SSE	0.0	-
22:00-23:00	1.8	SSE	1.3	SSE	1.8	SE	1.3	SE	1.3	SSE	0.9	S	0.0	-
23:00-00:00	1.3	SSE	1.3	S	1.3	SE	1.3	SE	1.3	SE	0.0	-	0.0	-
00:00-01:00	1.8	S	1.8	S	1.8	SE	1.3	S	1.3	SE	0.0	-	0.0	-
01:00-02:00	1.8	SSE	1.8	SSE	1.8	SSE	1.3	S	1.3	SE	0.0	-	0.0	-
02:00-03:00	1.8	S	1.8	S	1.8	SSE	1.3	S	1.8	SE	0.0	-	0.0	-
03:00-04:00	1.3	S	1.8	S	1.8	S	1.3	SSE	1.8	SE	0.0	-	0.0	-
04:00-05:00	1.8	S	1.8	S	2.2	S	1.3	SSE	1.8	SE	0.0	-	0.0	-
05:00-06:00	1.8	S	2.2	S	2.2	S	1.3	SSE	1.8	SE	0.4	S	0.0	-
06:00-07:00	1.8	S	1.3	S	1.8	S	1.3	SSE	1.8	SE	0.0	-	0.0	-
07:00-08:00	1.3	S	1.3	S	1.3	S	1.3	SSE	1.8	S	0.0	-	0.0	-
08:00-09:00	1.8	S	1.3	SSE	0.4	S	1.3	SSE	0.9	S	0.4	NW	0.0	-
09:00-10:00	2.2	S	1.8	SSE	1.3	S	1.3	SSE	0.4	S	0.4	NNW	0.0	-

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Wind Speed & Wind Direction

Request No. LA68-R0415

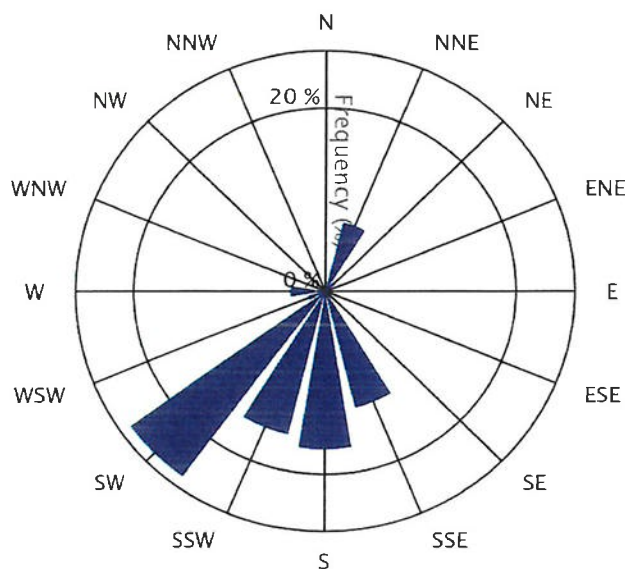
NS BlueScope (Thailand) Limited

Sample No. 06122

Sampling Source : วัดมาบขลุ่ด

Sampling Date : March 25 - April 1, 2025

Calm 13.7 %


 0.4-1.9
 2.0-3.9
 4.0-5.9
 6.0-7.9
 8.0-9.9
 > 9.9 (m/s)

WD/WS	Percentage of Occurrence of Wind Direct Grouped in Various Wind Speed						Total
	0.4-1.9 m/s	2.0-3.9 m/s	4.0-5.9 m/s	6.0-7.9 m/s	8.0-9.9 m/s	> 9.9 m/s	
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	7.7	0.0	0.0	0.0	0.0	0.0	7.7
NE	1.2	0.0	0.0	0.0	0.0	0.0	1.2
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	13.1	0.0	0.0	0.0	0.0	0.0	13.1
S	17.3	0.0	0.0	0.0	0.0	0.0	17.3
SSW	16.1	0.0	0.0	0.0	0.0	0.0	16.1
SW	25.0	0.0	0.0	0.0	0.0	0.0	25.0
WSW	1.8	0.0	0.0	0.0	0.0	0.0	1.8
W	3.6	0.0	0.0	0.0	0.0	0.0	3.6
WNW	0.6	0.0	0.0	0.0	0.0	0.0	0.6
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	86.3	0.0	0.0	0.0	0.0	0.0	

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Wind Speed & Wind Direction

Request No. LA68-R0415

NS BlueScope (Thailand) Limited

Sample No. 06122

Sampling Source : วัดมาบหุด

Sampling Date : March 25 - April 1, 2025

Time	March 25-26, 2025		March 26-27, 2025		March 27-28, 2025		March 28-29, 2025		March 29-30, 2025		March 30-31, 2025		March 31 - April 1, 2025	
	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction	Wind Speed (m/s)	Wind Direction
10:00-11:00	0.4	SW	0.4	SW	0.4	SW	0.4	SW	0.4	SW	0.4	SW	0.9	NNE
11:00-12:00	0.4	SW	0.4	SSW	0.9	SSW	0.9	SW	0.4	SSW	0.4	W	0.4	NE
12:00-13:00	0.4	SW	0.9	SSW	0.9	SSW	0.9	SW	0.9	SW	0.4	W	0.9	S
13:00-14:00	0.4	SSW	0.9	SSW	0.9	SW	0.9	SSW	0.9	SSW	0.4	SW	0.4	S
14:00-15:00	0.4	SW	0.4	SW	0.9	SW	0.9	SSW	0.9	SW	0.4	SW	0.4	SW
15:00-16:00	0.9	SSW	0.4	SW	0.9	SW	0.9	SW	0.9	SW	0.9	SW	0.4	W
16:00-17:00	0.4	SSW	0.4	SSW	0.9	SW	0.9	SW	0.9	SW	0.9	SW	0.4	W
17:00-18:00	0.4	S	0.4	SSW	0.9	SSW	0.4	SW	0.9	SW	0.9	SW	0.0	-
18:00-19:00	0.4	SSE	0.4	S	0.9	S	0.4	SW	0.4	SW	0.4	WSW	0.0	-
19:00-20:00	0.4	S	0.4	SSE	0.4	S	0.0	-	0.4	SW	0.4	W	0.0	-
20:00-21:00	0.4	SSE	0.4	S	0.4	S	0.0	-	0.4	SW	0.4	SW	0.0	-
21:00-22:00	0.4	SSE	0.4	S	0.9	SSE	0.0	-	0.4	SW	0.4	NNE	0.0	-
22:00-23:00	0.4	SSE	0.4	SSE	0.4	S	0.0	-	0.4	SSE	0.4	NNE	0.0	-
23:00-00:00	0.4	S	0.4	SSE	0.4	SSE	0.4	SSE	0.4	SSE	0.4	NNE	0.0	-
00:00-01:00	0.4	SSW	0.4	SSE	0.4	SSE	0.0	-	0.4	S	0.4	NNE	0.0	-
01:00-02:00	0.4	S	0.9	S	0.4	SSW	0.4	SW	0.4	S	0.0	-	0.0	-
02:00-03:00	0.4	S	0.4	S	0.4	S	0.4	SW	0.4	S	0.0	-	0.0	-
03:00-04:00	0.4	SSW	0.4	SSE	0.9	S	0.0	-	0.4	S	0.0	-	0.0	-
04:00-05:00	0.4	SSW	0.4	SSW	0.4	SSW	0.4	SSE	0.4	S	0.0	-	0.0	-
05:00-06:00	0.4	SW	0.4	S	0.4	SSW	0.4	SSE	0.4	SSW	0.4	NNE	0.0	-
06:00-07:00	0.4	S	0.4	SSE	0.4	SW	0.4	SSE	0.4	S	0.4	NNE	0.4	NE
07:00-08:00	0.4	SSW	0.4	S	0.4	SW	0.4	SSE	0.4	SSW	0.9	NNE	0.9	NNE
08:00-09:00	0.4	SSW	0.4	S	0.4	WSW	0.4	SSE	0.4	W	0.9	NNE	0.9	NNE
09:00-10:00	0.4	SSW	0.9	S	0.4	WSW	0.4	SSE	0.4	WNW	0.9	NNE	0.4	NNE

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ผลการตรวจวัดระดับเสียงโดยทั่วไป

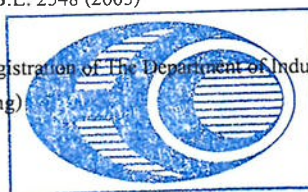
Request No. LA68-R0415

Report No. R6804-0648

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06100
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 25-26/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	25-26/03/2025 (L_{eq})	25-26/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	51.5	49.6	dB(A)
12:00 - 13:00	50.9	49.4	dB(A)
13:00 - 14:00	51.5	49.7	dB(A)
14:00 - 15:00	52.6	50.4	dB(A)
15:00 - 16:00	56.5	53.9	dB(A)
16:00 - 17:00	52.4	50.3	dB(A)
17:00 - 18:00	53.3	51.4	dB(A)
18:00 - 19:00	54.0	51.7	dB(A)
19:00 - 20:00	52.6	51.5	dB(A)
20:00 - 21:00	52.3	51.1	dB(A)
21:00 - 22:00	52.2	51.4	dB(A)
22:00 - 23:00	51.6	50.7	dB(A)
23:00 - 00:00	51.2	50.3	dB(A)
00:00 - 01:00	51.8	51.1	dB(A)
01:00 - 02:00	51.0	50.4	dB(A)
02:00 - 03:00	54.1	52.5	dB(A)
03:00 - 04:00	50.4	49.8	dB(A)
04:00 - 05:00	51.2	50.2	dB(A)
05:00 - 06:00	52.4	50.8	dB(A)
06:00 - 07:00	52.9	50.9	dB(A)
07:00 - 08:00	54.2	50.9	dB(A)
08:00 - 09:00	55.4	52.1	dB(A)
09:00 - 10:00	63.2	58.0	dB(A)
10:00 - 11:00	60.8	54.3	dB(A)
L_{eq} 24 hr.	55.0	-	dB(A)
L_{dn}	59.3	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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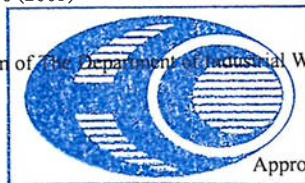
Request No. LA68-R0415

Report No. R6804-0649

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakongsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06101
DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 26-27/03/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	26-27/03/2025 (L_{eq})	26-27/03/2025 (L_{90})	UNIT
11:00 - 12:00 ³	61.8	55.2	dB(A)
12:00 - 13:00	53.8	51.6	dB(A)
13:00 - 14:00	52.8	50.4	dB(A)
14:00 - 15:00	61.2	52.5	dB(A)
15:00 - 16:00	54.1	50.1	dB(A)
16:00 - 17:00	55.3	52.2	dB(A)
17:00 - 18:00	56.9	54.4	dB(A)
18:00 - 19:00	56.6	54.4	dB(A)
19:00 - 20:00	57.4	53.4	dB(A)
20:00 - 21:00	56.5	54.6	dB(A)
21:00 - 22:00	54.3	52.8	dB(A)
22:00 - 23:00	53.3	51.6	dB(A)
23:00 - 00:00	52.3	51.5	dB(A)
00:00 - 01:00	52.0	51.3	dB(A)
01:00 - 02:00	51.6	50.6	dB(A)
02:00 - 03:00	52.8	50.0	dB(A)
03:00 - 04:00	51.5	50.3	dB(A)
04:00 - 05:00	51.1	50.1	dB(A)
05:00 - 06:00	53.5	51.0	dB(A)
06:00 - 07:00	55.2	51.6	dB(A)
07:00 - 08:00	56.3	52.8	dB(A)
08:00 - 09:00	52.7	51.2	dB(A)
09:00 - 10:00	53.0	50.7	dB(A)
10:00 - 11:00	54.1	51.5	dB(A)
L_{eq} 24 hr.	55.7	-	dB(A)
L_{dn}	60.0	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ¹ Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)² Notification of Ministry of the Industry B.E. 2548 (2005)³ Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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Request No. LA68-R0415

Report No. R6804-0650

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06102
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 27-28/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	27-28/03/2025 (L_{eq})	27-28/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	51.7	49.9	dB(A)
12:00 - 13:00	50.9	49.3	dB(A)
13:00 - 14:00	52.0	49.4	dB(A)
14:00 - 15:00	51.3	49.0	dB(A)
15:00 - 16:00	53.3	49.9	dB(A)
16:00 - 17:00	53.6	49.7	dB(A)
17:00 - 18:00	53.9	51.1	dB(A)
18:00 - 19:00	53.8	52.3	dB(A)
19:00 - 20:00	53.4	51.9	dB(A)
20:00 - 21:00	52.8	51.3	dB(A)
21:00 - 22:00	52.6	51.2	dB(A)
22:00 - 23:00	52.6	51.4	dB(A)
23:00 - 00:00	52.3	51.1	dB(A)
00:00 - 01:00	50.8	50.1	dB(A)
01:00 - 02:00	51.7	49.9	dB(A)
02:00 - 03:00	50.9	50.2	dB(A)
03:00 - 04:00	50.8	49.8	dB(A)
04:00 - 05:00	51.9	49.8	dB(A)
05:00 - 06:00	52.2	50.8	dB(A)
06:00 - 07:00	53.3	51.0	dB(A)
07:00 - 08:00	52.0	49.9	dB(A)
08:00 - 09:00	51.1	48.7	dB(A)
09:00 - 10:00	52.7	50.6	dB(A)
10:00 - 11:00	51.5	49.0	dB(A)
L_{eq} 24 hr.	52.3	-	dB(A)
L_{dn}	58.4	-	dB(A)
Standard	70 ^{/1} , 70 ^{/2}	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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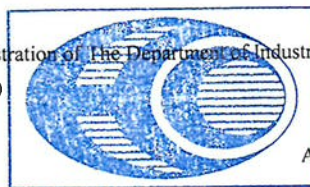
Request No. LA68-R0415

Report No. R6804-0651

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06103
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 28-29/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	28-29/03/2025 (L_{eq})	28-29/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	51.4	49.2	dB(A)
12:00 - 13:00	50.9	48.6	dB(A)
13:00 - 14:00	50.7	48.7	dB(A)
14:00 - 15:00	52.9	49.3	dB(A)
15:00 - 16:00	50.9	48.4	dB(A)
16:00 - 17:00	53.1	49.9	dB(A)
17:00 - 18:00	54.3	51.8	dB(A)
18:00 - 19:00	52.6	51.1	dB(A)
19:00 - 20:00	52.4	51.2	dB(A)
20:00 - 21:00	52.8	51.8	dB(A)
21:00 - 22:00	53.5	52.2	dB(A)
22:00 - 23:00	51.8	51.0	dB(A)
23:00 - 00:00	51.0	50.5	dB(A)
00:00 - 01:00	51.1	50.3	dB(A)
01:00 - 02:00	50.8	50.1	dB(A)
02:00 - 03:00	53.0	50.9	dB(A)
03:00 - 04:00	51.4	50.8	dB(A)
04:00 - 05:00	51.4	50.6	dB(A)
05:00 - 06:00	52.7	51.1	dB(A)
06:00 - 07:00	53.7	51.3	dB(A)
07:00 - 08:00	53.0	51.2	dB(A)
08:00 - 09:00	52.4	50.6	dB(A)
09:00 - 10:00	52.7	50.0	dB(A)
10:00 - 11:00	51.2	49.4	dB(A)
L_{eq} 24 hr.	52.3	-	dB(A)
L_{dn}	58.5	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By. 

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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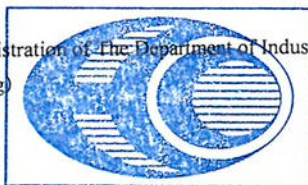
Request No. LA68-R0415

Report No. R6804-0652

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06104
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 29-30/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	29-30/03/2025 (L_{eq})	29-30/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	50.9	49.2	dB(A)
12:00 - 13:00	50.7	48.9	dB(A)
13:00 - 14:00	53.9	50.2	dB(A)
14:00 - 15:00	53.8	52.6	dB(A)
15:00 - 16:00	50.5	48.7	dB(A)
16:00 - 17:00	51.3	48.6	dB(A)
17:00 - 18:00	51.1	48.8	dB(A)
18:00 - 19:00	51.8	50.1	dB(A)
19:00 - 20:00	50.5	49.6	dB(A)
20:00 - 21:00	50.7	49.9	dB(A)
21:00 - 22:00	50.9	50.2	dB(A)
22:00 - 23:00	56.2	51.2	dB(A)
23:00 - 00:00	52.0	51.0	dB(A)
00:00 - 01:00	51.3	50.5	dB(A)
01:00 - 02:00	51.3	50.5	dB(A)
02:00 - 03:00	51.2	50.5	dB(A)
03:00 - 04:00	52.2	50.6	dB(A)
04:00 - 05:00	52.6	51.1	dB(A)
05:00 - 06:00	52.8	51.0	dB(A)
06:00 - 07:00	52.6	50.4	dB(A)
07:00 - 08:00	52.6	50.9	dB(A)
08:00 - 09:00	54.0	50.0	dB(A)
09:00 - 10:00	50.4	48.8	dB(A)
10:00 - 11:00	51.8	49.6	dB(A)
L_{eq} 24 hr.	52.2	-	dB(A)
L_{dn}	59.0	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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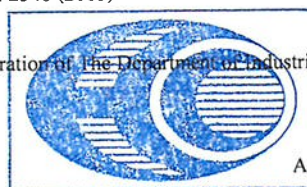
Request No. LA68-R0415

Report No. R6804-0653

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06105
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 30-31/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	30-31/03/2025 (L_{eq})	30-31/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	55.1	53.0	dB(A)
12:00 - 13:00	51.7	49.8	dB(A)
13:00 - 14:00	50.4	49.1	dB(A)
14:00 - 15:00	55.1	51.4	dB(A)
15:00 - 16:00	49.5	48.0	dB(A)
16:00 - 17:00	52.5	48.8	dB(A)
17:00 - 18:00	51.3	49.1	dB(A)
18:00 - 19:00	51.6	50.3	dB(A)
19:00 - 20:00	51.2	50.5	dB(A)
20:00 - 21:00	51.8	51.0	dB(A)
21:00 - 22:00	52.1	51.4	dB(A)
22:00 - 23:00	53.4	52.8	dB(A)
23:00 - 00:00	53.5	52.8	dB(A)
00:00 - 01:00	53.1	52.6	dB(A)
01:00 - 02:00	53.1	52.6	dB(A)
02:00 - 03:00	52.7	52.2	dB(A)
03:00 - 04:00	52.3	51.8	dB(A)
04:00 - 05:00	53.2	52.2	dB(A)
05:00 - 06:00	54.8	53.4	dB(A)
06:00 - 07:00	55.6	54.1	dB(A)
07:00 - 08:00	56.2	54.8	dB(A)
08:00 - 09:00	55.9	54.3	dB(A)
09:00 - 10:00	55.8	54.3	dB(A)
10:00 - 11:00	57.4	54.5	dB(A)
L_{eq} 24 hr.	53.8	-	dB(A)
L_{dn}	60.1	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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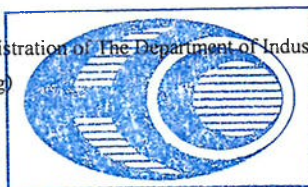
Request No. LA68-R0415

Report No. R6804-0654

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้ของที่ตั้งโครงการ (N1)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06106
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 31/03/2025-01/04/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G300957 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	31/03/2025-01/04/2025 (L_{eq})	31/03/2025-01/04/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	57.0	54.2	dB(A)
12:00 - 13:00	60.9	57.5	dB(A)
13:00 - 14:00	55.0	53.1	dB(A)
14:00 - 15:00	53.5	51.1	dB(A)
15:00 - 16:00	53.9	51.0	dB(A)
16:00 - 17:00	57.3	52.3	dB(A)
17:00 - 18:00	57.7	51.7	dB(A)
18:00 - 19:00	53.5	51.5	dB(A)
19:00 - 20:00	51.4	50.4	dB(A)
20:00 - 21:00	51.5	50.9	dB(A)
21:00 - 22:00	52.8	51.3	dB(A)
22:00 - 23:00	57.0	52.3	dB(A)
23:00 - 00:00	51.9	51.2	dB(A)
00:00 - 01:00	51.9	51.1	dB(A)
01:00 - 02:00	51.9	51.1	dB(A)
02:00 - 03:00	52.0	51.1	dB(A)
03:00 - 04:00	53.8	51.7	dB(A)
04:00 - 05:00	52.8	51.4	dB(A)
05:00 - 06:00	53.3	51.2	dB(A)
06:00 - 07:00	52.9	50.7	dB(A)
07:00 - 08:00	53.4	51.5	dB(A)
08:00 - 09:00	53.9	49.8	dB(A)
09:00 - 10:00	51.2	49.6	dB(A)
10:00 - 11:00	52.9	50.6	dB(A)
L_{eq} 24 hr.	54.7	-	dB(A)
L_{dn}	60.1	-	dB(A)
Standard	$70^{/1}, 70^{/2}$	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....
(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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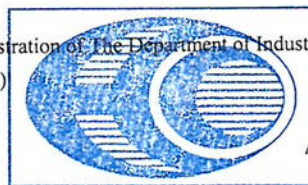
Request No. LA68-R0415

Report No. R6804-0655

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06107
DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 25-26/03/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	25-26/03/2025 (L_{eq})	25-26/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	56.8	54.1	dB(A)
12:00 - 13:00	54.7	53.5	dB(A)
13:00 - 14:00	56.3	54.0	dB(A)
14:00 - 15:00	56.5	54.0	dB(A)
15:00 - 16:00	57.1	54.3	dB(A)
16:00 - 17:00	55.6	54.0	dB(A)
17:00 - 18:00	55.9	54.3	dB(A)
18:00 - 19:00	69.8	67.3	dB(A)
19:00 - 20:00	55.8	54.3	dB(A)
20:00 - 21:00	56.0	54.4	dB(A)
21:00 - 22:00	66.6	61.6	dB(A)
22:00 - 23:00	56.1	54.5	dB(A)
23:00 - 00:00	66.7	63.7	dB(A)
00:00 - 01:00	56.4	55.0	dB(A)
01:00 - 02:00	56.2	54.6	dB(A)
02:00 - 03:00	56.1	54.3	dB(A)
03:00 - 04:00	55.5	54.1	dB(A)
04:00 - 05:00	55.8	54.3	dB(A)
05:00 - 06:00	69.5	67.5	dB(A)
06:00 - 07:00	64.9	54.5	dB(A)
07:00 - 08:00	55.3	54.1	dB(A)
08:00 - 09:00	56.1	54.3	dB(A)
09:00 - 10:00	57.1	54.6	dB(A)
10:00 - 11:00	56.4	54.3	dB(A)
L_{eq} 24 hr.	62.1	-	dB(A)
L_{dn}	69.4	-	dB(A)
Standard	70 ^{/1} , 70 ^{/2}	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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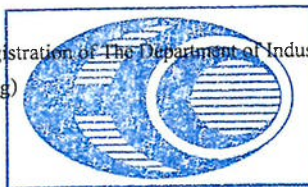
Request No. LA68-R0415

Report No. R6804-0656

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06108
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 26-27/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	26-27/03/2025 (L_{eq})	26-27/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	55.4	54.2	dB(A)
12:00 - 13:00	55.2	54.0	dB(A)
13:00 - 14:00	59.8	55.1	dB(A)
14:00 - 15:00	55.9	54.0	dB(A)
15:00 - 16:00	56.2	54.1	dB(A)
16:00 - 17:00	56.3	54.5	dB(A)
17:00 - 18:00	55.5	54.3	dB(A)
18:00 - 19:00	60.8	58.5	dB(A)
19:00 - 20:00	55.8	54.5	dB(A)
20:00 - 21:00	61.8	59.9	dB(A)
21:00 - 22:00	60.2	57.9	dB(A)
22:00 - 23:00	59.7	57.3	dB(A)
23:00 - 00:00	56.2	54.7	dB(A)
00:00 - 01:00	56.0	54.6	dB(A)
01:00 - 02:00	61.3	59.8	dB(A)
02:00 - 03:00	60.3	57.9	dB(A)
03:00 - 04:00	56.0	54.4	dB(A)
04:00 - 05:00	55.5	54.3	dB(A)
05:00 - 06:00	63.0	60.9	dB(A)
06:00 - 07:00	58.9	54.7	dB(A)
07:00 - 08:00	55.9	54.5	dB(A)
08:00 - 09:00	56.4	54.6	dB(A)
09:00 - 10:00	56.3	54.2	dB(A)
10:00 - 11:00	56.9	54.3	dB(A)
L_{eq} 24 hr.	58.5	-	dB(A)
L_{dn}	65.5	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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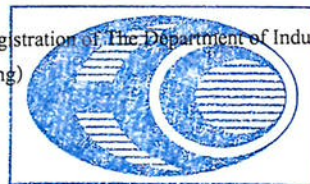
Request No. LA68-R0415

Report No. R6804-0657

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06109
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 27-28/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	27-28/03/2025 (L_{eq})	27-28/03/2025 (L_{90})	UNIT
11:00 - 12:00 ³	55.9	54.3	dB(A)
12:00 - 13:00	55.4	54.2	dB(A)
13:00 - 14:00	56.0	54.2	dB(A)
14:00 - 15:00	56.3	54.1	dB(A)
15:00 - 16:00	56.0	54.2	dB(A)
16:00 - 17:00	55.7	54.0	dB(A)
17:00 - 18:00	55.5	54.1	dB(A)
18:00 - 19:00	66.9	65.3	dB(A)
19:00 - 20:00	55.7	54.5	dB(A)
20:00 - 21:00	65.0	58.8	dB(A)
21:00 - 22:00	65.6	58.5	dB(A)
22:00 - 23:00	58.5	54.4	dB(A)
23:00 - 00:00	55.6	54.4	dB(A)
00:00 - 01:00	66.3	59.8	dB(A)
01:00 - 02:00	63.7	58.6	dB(A)
02:00 - 03:00	56.3	54.7	dB(A)
03:00 - 04:00	55.9	54.6	dB(A)
04:00 - 05:00	55.9	54.5	dB(A)
05:00 - 06:00	68.7	65.0	dB(A)
06:00 - 07:00	61.0	54.2	dB(A)
07:00 - 08:00	55.1	53.9	dB(A)
08:00 - 09:00	55.5	53.9	dB(A)
09:00 - 10:00	55.6	53.8	dB(A)
10:00 - 11:00	56.4	53.8	dB(A)
L_{eq} 24 hr.	61.5	-	dB(A)
L_{dn}	69.0	-	dB(A)
Standard	70 ¹ , 70 ²	-	dB(A)

REMARK : ¹ Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)² Notification of Ministry of the Industry B.E. 2548 (2005)³ Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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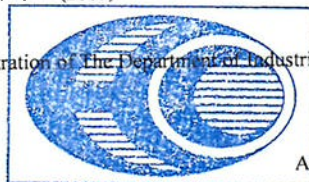
Request No. LA68-R0415

Report No. R6804-0658

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06110
DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 28-29/03/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	28-29/03/2025 (L_{eq})	28-29/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	56.7	54.0	dB(A)
12:00 - 13:00	55.2	54.0	dB(A)
13:00 - 14:00	57.0	54.2	dB(A)
14:00 - 15:00	56.0	54.3	dB(A)
15:00 - 16:00	56.5	54.4	dB(A)
16:00 - 17:00	56.1	54.1	dB(A)
17:00 - 18:00	55.7	54.2	dB(A)
18:00 - 19:00	68.7	66.2	dB(A)
19:00 - 20:00	56.0	54.2	dB(A)
20:00 - 21:00	56.5	54.6	dB(A)
21:00 - 22:00	56.3	54.7	dB(A)
22:00 - 23:00	64.2	59.6	dB(A)
23:00 - 00:00	58.8	54.5	dB(A)
00:00 - 01:00	56.0	54.4	dB(A)
01:00 - 02:00	55.6	54.2	dB(A)
02:00 - 03:00	55.8	54.4	dB(A)
03:00 - 04:00	55.8	54.5	dB(A)
04:00 - 05:00	56.3	54.8	dB(A)
05:00 - 06:00	68.2	64.0	dB(A)
06:00 - 07:00	64.6	54.2	dB(A)
07:00 - 08:00	55.4	54.1	dB(A)
08:00 - 09:00	56.0	54.0	dB(A)
09:00 - 10:00	56.3	53.8	dB(A)
10:00 - 11:00	56.3	53.9	dB(A)
L_{eq} 24 hr.	60.7	-	dB(A)
L_{dn}	68.3	-	dB(A)
Standard	70 ^{1/1} , 70 ^{1/2}	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

Approved By.

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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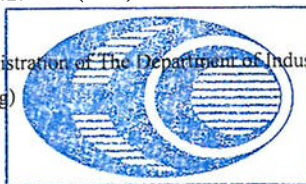
Request No. LA68-R0415

Report No. R6804-0659

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06111
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 29-30/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	29-30/03/2025 (L_{eq})	29-30/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	55.3	53.7	dB(A)
12:00 - 13:00	55.3	53.9	dB(A)
13:00 - 14:00	56.3	54.0	dB(A)
14:00 - 15:00	56.4	53.8	dB(A)
15:00 - 16:00	55.4	53.8	dB(A)
16:00 - 17:00	55.3	54.0	dB(A)
17:00 - 18:00	55.5	54.1	dB(A)
18:00 - 19:00	62.8	60.8	dB(A)
19:00 - 20:00	55.4	53.9	dB(A)
20:00 - 21:00	56.2	54.0	dB(A)
21:00 - 22:00	66.0	55.8	dB(A)
22:00 - 23:00	56.2	54.4	dB(A)
23:00 - 00:00	55.6	54.3	dB(A)
00:00 - 01:00	55.9	54.6	dB(A)
01:00 - 02:00	55.9	54.5	dB(A)
02:00 - 03:00	55.8	54.3	dB(A)
03:00 - 04:00	55.7	54.2	dB(A)
04:00 - 05:00	55.8	54.3	dB(A)
05:00 - 06:00	62.6	59.5	dB(A)
06:00 - 07:00	55.2	53.8	dB(A)
07:00 - 08:00	54.5	53.4	dB(A)
08:00 - 09:00	56.9	55.1	dB(A)
09:00 - 10:00	55.7	53.3	dB(A)
10:00 - 11:00	55.4	53.5	dB(A)
L_{eq} 24 hr.	58.1	-	dB(A)
L_{dn}	63.9	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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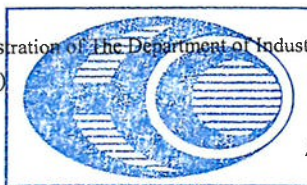
Request No. LA68-R0415

Report No. R6804-0660

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06112
DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 30-31/03/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	30-31/03/2025 (L_{eq})	30-31/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	57.4	55.5	dB(A)
12:00 - 13:00	55.0	53.6	dB(A)
13:00 - 14:00	56.3	53.9	dB(A)
14:00 - 15:00	55.5	53.6	dB(A)
15:00 - 16:00	59.6	53.6	dB(A)
16:00 - 17:00	55.5	53.7	dB(A)
17:00 - 18:00	55.4	53.5	dB(A)
18:00 - 19:00	63.9	61.2	dB(A)
19:00 - 20:00	56.7	53.8	dB(A)
20:00 - 21:00	55.6	53.9	dB(A)
21:00 - 22:00	55.4	53.8	dB(A)
22:00 - 23:00	64.4	60.8	dB(A)
23:00 - 00:00	57.7	54.1	dB(A)
00:00 - 01:00	55.9	53.7	dB(A)
01:00 - 02:00	54.9	53.4	dB(A)
02:00 - 03:00	54.7	53.5	dB(A)
03:00 - 04:00	54.9	53.4	dB(A)
04:00 - 05:00	55.3	53.5	dB(A)
05:00 - 06:00	65.6	57.7	dB(A)
06:00 - 07:00	66.2	63.8	dB(A)
07:00 - 08:00	54.5	53.3	dB(A)
08:00 - 09:00	55.3	53.3	dB(A)
09:00 - 10:00	55.5	53.4	dB(A)
10:00 - 11:00	56.2	53.6	dB(A)
L_{eq} 24 hr.	59.4	-	dB(A)
L_{dn}	67.5	-	dB(A)
Standard	70 ^{/1} , 70 ^{/2}	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

21/04/2025

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Request No. LA68-R0415

Report No. R6804-0661

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือของที่ตั้งโครงการ (N2)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06113
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 31/03/2025-01/04/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301660 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	31/03/2025-01/04/2025 (L_{eq})	31/03/2025-01/04/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	66.0	64.5	dB(A)
12:00 - 13:00	63.2	59.5	dB(A)
13:00 - 14:00	57.0	54.5	dB(A)
14:00 - 15:00	57.1	54.5	dB(A)
15:00 - 16:00	56.8	54.6	dB(A)
16:00 - 17:00	56.5	54.4	dB(A)
17:00 - 18:00	55.0	54.1	dB(A)
18:00 - 19:00	63.2	58.4	dB(A)
19:00 - 20:00	55.7	54.3	dB(A)
20:00 - 21:00	55.6	54.4	dB(A)
21:00 - 22:00	55.8	54.6	dB(A)
22:00 - 23:00	56.1	54.6	dB(A)
23:00 - 00:00	56.1	54.4	dB(A)
00:00 - 01:00	65.5	63.6	dB(A)
01:00 - 02:00	55.7	54.3	dB(A)
02:00 - 03:00	56.0	54.3	dB(A)
03:00 - 04:00	55.6	54.0	dB(A)
04:00 - 05:00	56.0	54.2	dB(A)
05:00 - 06:00	64.4	60.8	dB(A)
06:00 - 07:00	55.8	54.4	dB(A)
07:00 - 08:00	55.3	53.9	dB(A)
08:00 - 09:00	55.6	54.1	dB(A)
09:00 - 10:00	55.8	53.9	dB(A)
10:00 - 11:00	56.9	54.6	dB(A)
L_{eq} 24 hr.	59.6	-	dB(A)
L_{dn}	66.3	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

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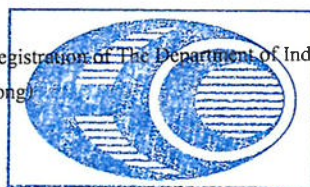
Request No. LA68-R0415

Report No. R6804-0662

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06114
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 25-26/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	25-26/03/2025 (L_{eq})	25-26/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	64.5	63.9	dB(A)
12:00 - 13:00	64.2	63.7	dB(A)
13:00 - 14:00	64.6	63.7	dB(A)
14:00 - 15:00	64.8	64.1	dB(A)
15:00 - 16:00	64.9	64.2	dB(A)
16:00 - 17:00	64.4	63.9	dB(A)
17:00 - 18:00	64.6	63.9	dB(A)
18:00 - 19:00	64.9	64.3	dB(A)
19:00 - 20:00	64.9	64.4	dB(A)
20:00 - 21:00	65.0	64.3	dB(A)
21:00 - 22:00	65.6	64.6	dB(A)
22:00 - 23:00	65.7	64.9	dB(A)
23:00 - 00:00	65.4	64.9	dB(A)
00:00 - 01:00	65.4	64.9	dB(A)
01:00 - 02:00	65.4	64.9	dB(A)
02:00 - 03:00	65.5	64.9	dB(A)
03:00 - 04:00	65.5	65.0	dB(A)
04:00 - 05:00	65.6	65.0	dB(A)
05:00 - 06:00	65.5	65.0	dB(A)
06:00 - 07:00	65.5	65.0	dB(A)
07:00 - 08:00	65.4	64.9	dB(A)
08:00 - 09:00	65.3	64.7	dB(A)
09:00 - 10:00	65.4	64.4	dB(A)
10:00 - 11:00	64.8	64.1	dB(A)
L_{eq} 24 hr.	65.1	-	dB(A)
L_{dn}	71.8	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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Request No. LA68-R0415

Report No. R6804-0663

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06115
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 26-27/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	26-27/03/2025 (L_{eq})	26-27/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	64.5	64.0	dB(A)
12:00 - 13:00	64.5	64.0	dB(A)
13:00 - 14:00	64.7	64.1	dB(A)
14:00 - 15:00	64.9	64.2	dB(A)
15:00 - 16:00	65.0	64.2	dB(A)
16:00 - 17:00	65.0	64.4	dB(A)
17:00 - 18:00	64.7	64.1	dB(A)
18:00 - 19:00	65.2	64.5	dB(A)
19:00 - 20:00	64.9	64.4	dB(A)
20:00 - 21:00	65.0	64.4	dB(A)
21:00 - 22:00	65.1	64.4	dB(A)
22:00 - 23:00	65.3	64.5	dB(A)
23:00 - 00:00	65.1	64.5	dB(A)
00:00 - 01:00	65.0	64.4	dB(A)
01:00 - 02:00	64.9	64.5	dB(A)
02:00 - 03:00	64.9	64.5	dB(A)
03:00 - 04:00	64.9	64.3	dB(A)
04:00 - 05:00	64.7	64.2	dB(A)
05:00 - 06:00	64.8	64.3	dB(A)
06:00 - 07:00	64.9	64.3	dB(A)
07:00 - 08:00	64.9	64.4	dB(A)
08:00 - 09:00	65.3	64.5	dB(A)
09:00 - 10:00	65.6	64.7	dB(A)
10:00 - 11:00	65.4	64.3	dB(A)
L_{eq} 24 hr.	65.0	-	dB(A)
L_{dn}	71.4	-	dB(A)
Standard	70 ^{1/1} , 70 ^{1/2}	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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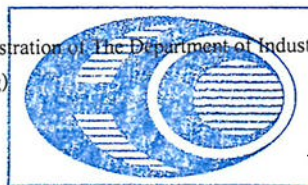
Request No. LA68-R0415

Report No. R6804-0664

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06116
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 27-28/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	27-28/03/2025 (L_{eq})	27-28/03/2025 (L_{90})	UNIT
11:00 - 12:00 ¹³	64.9	64.1	dB(A)
12:00 - 13:00	64.7	64.2	dB(A)
13:00 - 14:00	65.3	64.5	dB(A)
14:00 - 15:00	65.3	64.3	dB(A)
15:00 - 16:00	65.1	64.2	dB(A)
16:00 - 17:00	64.6	64.0	dB(A)
17:00 - 18:00	65.0	64.2	dB(A)
18:00 - 19:00	65.0	64.4	dB(A)
19:00 - 20:00	64.8	64.3	dB(A)
20:00 - 21:00	64.8	64.3	dB(A)
21:00 - 22:00	65.1	64.4	dB(A)
22:00 - 23:00	65.0	64.5	dB(A)
23:00 - 00:00	64.9	64.5	dB(A)
00:00 - 01:00	64.9	64.4	dB(A)
01:00 - 02:00	65.0	64.5	dB(A)
02:00 - 03:00	65.2	64.5	dB(A)
03:00 - 04:00	64.9	64.4	dB(A)
04:00 - 05:00	64.8	64.4	dB(A)
05:00 - 06:00	65.3	64.6	dB(A)
06:00 - 07:00	65.0	64.5	dB(A)
07:00 - 08:00	64.8	64.4	dB(A)
08:00 - 09:00	64.5	64.0	dB(A)
09:00 - 10:00	64.5	63.9	dB(A)
10:00 - 11:00	64.7	63.9	dB(A)
L_{eq} 24 hr.	64.9	-	dB(A)
L_{dn}	71.4	-	dB(A)
Standard	$70^{11}, 70^{12}$	-	dB(A)

REMARK : ¹¹ Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)¹² Notification of Ministry of the Industry B.E. 2548 (2005)¹³ Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....
(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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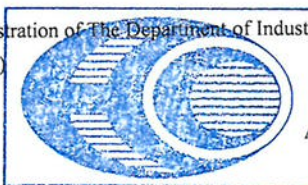
Request No. LA68-R0415

Report No. R6804-0665

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06117
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 28-29/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	28-29/03/2025 (L_{eq})	28-29/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	64.9	63.9	dB(A)
12:00 - 13:00	64.4	63.9	dB(A)
13:00 - 14:00	65.1	64.0	dB(A)
14:00 - 15:00	65.0	64.2	dB(A)
15:00 - 16:00	64.7	64.0	dB(A)
16:00 - 17:00	64.8	64.1	dB(A)
17:00 - 18:00	65.1	64.2	dB(A)
18:00 - 19:00	65.1	64.7	dB(A)
19:00 - 20:00	65.0	64.6	dB(A)
20:00 - 21:00	65.2	64.6	dB(A)
21:00 - 22:00	65.2	64.6	dB(A)
22:00 - 23:00	65.2	64.6	dB(A)
23:00 - 00:00	65.2	64.6	dB(A)
00:00 - 01:00	65.4	64.9	dB(A)
01:00 - 02:00	65.3	64.8	dB(A)
02:00 - 03:00	65.3	64.6	dB(A)
03:00 - 04:00	65.2	64.6	dB(A)
04:00 - 05:00	65.2	64.6	dB(A)
05:00 - 06:00	65.1	64.7	dB(A)
06:00 - 07:00	65.1	64.6	dB(A)
07:00 - 08:00	65.0	64.6	dB(A)
08:00 - 09:00	65.0	64.4	dB(A)
09:00 - 10:00	64.9	64.1	dB(A)
10:00 - 11:00	64.9	63.9	dB(A)
L_{eq} 24 hr.	65.1	-	dB(A)
L_{dn}	71.6	-	dB(A)
Standard	70 ^{/1} , 70 ^{/2}	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)Approved By.....
(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
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Request No. LA68-R0415

Report No. R6804-0666

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06118
DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 29-30/03/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	29-30/03/2025 (L_{eq})	29-30/03/2025 (L_{90})	UNIT
11:00 - 12:00 ³	65.0	64.3	dB(A)
12:00 - 13:00	65.6	64.8	dB(A)
13:00 - 14:00	65.6	64.9	dB(A)
14:00 - 15:00	66.1	65.0	dB(A)
15:00 - 16:00	65.2	64.5	dB(A)
16:00 - 17:00	64.5	63.8	dB(A)
17:00 - 18:00	66.4	65.1	dB(A)
18:00 - 19:00	64.8	64.3	dB(A)
19:00 - 20:00	64.8	64.3	dB(A)
20:00 - 21:00	64.9	64.4	dB(A)
21:00 - 22:00	65.0	64.4	dB(A)
22:00 - 23:00	65.1	64.5	dB(A)
23:00 - 00:00	65.0	64.5	dB(A)
00:00 - 01:00	64.9	64.4	dB(A)
01:00 - 02:00	65.1	64.6	dB(A)
02:00 - 03:00	65.1	64.5	dB(A)
03:00 - 04:00	65.5	64.8	dB(A)
04:00 - 05:00	65.5	64.9	dB(A)
05:00 - 06:00	65.2	64.7	dB(A)
06:00 - 07:00	65.1	64.5	dB(A)
07:00 - 08:00	65.1	64.7	dB(A)
08:00 - 09:00	64.7	64.3	dB(A)
09:00 - 10:00	65.2	64.2	dB(A)
10:00 - 11:00	65.2	64.4	dB(A)
L_{eq} 24 hr.	65.2	-	dB(A)
L_{dn}	71.6	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ¹ Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)² Notification of Ministry of the Industry B.E. 2548 (2005)³ Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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Request No. LA68-R0415

Report No. R6804-0667

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06119
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 30-31/03/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	30-31/03/2025 (L_{eq})	30-31/03/2025 (L_{90})	UNIT
11:00 - 12:00 ^{/3}	65.4	64.8	dB(A)
12:00 - 13:00	64.7	64.1	dB(A)
13:00 - 14:00	64.8	64.0	dB(A)
14:00 - 15:00	64.9	64.2	dB(A)
15:00 - 16:00	65.0	64.1	dB(A)
16:00 - 17:00	64.6	64.0	dB(A)
17:00 - 18:00	64.8	64.2	dB(A)
18:00 - 19:00	65.0	64.4	dB(A)
19:00 - 20:00	65.0	64.6	dB(A)
20:00 - 21:00	65.5	65.0	dB(A)
21:00 - 22:00	65.2	64.7	dB(A)
22:00 - 23:00	65.2	64.5	dB(A)
23:00 - 00:00	65.0	64.5	dB(A)
00:00 - 01:00	64.9	64.5	dB(A)
01:00 - 02:00	65.3	64.7	dB(A)
02:00 - 03:00	65.2	64.7	dB(A)
03:00 - 04:00	65.2	64.7	dB(A)
04:00 - 05:00	65.1	64.6	dB(A)
05:00 - 06:00	65.1	64.5	dB(A)
06:00 - 07:00	64.9	64.4	dB(A)
07:00 - 08:00	64.8	64.5	dB(A)
08:00 - 09:00	64.9	64.4	dB(A)
09:00 - 10:00	65.0	64.3	dB(A)
10:00 - 11:00	65.2	64.5	dB(A)
L_{eq} 24 hr.	65.0	-	dB(A)
L_{dn}	71.5	-	dB(A)
Standard	70 ^{/1} , 70 ^{/2}	-	dB(A)

REMARK : ^{/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By: 
(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
 THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
 WITHOUT THE WRITTEN APPROVAL LABORATORY

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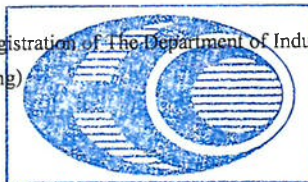
Request No. LA68-R0415

Report No. R6804-0668

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : บริเวณริมรั้วด้านทิศตะวันตกของที่ตั้งโครงการ (N3)
 PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{90} & L_{dn} SAMPLE NO. : 06120
 DETERMINATION METHOD : ISO 1996-1:2016 MEASURING DATE : 31/03/2025-01/04/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 01/04/2025
 S/N G301661 : Class 2 REPORTED DATE : 21/04/2025

TIME \ DATE	31/03/2025-01/04/2025 (L_{eq})	31/03/2025-01/04/2025 (L_{90})	UNIT
11:00 - 12:00 ^{1/3}	65.6	64.8	dB(A)
12:00 - 13:00	66.0	65.3	dB(A)
13:00 - 14:00	65.7	64.8	dB(A)
14:00 - 15:00	65.4	64.6	dB(A)
15:00 - 16:00	65.1	64.4	dB(A)
16:00 - 17:00	65.3	64.7	dB(A)
17:00 - 18:00	65.0	64.6	dB(A)
18:00 - 19:00	65.1	64.5	dB(A)
19:00 - 20:00	65.3	64.6	dB(A)
20:00 - 21:00	65.2	64.7	dB(A)
21:00 - 22:00	65.2	64.7	dB(A)
22:00 - 23:00	65.4	64.6	dB(A)
23:00 - 00:00	67.7	64.9	dB(A)
00:00 - 01:00	67.1	64.5	dB(A)
01:00 - 02:00	69.4	65.0	dB(A)
02:00 - 03:00	68.5	65.6	dB(A)
03:00 - 04:00	66.0	65.6	dB(A)
04:00 - 05:00	66.0	65.5	dB(A)
05:00 - 06:00	66.0	65.6	dB(A)
06:00 - 07:00	66.1	65.6	dB(A)
07:00 - 08:00	65.9	65.5	dB(A)
08:00 - 09:00	66.1	65.5	dB(A)
09:00 - 10:00	66.1	65.5	dB(A)
10:00 - 11:00	66.4	65.6	dB(A)
L_{eq} 24 hr.	66.2	-	dB(A)
L_{dn}	73.3	-	dB(A)
Standard	$70^{1/1}, 70^{1/2}$	-	dB(A)

REMARK : ^{1/1} Notification of Office of The National Environmental Board Volume 15 B.E. 2540 (1997)^{1/2} Notification of Ministry of the Industry B.E. 2548 (2005)^{1/3} Start Time* Parameter Outside The Scope of The Registration of The Department of Industrial Works
(Measurement By Mr. Seksan Pluemwong)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

21/04/2025

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ผลการทดสอบคุณภาพน้ำทิ้ง

Test Report

Request No : W6801007

Report No : 6801-0612

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68010025

Sample Name : Effluent

Sampling Date : 02/01/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 04/01/2025

Tested Date : 04/01/2025 - 14/01/2025

Reported Date : 15/01/2025

Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.10	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	3.9	≤500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	< 40	≤750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	443	≤2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.78	≤10

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบบึงแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

15/01/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Test Report

Request No : W6801007

Report No : 6801-0612

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohroad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68010025

Sample Name : Effluent

Sampling Date : 02/01/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 04/01/2025

Tested Date : 04/01/2025 - 14/01/2025

Reported Date : 15/01/2025

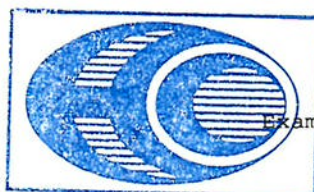
Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤10
pH (on site)		Electrometric Method	7.3	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	29	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	928	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	< 5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	< 5	≤200

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L ,PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบบ้างแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

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บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

15/01/2025

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Test Report

Request No : W6801007

Report No : 6801-0612

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68010025

Sample Name : Effluent

Sampling Date : 02/01/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 04/01/2025

Tested Date : 04/01/2025 - 14/01/2025

Reported Date : 15/01/2025

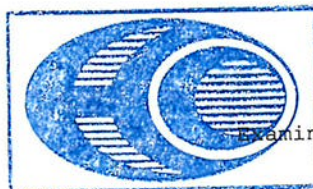
Parameter	Unit	Method	Result	Standard ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L (3 Bottle) , PE 1.0 L , PE 1.8 L , G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบล้างผลของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

15/01/2025

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Test Report

Request No : W6801008

Report No : 6801-0428

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68010026

Sample Name : Influent

Sampling Date : 02/01/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 04/01/2025

Tested Date : 06/01/2025

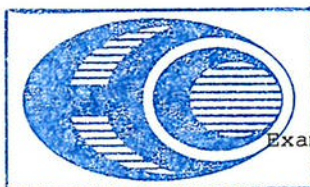
Reported Date : 09/01/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux,Titrimetric Method (SM:5220C)	73

Physical Apperance : 1. Sample : yellowish, lightly SS (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

09/01/2025

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Test Report

Request No : W6802124

Report No : 6802-0777

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68020397

Sample Name : Effluent

Sampling Date : 04/02/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 06/02/2025

Tested Date : 06/02/2025 - 14/02/2025

Reported Date : 17/02/2025

Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.13	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	9.1	≤500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	54	≤750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	521	≤2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.54	≤10

Physical Appearance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L , G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบล้างผลของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

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บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

17/02/2025

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Test Report

Request No : W6802124

Report No : 6802-0777

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68020397

Sample Name : Effluent

Sampling Date : 04/02/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 06/02/2025

Tested Date : 06/02/2025 - 14/02/2025

Reported Date : 17/02/2025

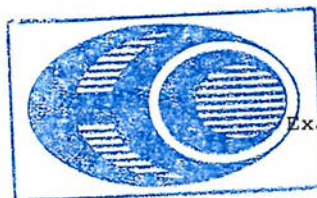
Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤10
pH (on site)		Electrometric Method	7.3	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	30	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	1,394	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	< 5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	8	≤200

Physical Apperance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L ,PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบท่สิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By : (Miss Apiradee Chuen-arom)
17/02/2025

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Test Report

Request No : W6802124

Report No : 6802-0777

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68020397

Sample Name : Effluent

Sampling Date : 04/02/2025

Sampling By : Customer

Sampling Time : 9:00 AM

Sampling Method : Grab

Received Date : 06/02/2025

Tested Date : 06/02/2025 - 14/02/2025

Reported Date : 17/02/2025

Parameter	Unit	Method	Result	Standard ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5

Physical Appearance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L (3 Bottle), PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

17/02/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Test Report

Request No : W6802124

Report No : 6802-0778

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68020398

Sample Name : Influent

Sampling Date : 04/02/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 06/02/2025

Tested Date : 10/02/2025

Reported Date : 17/02/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	2,863

Physical Appearance : 1. Sample : purple, turbid (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By : 

(Miss Apiradee Chuen-arom)

17/02/2025

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Test Report

Request No : W6803307

Report No : 6803-1183

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68030954

Sample Name : Effluent

Sampling Date : 10/03/2025

Sampling By : Customer

Sampling Time : 10:00 AM

Sampling Method : Grab

Received Date : 12/03/2025

Tested Date : 12/03/2025 - 20/03/2025

Reported Date : 21/03/2025

Parameter	Unit	Method	Result	Standard/l
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.20	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	3.6	≤500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	82	≤750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	574	≤2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	2.46	≤10

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

21/03/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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COPY

Test Report

Request No : W6803307

Report No : 6803-1183

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68030954

Sample Name : Effluent

Sampling Date : 10/03/2025

Sampling By : Customer

Sampling Time : 10:00 AM

Sampling Method : Grab

Received Date : 12/03/2025

Tested Date : 12/03/2025 - 20/03/2025

Reported Date : 21/03/2025

Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	<3.0	≤10
pH (on site)		Electrometric Method	7.4	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	31	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	1,172	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	10	≤200

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L ,PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

21/03/2025

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Test Report

Request No : W6803307

Report No : 6803-1183

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68030954

Sample Name : Effluent

Sampling Date : 10/03/2025

Sampling By : Customer

Sampling Time : 10:00 AM

Sampling Method : Grab

Received Date : 12/03/2025

Tested Date : 12/03/2025 - 20/03/2025

Reported Date : 21/03/2025

Parameter	Unit	Method	Result	Standard/ ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	≤ 5

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle), PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบลสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By : 

(Miss Apiradee Chuen-arom)

21/03/2025

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Test Report

Request No : W6803307

Report No : 6803-1184

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68030955

Sample Name : Influent

Sampling Date : 10/03/2025

Sampling By : Customer

Sampling Time : 10:15 AM

Sampling Method : Grab

Received Date : 12/03/2025

Tested Date : 17/03/2025

Reported Date : 21/03/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	568

Physical Apperance : 1. Sample : white, turbid (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



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Examined By : 

(Miss Apiradee Chuen-arom)

21/03/2025

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Test Report

Request No : W6804145

Report No : 6804-0918

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakomsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68040473

Sample Name : Effluent

Sampling Date : 04/04/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 05/04/2025

Tested Date : 05/04/2025 - 19/04/2025

Reported Date : 21/04/2025

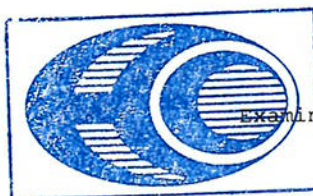
Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.11	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	9.2	≤500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	58	≤750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	469	≤2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.33	≤10

Physical Appearance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



Examined By :

(Miss Apiradee Chuen-arom)
21/04/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Test Report

Request No : W6804145

Report No : 6804-0918

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68040473

Sample Name : Effluent

Sampling Date : 04/04/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 05/04/2025

Tested Date : 05/04/2025 - 19/04/2025

Reported Date : 21/04/2025

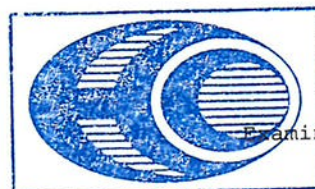
Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	<3.0	≤10
pH (on site)		Electrometric Method	7.7	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	31	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	786	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	<5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	<5	≤200

Physical Apperance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L ,PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบทั้งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

21/04/2025

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Test Report

Request No : W6804145

Report No : 6804-0918

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68040473

Sample Name : Effluent

Sampling Date : 04/04/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 05/04/2025

Tested Date : 05/04/2025 - 19/04/2025

Reported Date : 21/04/2025

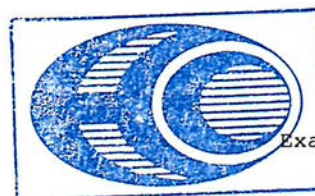
Parameter	Unit	Method	Result	Standard ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	≤ 5

Physical Apperance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L , G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลต์ติง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

21/04/2025

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Test Report

Request No : W6804145

Report No : 6804-0919

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68040474

Sample Name : Influent

Sampling Date : 04/04/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 05/04/2025

Tested Date : 09/04/2025

Reported Date : 21/04/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	80

Physical Apperance : 1. Sample : lightly SS (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

21/04/2025

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Test Report

Request No : W6805257

Report No : 6805-1058

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68050807

Sample Name : Effluent

Sampling Date : 08/05/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 10/05/2025

Tested Date : 10/05/2025 - 16/05/2025

Reported Date : 17/05/2025

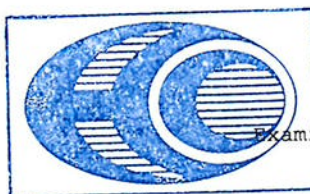
Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.25	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	5.4	≤500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	102	≤750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	662	≤2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	4.31	≤10

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยายฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

17/05/2025

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Test Report

Request No : W6805257

Report No : 6805-1058

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68050807

Sample Name : Effluent

Sampling Date : 08/05/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 10/05/2025

Tested Date : 10/05/2025 - 16/05/2025

Reported Date : 17/05/2025

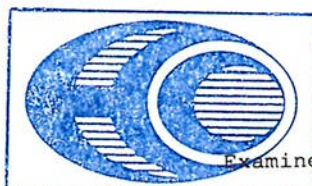
Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	3.9	≤10
pH (on site)		Electrometric Method	7.5	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	35	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	1,484	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	< 5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	7	≤200

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L ,PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบบึงแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

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บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)
17/05/2025

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Page 2 of 3

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Test Report

Request No : W6805257

Report No : 6805-1058

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkroh Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68050807

Sample Name : Effluent

Sampling Date : 08/05/2025

Sampling By : Customer

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 10/05/2025

Tested Date : 10/05/2025 - 16/05/2025

Reported Date : 17/05/2025

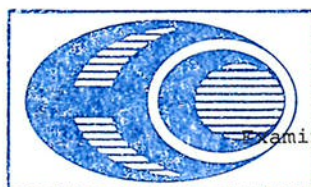
Parameter	Unit	Method	Result	Standard/ ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.08	≤ 5

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1. /1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลต์ติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

17/05/2025

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Test Report

Request No : W6805257

Report No : 6805-1059

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68050808

Sample Name : Influent

Sampling Date : 08/05/2025

Sampling By : Customer

Sampling Time : 10:00 AM

Sampling Method : Grab

Received Date : 10/05/2025

Tested Date : 14/05/2025

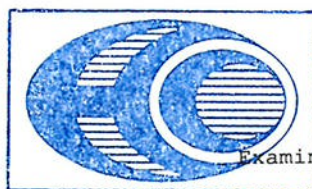
Reported Date : 17/05/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	70

Physical Apperance : 1. Sample : yellowish, lightly SS (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

17/05/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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WITHOUT THE WRITTEN APPROVAL LABORATORY

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Test Report

Request No : W6806256

Report No : 6806-1139

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68060829

Sample Name : Effluent

Sampling Date : 09/06/2025

Sampling By : Customer

Sampling Time : 9:40 AM

Sampling Method : Grab

Received Date : 11/06/2025

Tested Date : 11/06/2025 - 18/06/2025

Reported Date : 20/06/2025

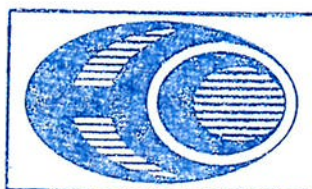
Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.10	-
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	< 2.0	≤ 500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	44	≤ 750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	416	≤ 2000
Flow Rate	m ³ /hr.	Calculation	60.00	-
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤ 0.25
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.08	≤ 10

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

20/06/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Test Report

Request No : W6806256

Report No : 6806-1139

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68060829

Sample Name : Effluent

Sampling Date : 09/06/2025

Sampling By : Customer

Sampling Time : 9:40 AM

Sampling Method : Grab

Received Date : 11/06/2025

Tested Date : 11/06/2025 - 18/06/2025

Reported Date : 20/06/2025

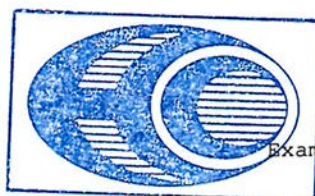
Parameter	Unit	Method	Result	Standard ¹
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤10
pH (on site)		Electrometric Method	7.4	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550 B)	34	≤45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	1,216	≤3000
Total Kjeldahl Nitrogen	mg/L as NH ₃ -N	Macro Kjeldahl Method (SM:4500 -Norg B)	< 5	≤100
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540D)	6	≤200

Physical Apperance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบทั้งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

20/06/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Test Report

Request No : W6806256

Report No : 6806-1139

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68060829

Sample Name : Effluent

Sampling Date : 09/06/2025

Sampling By : Customer

Sampling Time : 9:40 AM

Sampling Method : Grab

Received Date : 11/06/2025

Tested Date : 11/06/2025 - 18/06/2025

Reported Date : 20/06/2025

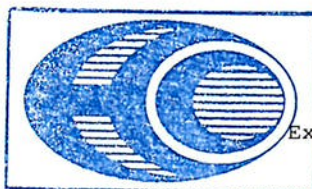
Parameter	Unit	Method	Result	Standard ¹
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	≤ 0.75
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5

Physical Appearance : 1. Sample : yellow, lightly SS

2. Container : Normal [PE 0.5 L(3 Bottle) , PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1./1 ค่าที่กำหนดไว้ในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมของโครงการนิคมอุตสาหกรรมเหมราชตะวันออก (มาบตาพุด) ส่วนขยาย
ฉบับเดือนมิถุนายน พ.ศ. 2551

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

20/06/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

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Test Report

Request No : W6806256

Report No : 6806-1140

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68060830

Sample Name : Influent

Sampling Date : 09/06/2025

Sampling By : Customer

Sampling Time : 10:00 AM

Sampling Method : Grab

Received Date : 11/06/2025

Tested Date : 16/06/2025

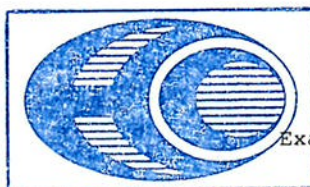
Reported Date : 20/06/2025

Parameter	Unit	Method	Result
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	76

Physical Apperance : 1. Sample : yellow, lightly SS (preserved by Sulfuric Acid)

2. Container : Normal [PE 0.5 L]

Remark : 1. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

20/06/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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WITHOUT THE WRITTEN APPROVAL LABORATORY**COPY**

ผลการทดสอบคุณภาพน้ำใต้ดิน

Test Report

Request No : W6805372

Report No : 6805-1383

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051307

Sample Name : Ground Water Bore # 1

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 10:20 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

Parameter	Unit	Method	Result	Standard/ ¹
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.05
pH (on site)		Electrometric Method	4.4	-
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.38	≤5

Physical Appearance : 1. Sample : yellowish, turbid

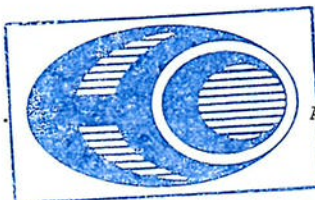
2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /I Ground Water Standard Notification of the National of Environment Board No. 20 , B.E. 2543 (2000)

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

3. Sampling By Mr. Supharerk Phatklang (จ-003-ท-0031)

Examined By :

(Miss Apiradee Chuen-arom)
(จ-003-ท-0007)
23/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By :

(Miss Nunnaphat Bakhuntod)
(จ-003-ท-0005)
23/05/2025REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Test Report

Request No : W6805372

Report No : 6805-1383

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051307

Sample Name : Ground Water Bore # 1

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 10:20 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

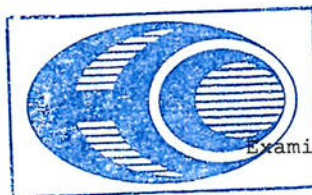
Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.10	-
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.07	-
Temperature	°C	Laboratory and Field Method (SM:2550 B)	30	-

Physical Apperance : 1. Sample : yellowish, turbid

2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /1 Ground Water Standard Notification of the National of Environment Board No. 20, B.E. 2543 (2000)

- SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
- Parameter Outside The Scope of The Registration of Department of Industrial Works
- Sampling By Mr. Supharerk Phatklang



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

23/05/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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 WITHOUT THE WRITTEN APPROVAL LABORATORY

Test Report

Request No : W6805372

Report No : 6805-1384

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkroh Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051308

Sample Name : Ground Water Bore # 2

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

Parameter	Unit	Method	Result	Standard ¹
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.05
pH (on site)		Electrometric Method	5.5	-
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.30	≤5

Physical Appearance : 1. Sample : yellowish, turbid

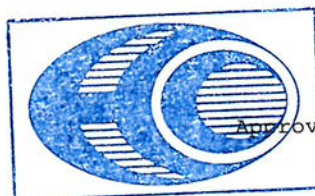
2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1./1 Ground Water Standard Notification of the National of Environment Board No. 20, B.E. 2543 (2000)

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

3. Sampling By Mr. Supharek Phatklang (ว-003-ท-0031)

Examined By :

(Miss Apiradee Chuen-arom)
(ว-003-ค-0007)
23/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By :

(Miss Nunnaphat Bakhuntod)
(ว-003-ค-0005)
23/05/2025REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Test Report

Request No : W6805372

Report No : 6805-1384

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051308

Sample Name : Ground Water Bore # 2

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 9:30 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

Parameter	Unit	Method	Result	Standard/ ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.10	-
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	2.40	-
Temperature	°C	Laboratory and Field Method (SM:2550 B)	30	-

Physical Appearance : 1. Sample : yellowish, turbid

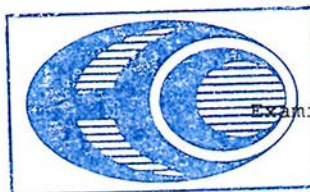
2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /1 Ground Water Standard Notification of the National of Environment Board No. 20, B.E. 2543 (2000)

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

3. Parameter Outside The Scope of The Registration of Department of Industrial Works

4. Sampling By Mr. Supharerk Phatklang



Examined By :

(Miss Apiradee Chuen-arom)
23/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Test Report

Request No : W6805372

Report No : 6805-1385

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051309

Sample Name : Ground Water Bore #3

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 9:35 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

Parameter	Unit	Method	Result	Standard ¹
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.05
pH (on site)		Electrometric Method	5.8	-
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.58	≤5

Physical Appearance : 1. Sample : orange, turbid

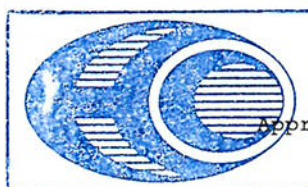
2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /1 Ground Water Standard Notification of the National of Environment Board No. 20 , B.E. 2543 (2000)

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

3. Sampling By Mr. Supharerk Phatklang (๖-003-๓-0031)

Examined By :

(Miss Apiradee Chuen-arom)
(๖-003-๓-0007)
23/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By :

(Miss Nunnaphat Bakhuntod)
(๖-003-๓-0005)
23/05/2025REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
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Test Report

Request No : W6805372

Report No : 6805-1385

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut , A. Muang , Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051309

Sample Name : Ground Water Bore # 3

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 9:35 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

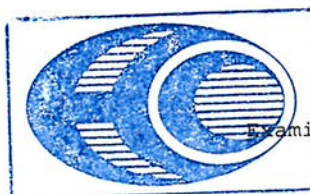
Parameter	Unit	Method	Result	Standard/ ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.10	-
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	20.0	-
Temperature	°C	Laboratory and Field Method (SM:2550 B)	31	-

Physical Apperance : 1. Sample : orange, turbid

2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /I Ground Water Standard Notification of the National of Environment Board No. 20 , B.E. 2543 (2000)

- SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
- Parameter Outside The Scope of The Registration of Department of Industrial Works
- Sampling By Mr. Supharerk Phatklang



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

23/05/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Test Report

Request No : W6805372

Report No : 6805-1386

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakomsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051310

Sample Name : Ground Water Bore # 4

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 10:10 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

Parameter	Unit	Method	Result	Standard ¹
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤0.05
pH (on site)		Electrometric Method	5.1	-
Trivalent Chromium	mg/L as Cr ³⁺	Digestion, Direct ICP Method; Filtration, Colorimetric Method; Calculation (SM:3500 -Cr B, 3120B)	< 0.03	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	1.26	≤5

Physical Appearance : 1. Sample : yellowish, lightly SS

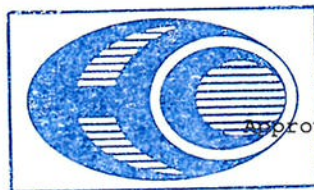
2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /1 Ground Water Standard Notification of the National of Environment Board No. 20, B.E. 2543 (2000)

2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

3. Sampling By Mr. Supharerk Phatklang (ว-003-ท-0031)

Examined By :

(Miss Apiradee Chuen-arom)
(ว-003-ท-0007)
23/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By :

(Miss Nunnaphat Bakhuntod)
(ว-003-ท-0005)
23/05/2025REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

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Test Report

Request No : W6805372

Report No : 6805-1386

Customer : NS BlueScope (Thailand) Limited

Address : No.2 Soi G 9 Pakornsongkrohrad Rd., T. Maptaphut, A. Muang, Rayong 21150

Sampling Source : NS BlueScope (Thailand) Limited

Sample No : W 68051310

Sample Name : Ground Water Bore # 4

Sampling Date : 14/05/2025

Sampling By : ETC

Sampling Time : 10:10 AM

Sampling Method : Grab

Received Date : 15/05/2025

Tested Date : 15/05/2025 - 21/05/2025

Reported Date : 23/05/2025

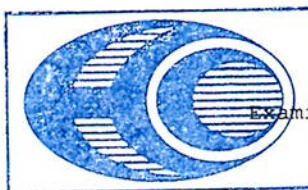
Parameter	Unit	Method	Result	Standard ¹
Aluminium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.27	-
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.04	-
Temperature	°C	Laboratory and Field Method (SM:2550 B)	28	-

Physical Appearance : 1. Sample : yellowish, lightly SS

2. Container : Normal [PE 0.5 L [3 Bottle]]

Remark : 1. /1 Ground Water Standard Notification of the National of Environment Board No. 20, B.E. 2543 (2000)

- SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
- Parameter Outside The Scope of The Registration of Department of Industrial Works
- Sampling By Mr. Supharek Phatklang



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By :

(Miss Apiradee Chuen-arom)

23/05/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

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ผลการทดสอบคุณภาพอากาศในบริเวณการทำงาน

Request No. ATR6802022

Report No. 6802-0185

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE NAME : Passivation ในสายการผลิต Zinalume Line:MCL2

SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020185

RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:12-09:12

SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025

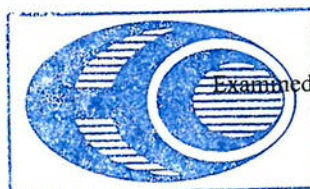
Serial No. 20200403065 REPORTED DATE : 25/02/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Chromium (Cr)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:^{1/} Occupational Safety and Health Administration (OSHA) ; Standard Number 1910.1000 Table Z-1 Limits for Air Contaminants.

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6805034

Report No. 6805-0614

TEST REPORT

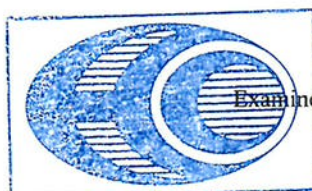
CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakomsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Passivation ในสายการผลิต Zincalume Line:MCL2
 SAMPLING DATE : 07/05/2025 SAMPLE NO. : A68050614
 RECEIVED DATE : 09/05/2025 SAMPLING TIME : 09:40-10:40
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 09/05/2025-16/05/2025
 Serial No. 20200403076 REPORTED DATE : 20/05/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Chromium (Cr)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:¹ Occupational Safety and Health Administration (OSHA) ; Standard Number 1910.1000 Table Z-1 Limits for Air Contaminants.

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

20/05/2025

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Request No. ATR6802022

Report No. 6802-0186

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Passivation ในสายการผลิต Zincalume Line:MCL3
 SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020186
 RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:35-09:35
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025
 Serial No. 20211102097 REPORTED DATE : 25/02/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Chromium (Cr)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:¹ Occupational Safety and Health Administration (OSHA) ; Standard Number 1910.1000 Table Z-1 Limits for Air Contaminants.

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6804035

Report No. 6804-0657

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : Passivation ในสายการผลิต Zincalume Line:MCL3
SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040657
RECEIVED DATE : 11/04/2025 SAMPLING TIME : 09:16-10:16
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 11/04/2025-22/04/2025
Serial No. 20200403071 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Chromium (Cr)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:^{/1} Occupational Safety and Health Administration (OSHA) ; Standard Number 1910.1000 Table Z-1 Limits for Air Contaminants.

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

23/04/2025

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Request No. ATR6804035

Report No. 6804-0664

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : Alkali Cleaning Section (CPL Process Section)
SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040664
RECEIVED DATE : 11/04/2025 SAMPLING TIME : 10:28-11:28
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 11/04/2025-12/04/2025
Serial No. 20211102105 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Sodium Hydroxide	Filtration Acid Base Titrimetric Method	< 0.4	2.0	mg/m ³
		< 0.2	1.2	ppm

REMARK:

^{/1} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsoon)

23/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

23/04/2025

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Request No. ATR6805034

Report No. 6805-0617

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Alkali Cleaning Section : MCL2
 SAMPLING DATE : 07/05/2025 SAMPLE NO. : A68050617
 RECEIVED DATE : 09/05/2025 SAMPLING TIME : 09:25-10:25
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 09/05/2025-14/05/2025
 Serial No. 20200403080 REPORTED DATE : 20/05/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Sodium Hydroxide	Filtration Acid Base Titrimetric Method	< 0.4	2.0	mg/m ³
		< 0.2	1.2	ppm

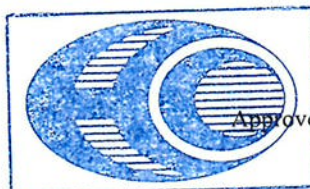
REMARK:^{/1} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanaporn Klinsoon)

20/05/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

20/05/2025

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Request No. ATR6804035

Report No. 6804-0665

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Alkali Cleaning Section : MCL3
 SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040665
 RECEIVED DATE : 11/04/2025 SAMPLING TIME : 09:15-10:15
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 11/04/2025-12/04/2025
 Serial No. 20211103024 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Sodium Hydroxide	Filtration Acid Base Titrimetric Method	< 0.4	2.0	mg/m ³
		< 0.2	1.2	ppm

REMARK:¹ Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsopon)

23/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

23/04/2025

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Request No. ATR6802022

Report No. 6802-0187

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : MCL Pot Area: MCL2
 SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020187
 RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:10-09:10
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025
 Serial No. 20200403076 REPORTED DATE : 25/02/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Zinc (Zn)	Filtration, ICP-OES /NIOSH 7300	< 0.004	5	mg/m ³

REMARK:^{1/} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

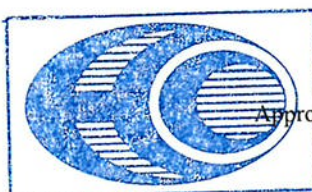
* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
 No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsoon)

25/02/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6805034

Report No. 6805-0615

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE NAME : MCL Pot Area: MCL2

SAMPLING DATE : 07/05/2025 SAMPLE NO. : A68050615

RECEIVED DATE : 09/05/2025 SAMPLING TIME : 09:30-10:30

SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 09/05/2025-16/05/2025

Serial No. 20200403072 REPORTED DATE : 20/05/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Zinc (Zn)	Filtration, ICP-OES /NIOSH 7300	0.021	5	mg/m ³

REMARK:^{1/} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and

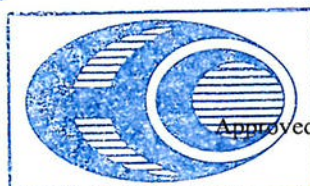
No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsopon)

20/05/2025



Approved By

(Mr. Kawee Suthasub)

20/05/2025

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Request No. ATR6802022

Report No. 6802-0188

TEST REPORT

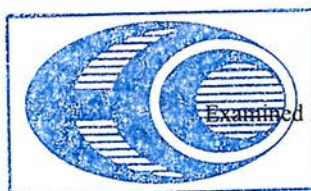
CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : MCL Pot Area: MCL2
SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020188
RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:10-09:10
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025
Serial No. 20200403076 REPORTED DATE : 25/02/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Aluminium (Al)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:^{1/} American Conference of Government Industrial Hygienists (ACGIH) B.E. 2567 (2024)

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



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Examined By.....

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6805034

Report No. 6805-0616

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : MCL Pot Area: MCL2
SAMPLING DATE : 07/05/2025 SAMPLE NO. : A68050616
RECEIVED DATE : 09/05/2025 SAMPLING TIME : 09:30-10:30
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 09/05/2025-16/05/2025
Serial No. 20200403072 REPORTED DATE : 20/05/2025

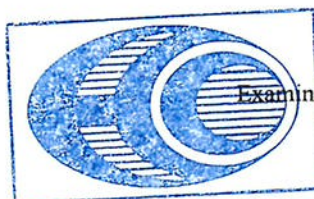
PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Aluminium (Al)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:

^{/1} American Conference of Government Industrial Hygienists (ACGIH) B.E. 2567 (2024)

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

20/05/2025

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Request No. ATR6804035

Report No. 6804-0658

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : MCL Pot Area:MCL3
 SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040658
 RECEIVED DATE : 11/04/2025 SAMPLING TIME : 09:05-10:05
 SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 11/04/2025-22/04/2025
 Serial No. 20200403072 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Zinc (Zn)	Filtration, ICP-OES /NIOSH 7300	0.005	5	mg/m ³

REMARK:^{/1} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

(Standard for Zinc oxide fume)

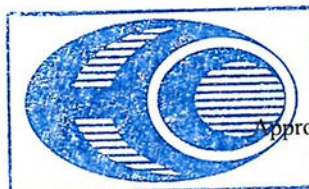
* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
 No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsoon)

23/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

23/04/2025

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Request No. ATR6802022

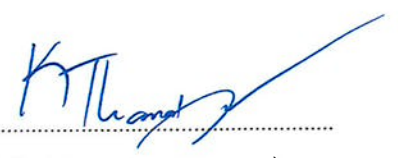
Report No. 6802-0189

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : MCL Pot Area:MCL3
SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020189
RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:30-09:30
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025
Serial No. 20211103024 REPORTED DATE : 25/02/2025

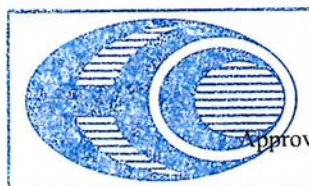
PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Zinc (Zn)	Filtration, ICP-OES /NIOSH 7300	< 0.004	5	mg/m ³

REMARK: ^{1/} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.
* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and
No.0202-03-2564-0005.
(Sampling By Mr. Suttha Songthaninai)


Examined By 

(Miss Thanatporn Klinsoon)

25/02/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By 

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6804035

Report No. 6804-0663

TEST REPORT

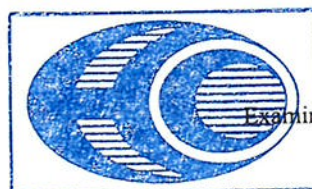
CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : MCL Pot Area:MCL3
SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040663
RECEIVED DATE : 11/04/2025 SAMPLING TIME : 09:05-10:05
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 11/04/2025-22/04/2025
Serial No. 20200403072 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Aluminium (Al)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:^{1/} American Conference of Government Industrial Hygienists (ACGIH) B.E. 2567 (2024)

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

23/04/2025

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Request No. ATR6802022

Report No. 6802-0190

TEST REPORT

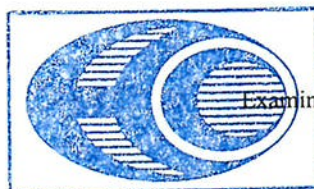
CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : MCL Pot Area:MCL3
SAMPLING DATE : 14/02/2025 SAMPLE NO. : A68020190
RECEIVED DATE : 19/02/2025 SAMPLING TIME : 08:30-09:30
SAMPLING INSTRUMENT : Personal Pump Flow rate 2.00 L/min TESTED DATE : 19/02/2025-21/02/2025
Serial No. 20211103024 REPORTED DATE : 25/02/2025

PARAMETER*	TEST METHOD	RESULT	STD ^{/1}	UNIT
Aluminium (Al)	Filtration, ICP-OES /NIOSH 7300	< 0.004	1	mg/m ³

REMARK:^{/1} American Conference of Government Industrial Hygienists (ACGIH) B.E. 2567 (2024)

* Parameter not have License Registration of Department of Labour Protection and Welfare.

(Sampling By Mr. Suttha Songthaninai)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined By.....

(Mr. Kawee Suthasub)

25/02/2025

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Request No. ATR6804035

Report No. 6804-0654

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Pickle Line Exit Section
 SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040654
 RECEIVED DATE : 11/04/2025 SAMPLING TIME : 07:52-08:07
 SAMPLING INSTRUMENT : Personal Pump Flow rate 0.50 L/min TESTED DATE : 11/04/2025-12/04/2025
 Serial No. 218445 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Hydrogen chloride (HCl)	Ion Chromatography Method (OSHA ID 174sg)	< 0.015	7	mg/m ³
		< 0.010	5	ppm

REMARK:¹ Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsopon)

23/04/2025



Approved By

(Mr. Kawee Suthasub)

23/04/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
 THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
 WITHOUT THE WRITTEN APPROVAL LABORATORY

COPY

Request No. ATR6804035

Report No. 6804-0655

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
SAMPLE SOURCE : NS BlueScope (Thailand) Limited
SAMPLE NAME : Pickel Line Entry Section
SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040655
RECEIVED DATE : 11/04/2025 SAMPLING TIME : 07:57-08:12
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.50 L/min TESTED DATE : 11/04/2025-12/04/2025
Serial No. 218444 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Hydrogen chloride (HCl)	Ion Chromatography Method (OSHA ID 174sg)	< 0.015	7	mg/m ³
		< 0.010	5	ppm

REMARK:

¹ Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and

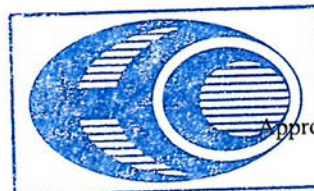
No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsopon)

23/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

23/04/2025

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ผลการตรวจวัดระดับเสียงในบริเวณการทำงาน

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Air Compressor***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 02031
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 14/02/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 14/02/2025
S/N 00222593 : Class 2 REPORTED DATE : 24/02/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:10 - 09:10	89	89	dB(A)
09:10 - 10:10	88	88	dB(A)
10:10 - 11:10	89	89	dB(A)
11:10 - 12:10	89	89	dB(A)
12:10 - 13:10	89	89	dB(A)
13:10 - 14:10	88	88	dB(A)
14:10 - 15:10	88	88	dB(A)
15:10 - 16:10	88	88	dB(A)
L_{eq} 8 hr. (TWA)	88*	88**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsoon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Jutarat Suksaget)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

24/02/2025

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakongsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Air Compressor***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 07451
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 04/04/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 04/04/2025
S/N 00322751 : Class 2 REPORTED DATE : 29/04/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:00 - 09:00	86	86	dB(A)
09:00 - 10:00	86	86	dB(A)
10:00 - 11:00	85	85	dB(A)
11:00 - 12:00	85	85	dB(A)
12:00 - 13:00	85	85	dB(A)
13:00 - 14:00	86	86	dB(A)
14:00 - 15:00	86	86	dB(A)
15:00 - 16:00	86	86	dB(A)
L_{eq} 8 hr. (TWA)	85*	85**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsoon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Onanong Leewongsak)



Approved By

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Cold Reduction Mill (In Front of Mill CRM)***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 07449
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 04/04/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 04/04/2025
S/N 00222593 : Class 2 REPORTED DATE : 29/04/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
07:50 - 08:50	82	82	dB(A)
08:50 - 09:50	82	82	dB(A)
09:50 - 10:50	83	83	dB(A)
10:50 - 11:50	84	84	dB(A)
11:50 - 12:50	84	84	dB(A)
12:50 - 13:50	84	84	dB(A)
13:50 - 14:50	84	84	dB(A)
14:50 - 15:50	84	84	dB(A)
L_{eq} 8 hr. (TWA)	83*	83**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsopon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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WITHOUT THE WRITTEN APPROVAL LABORATORY

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TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Zincalume Pot Area : MCL 2***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 11068
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 07/05/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 07/05/2025
S/N 00322750 : Class 2 REPORTED DATE : 16/05/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:35 - 09:35	88	88	dB(A)
09:35 - 10:35	88	88	dB(A)
10:35 - 11:35	88	88	dB(A)
11:35 - 12:35	87	87	dB(A)
12:35 - 13:35	88	88	dB(A)
13:35 - 14:35	88	88	dB(A)
14:35 - 15:35	88	88	dB(A)
15:35 - 16:35	88	88	dB(A)
L_{eq} 8 hr. (TWA)	87*	87**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsopon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Onanong Leewongsak)



Approved By

(MRS. WANPEN LHAOCHINDAWAT)

16/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติง 1992 จำกัด
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TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Zincalume Pot Area : MCL 2***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 02029
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 14/02/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 14/02/2025
S/N 00322748 : Class 2 REPORTED DATE : 24/02/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:00 - 09:00	87	87	dB(A)
09:00 - 10:00	87	87	dB(A)
10:00 - 11:00	87	87	dB(A)
11:00 - 12:00	87	87	dB(A)
12:00 - 13:00	87	87	dB(A)
13:00 - 14:00	87	87	dB(A)
14:00 - 15:00	88	88	dB(A)
15:00 - 16:00	88	88	dB(A)
L_{eq} 8 hr. (TWA)	87*	87**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsoon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Jutarat Suksaget)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

24/02/2025

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WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. LA68-R0449

Report No. R6804-1988

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat. Muang, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE POINT : Zinalume Pot Area : MCL 3
 PARAMETER*** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 07450
 DETERMINATION METHOD : ISO 11202:2010 MEASURING DATE : 04/04/2025
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 04/04/2025
 S/N 00322749 : Class 2 REPORTED DATE : 29/04/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:35 - 09:35	85	85	dB(A)
09:35 - 10:35	85	85	dB(A)
10:35 - 11:35	84	84	dB(A)
11:35 - 12:35	84	84	dB(A)
12:35 - 13:35	84	84	dB(A)
13:35 - 14:35	84	84	dB(A)
14:35 - 15:35	92	92	dB(A)
15:35 - 16:35	85	85	dB(A)
L_{eq} 8 hr. (TWA)	86*	85**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)
 (Published in the Government Gazette on January 26, 2018)
² Notification of The Ministry of Industry B.E. 2546 (2003)
 * Based on Criteria 85 dB(A); 3 dB Exchange Rate
 ** Based on Criteria 90 dB(A); 5 dB Exchange Rate
 *** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009
 (Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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 WITHOUT THE WRITTEN APPROVAL LABORATORY

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TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited***
ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150***
SAMPLE SOURCE : NS BlueScope (Thailand) Limited***
SAMPLE POINT : Zincalume Pot Area : MCL 3***
PARAMETER**** : L_{eq} 1 hr. & L_{eq} 8 hr. SAMPLE NO. : 02030
DETERMINATION METHOD : ISO 11202:2010## MEASURING DATE : 14/02/2025
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 14/02/2025
S/N 00322756 : Class 2 REPORTED DATE : 24/02/2025

MEASURING TIME	RESULT ¹	RESULT ²	UNIT
08:30 - 09:30	85	85	dB(A)
09:30 - 10:30	85	85	dB(A)
10:30 - 11:30	85	85	dB(A)
11:30 - 12:30	85	85	dB(A)
12:30 - 13:30	85	85	dB(A)
13:30 - 14:30	85	85	dB(A)
14:30 - 15:30	86	86	dB(A)
15:30 - 16:30	86	86	dB(A)
L_{eq} 8 hr. (TWA)	85*	85**	dB(A)
Standard	85 ¹	90 ²	dB(A)

REMARK : ## ISO 11202:2010, Notification of The Ministry of Industry B.E. 2546 (2003) on The Safety Protection Measures in Factory Regarding Working Area Environment, Dated November 6, 2003, Notification of The Department of Labour Protection and Welfare on The Standard of Noise Level That Employees are Allowed to Receive in Average Period of Work Each Day, Dated December 13, 2017, Notification of The Department of Labour Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, Dated February 8, 2018

¹ Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)

(Published in the Government Gazette on January 26, 2018)

² Notification of The Ministry of Industry B.E. 2546 (2003)

* Based on Criteria 85 dB(A); 3 dB Exchange Rate

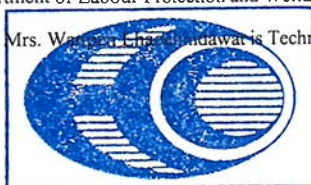
** Based on Criteria 90 dB(A); 5 dB Exchange Rate

*** These Data are Non Laboratory Data

**** Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009

(Ms. Thanatporn Klinsoon is Section Head / Mrs. Wanpen Lhaochindawat is Technical Management)

(Measurement By Ms. Jutarat Suksaget)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(MRS. WANPEN LHAOCHINDAWAT)

24/02/2025

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ผลการตรวจวัดระดับความร้อนในบริเวณการทำงาน

Request No. LA68-R0548

Report No. R6805-1953

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Zincalume Line Cleaning : MCL 2 SAMPLE NO. : 11067

MEASURING DATE : 07/05/2025 RECEIVED DATE : 07/05/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 16/05/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004318

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	10:00 - 10:30	28.5	36.3	35.7	30.8	°C
	10:30 - 11:00	28.9	36.6	35.8	31.2	°C
	11:00 - 11:30	29.1	36.8	36.0	31.4	°C
	11:30 - 12:00	29.2	36.8	36.2	31.5	°C
WBGT AVERAGE	10:00 - 12:00	-	-	-	31.2	°C
STANDARD		-	-	-	34.0 ^{/1,2}	°C

REMARK:

Work Load is Light, Indoor

^{/1} Regulation of The Ministry of Labour B.E. 2559 (2016)^{/2} Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

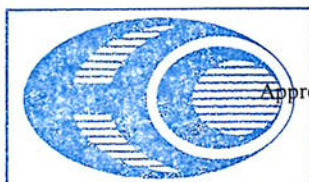
GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009

(Measurement By Ms. Onanong Leewongsak)



Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

16/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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Request No. LA68-R0548

Report No. R6805-1952

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Annealing Process : MCL 2 SAMPLE NO. : 11066

MEASURING DATE : 07/05/2025 RECEIVED DATE : 07/05/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 16/05/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004320

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	10:00 - 10:30	27.7	34.7	34.4	29.8	°C
	10:30 - 11:00	27.9	34.9	34.6	30.0	°C
	11:00 - 11:30	28.0	34.6	34.2	30.0	°C
	11:30 - 12:00	28.4	35.5	35.1	30.5	°C
WBGT AVERAGE	10:00 - 12:00	-	-	-	30.1	°C
STANDARD		-	-	-	34.0 ^{1/2}	°C

REMARK:

Work Load is Light, Indoor

¹ Regulation of The Ministry of Labour B.E. 2559 (2016)² Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009
(Measurement By Ms. Onanong Leewongsak)



Approved By

(MRS. WANPEN LHAOCHINDAWAT)

16/05/2025

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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WITHOUT THE WRITTEN APPROVAL LABORATORY

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Request No. LA68-R0449

Report No. R6804-1982

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Oven Room : CPL SAMPLE NO. : 07444

MEASURING DATE : 04/04/2025 RECEIVED DATE : 04/04/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 29/04/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004318

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	13:00 - 13:30	28.5	35.8	33.6	30.7	°C
	13:30 - 14:00	28.0	34.9	32.9	30.1	°C
	14:00 - 14:30	28.1	35.0	33.1	30.2	°C
	14:30 - 15:00	27.7	35.3	32.7	30.0	°C
WBGT AVERAGE	13:00 - 15:00	-	-	-	30.2	°C
STANDARD		-	-	-	34.0 ^{/1,2}	°C

REMARK:

Work Load is Light, Indoor

^{/1} Regulation of The Ministry of Labour B.E. 2559 (2016)^{/2} Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009

(Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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Request No. LA68-R0449

Report No. R6804-1983

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Coater Room : CPL SAMPLE NO. : 07445

MEASURING DATE : 04/04/2025 RECEIVED DATE : 04/04/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 29/04/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004319

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	13:00 - 13:30	28.2	34.3	34.2	30.0	°C
	13:30 - 14:00	27.9	34.1	33.9	29.8	°C
	14:00 - 14:30	27.7	33.8	33.6	29.5	°C
	14:30 - 15:00	27.7	33.7	33.5	29.5	°C
WBGT AVERAGE	13:00 - 15:00	-	-	-	29.7	°C
STANDARD		-	-	-	34.0 ^{1/2}	°C

REMARK:

Work Load is Light, Indoor

^{1/} Regulation of The Ministry of Labour B.E. 2559 (2016)^{2/} Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009

(Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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Request No. LA68-R0449

Report No. R6804-1980

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakornsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Zinacume Line Cleaning : MCL 3 SAMPLE NO. : 07442

MEASURING DATE : 04/04/2025 RECEIVED DATE : 04/04/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 29/04/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004320

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	09:00 - 09:30	27.2	32.2	32.0	28.7	°C
	09:30 - 10:00	26.9	32.3	32.1	28.5	°C
	10:00 - 10:30	27.0	32.4	32.1	28.6	°C
	10:30 - 11:00	27.2	32.5	32.3	28.8	°C
WBGT AVERAGE	09:00 - 11:00	-	-	-	28.7	°C
STANDARD		-	-	-	34.0 ^{/1,2}	°C

REMARK:

Work Load is Light, Indoor

^{/1} Regulation of The Ministry of Labour B.E. 2559 (2016)^{/2} Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009

(Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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Request No. LA68-R0449

Report No. R6804-1981

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited

ADDRESS : Soi G 9 Eastern Industrial Estate, Prakomsongkruarat, Muang, Rayong 21150

SAMPLE SOURCE : NS BlueScope (Thailand) Limited

SAMPLE POINT : Annealing Process : MCL 3 SAMPLE NO. : 07443

MEASURING DATE : 04/04/2025 RECEIVED DATE : 04/04/2025

SAMPLING INSTRUMENT : Heat Stress ; REPORTED DATE : 29/04/2025

Wet Bulb Globe Temperature (WBGT) : Serial No. 22004318

PARAMETER*	SAMPLING TIME	RESULT				
		NWB	GT	DB	WBGT	UNIT
Heat Stress	09:00 - 09:30	27.9	32.9	31.8	29.4	°C
	09:30 - 10:00	27.4	33.5	32.6	29.2	°C
	10:00 - 10:30	27.5	33.8	32.7	29.4	°C
	10:30 - 11:00	27.4	33.5	32.2	29.2	°C
WBGT AVERAGE	09:00 - 11:00	-	-	-	29.3	°C
STANDARD		-	-	-	34.0 ^{1/2}	°C

REMARK:

Work Load is Light, Indoor

¹ Regulation of The Ministry of Labour B.E. 2559 (2016)² Notification of The Ministry of Industry B.E. 2546 (2003)

NWB = Natural Wet - Bulb Temperature

GT = Globe Temperature

DB = Dry - Bulb Temperature

WBGT = Wet - Bulb Globe Temperature

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0401-03-2564-0009

(Measurement By Ms. Onanong Leewongsak)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By.....

(MRS. WANPEN LHAOCHINDAWAT)

29/04/2025

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Request No. ATR6804035

Report No. 6804-0656

TEST REPORT

CUSTOMER : NS BlueScope (Thailand) Limited
 ADDRESS : 2 Soi G9 Prakornsongkrohraj road, Mueang Rayong District, Rayong 21150
 SAMPLE SOURCE : NS BlueScope (Thailand) Limited
 SAMPLE NAME : Pickel Line Test Section
 SAMPLING DATE : 04/04/2025 SAMPLE NO. : A68040656
 RECEIVED DATE : 11/04/2025 SAMPLING TIME : 07:56-08:11
 SAMPLING INSTRUMENT : Personal Pump Flow rate 0.50 L/min TESTED DATE : 11/04/2025-12/04/2025
 Serial No. 218413 REPORTED DATE : 23/04/2025

PARAMETER*	TEST METHOD	RESULT	STD ¹	UNIT
Hydrogen chloride (HCl)	Ion Chromatography Method (OSHA ID 174sg)	0.053	7	mg/m ³
		0.036	5	ppm

REMARK:¹ Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

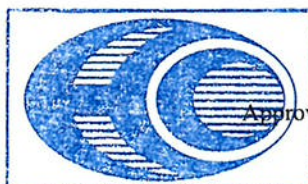
* Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008 and No.0202-03-2564-0005.

(Sampling By Mr. Suttha Songthaninai)

Examined By

(Miss Thanatporn Klinsoapon)

23/04/2025



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Approved By

(Mr. Kawee Suthasub)

23/04/2025

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ภาคผนวกที่ 2

เอกสารชี้แนะทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๒๐/๑๑๓๔๒



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๗ กรกฎาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอต่ออายุของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๗ มิถุนายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๙๒ รายการ
จำนวน ๑๙ แผ่น

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขุมวิท ๘ ตำบลหนองขาม อำเภอสรีราชา จังหวัดชลบุรี ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
- ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย ตามสิ่งที่ส่งมาด้วย ๒
- ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๗ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๒๑ รายการ น้ำใต้ดิน จำนวน ๑๑๑ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว
จำนวน ๑๘ รายการ และดิน จำนวน ๙๕ รายการ รวมทั้งสิ้นจำนวน ๒๙๒ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๕ กรกฎาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

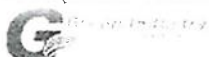
(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”

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เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง ๑๙๙๒ จำกัด เลขทะเบียน ว-๐๐๓

ที่ อก ๐๓๒๐/๑๑๓๔๒

ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

๑) นางสาวมาลีเกษ เลขะวัจกุล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๑
๒) นายวัฒนา โคตรหล้า	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๒
๓) นางวรรณเพ็ญ เหลาจินดาวัฒน์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๓
๔) นายกะวีร์ สุทธทรัพย์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๔
๕) นางสาวนันท์ณภัส แปะขุนทด	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๕
๖) นางสาวพรนภา หลงคำหงษ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๖
๗) นางสาวอภิรดี ชื่นอารมย์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๗
๘) นางสาวอัจฉรี จิตตะยโสธร	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๘
๙) นางสาวจิรพร ปานคง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๙
๑๐) นายสุทธา สองธนี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๐
๑๑) นางสาวนันประภา อูยสูงเนิน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๑
๑๒) นายธงไชย บุญศักดิ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๒
๑๓) นางสาวธนาพร กลิ่นโสภณ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๓
๑๔) นายธีระพงษ์ นวลอินทร์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๔
๑๕) นางสาวแพรว พลแสน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๕
๑๖) นายทรงพล ผิวอ้วน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๖
๑๗) นายภาคภูมิ บัวสวัสดิ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๗
๑๘) นางสาวจันทน์ สายพันธ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๘
๑๙) นายภาณุพงศ์ บำรุงรส	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๙
๒๐) นางสาวปภาณิน จันตะสอน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๐
๒๑) นายวรกร ไวทยะเสวี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๑
๒๒) นางสาววรรณภา ไชยศิริ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๒
๒๓) นางสาวพรพิมล ภูมิคอนสาร	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๓
๒๔) นางสาวธมลวรรณ ผลอ้อ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๔
๒๕) นางสาวบุญเรือง บุญถม	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๕
๒๖) นางสาวกสณันท์ ป้อมน้อย	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๖
๒๗) นายชานูวัฒน์ โชตะวงศ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๗
๒๘) นางสาวพจณีย์ งามวิสัย	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๘
๒๙) นายวิญญ์วัล สิงห์โต	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๙
๓๐) นางสาวนุกูล อารศรี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๐
๓๑) นายศุภฤกษ์ พาดกลาง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๑
๓๒) นายณิชาพล ทองหล่อ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๒
๓๓) นายธรรมรัตน์ โพธิ์ตันคำ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๓
๓๔) นายโอชา ขวัญศิริมงคล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๔
๓๕) นายเมธี สุขประเสริฐ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๕

COPY

๓๖) นางสาวพรพินันท์...

๓๖) นางสาวพรพินันท์ วิริยกุลกุล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๖
๓๗) นางสาวอาภาภรณ์ เสริมสนธิ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๗
๓๘) นางสาวนภัทร์ธมณต์ ประดิษฐ์นุช	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๘
๓๙) นางสาวสุนิษา เอ็งเส้ง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๙
๔๐) นางสาวระพิน อ้นชั้น	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๔๐

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย

๑) นางสาวดวงกมล เนื้อทอง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๑
๒) นางสาววัชรภรณ์ อินทสุข	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๒
๓) นางสาวกัญจน์ธวิภา จันทร์ชอดแก้ว	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๓
๔) นางสาวฉัตรสุดา มงคลโกชนัน	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๔
๕) นางสาวณัฐวดี อำนวยทัศน	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๕
๖) นางสาวนิอรธมา ปาระ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๖
๗) นางสาวธัญลักษณ์ ชันโต	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๗
๘) นางสาวสุทธิดา สร้างแก้ว	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๘
๙) นายอุดมทรัพย์ เจนจบจริง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๙
๑๐) นายณราธิป สงวนศิลป์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๐
๑๑) นายวีระชัย พอใจ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๑
๑๒) นายอัญชลี ทะพงษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๒
๑๓) นางสาวสุมลิตรา มีแก่น	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๓
๑๔) นางสาวสวรรณยา เพชรประไพ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๔
๑๕) นางสาวจุฑามาศ เจริญพรหม	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๕
๑๖) นางสาวนิภาพร คำขมภู	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๖
๑๗) นางสาวอรชา พันธุ์เมือง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๗
๑๘) นายกิตติ ไพโรจน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๘
๑๙) นายชาญณรงค์ ตั้งธรรมรักษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๙
๒๐) นางสาวปวีรศา เอสันเทียะ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๐
๒๑) นางสาวจุฑาทิพย์ กิจดี	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๑
๒๒) นางสาวสุภาวดี ศรีละออง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๒
๒๓) นางสาวณัฐชยา บรรพบุตร	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๓
๒๔) นางสาวณัฐนิช นนตานอก	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๔
๒๕) นางสาวดวงสุดา แสนวันดี	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๕

COPY

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด เลขทะเบียน ว-๐๐๓

ที่ อก ๐๓๒๐/๑๑๓๔๒

ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๙๒ รายการ

น้ำเสีย จำนวน 47 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
2	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
3	Barium	Digestion, Inductively Coupled Plasma Method ^[4]
4	α -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
5	β -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
6	δ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
7	γ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[4] 2) 5-Day BOD Test, Azide Modification Method ^[4]
9	Cadmium	Digestion, Inductively Coupled Plasma Method ^[4]
10	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^[4]
11	cis-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
12	trans-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
13	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]
15	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
16	Cyanide	Distillation, Colorimetric Method ^[4]
17	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
18	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
19	DDT	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
20	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
21	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
22	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
23	Endosulfan sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
25	Endrin aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
26	Endrin ketone	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
27	Formaldehyde	Distillation, Colorimetric Method ^[3]
28	Free Chlorine	1) Iodometric Method ^[4] 2) Colorimetric Method ^[4]

COPY

29 Heptachlor...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
29	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
30	Heptachlor Epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
31	Hexavalent Chromium	Filtration, Colorimetric Method ^[4]
32	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
33	Manganese	Digestion, Inductively Coupled Plasma Method ^[4]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
35	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
36	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
37	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[4]
38	pH	Electrometric Method ^[4]
39	Phenols	Distillation, Direct Photometric Method ^[4]
40	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
41	Sulfide	ZnS Precipitation, Iodometric Method ^[4]
42	Temperature	Field Method ^[4]
43	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4]
44	Total Dissolved Solids	Dried at 180 °C ^[4]
45	Total Kjeldahl Nitrogen	Macro Kjeldahl Method ^[4]
46	Total Suspended Solids	Dried at 103-105 °C ^[4]
47	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

COPY

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 21 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Carbon Monoxide	1) Bag, Non-Dispersive Infrared Method ^[5] 2) Instrumental Analyzer Method ^[5]
5	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
6	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
7	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
9	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
11	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
12	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
13	Opacity	Ringelmann's Method ^[1,5]
14	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[8] 2) Instrumental Analyzer Method ^[7]
15	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
17	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[6]
18	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]

COPY

19 Total Suspended Particulate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[6]
20	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
21	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[6]

น้ำใต้ดิน จำนวน 111 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[4]
6	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
7	Barium	Digestion, Inductively Coupled Plasma Method ^[4]
8	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
9	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
10	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
11	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
12	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
13	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
14	Beryllium	Digestion, Inductively Coupled Plasma Method ^[4]

COPY

15 Bis(2-chloroethyl)ether...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
16	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
17	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
18	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
19	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
20	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
21	Cadmium	Digestion, Inductively Coupled Plasma Method ^[4]
22	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
23	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
24	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
25	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
26	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
27	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
30	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
31	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
32	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
33	Chromium (VI)	Filtration, Colorimetric Method ^[4]
34	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
35	Cyanide	Distillation, Colorimetric Method ^[4]
36	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
37	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
38	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
39	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
40	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
41	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
42	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
43	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
44	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
45	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
46	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
47	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
48	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
49	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
50	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
51	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]



COPY

52 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
52	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
53	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
54	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
55	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
56	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
57	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
58	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
59	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
60	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
61	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
62	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
63	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
64	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
65	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
66	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
67	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
68	α -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
69	β -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

70 γ -HCH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
70	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
71	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
72	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
73	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
74	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
75	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
76	Manganese	Digestion, Inductively Coupled Plasma Method ^[4]
77	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
78	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
79	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
80	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
81	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
82	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
83	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
84	Nickel	Digestion, Inductively Coupled Plasma Method ^[4]
85	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
86	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
87	pH	Electrometric Method ^[4]
88	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

89 Phenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
89	Phenol	1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
90	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
92	Silver	Digestion, Inductively Coupled Plasma Method ^[4]
93	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
94	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
95	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
97	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
98	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
99	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
102	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
103	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
104	Vanadium	Digestion, Inductively Coupled Plasma Method ^[4]
105	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]

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107 m-Xylene...

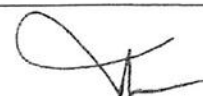
ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
107	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
108	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
109	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
110	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
111	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 18 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Digestion, Inductively Coupled Plasma Method ^[9,10]
2	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
3	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
4	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
5	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
6	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
7	Chromium (VI)	1) Waste Extraction, Digestion, Colorimetric Method ^[2,13]
		2) Alkaline Digestion, Colorimetric Method ^[9,13]
8	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]
9	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10]
		2) Digestion, Inductively Coupled Plasma Method ^[9,10]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
11	Mercury	1) Waste Extraction, Digestion, Cold Vapor Atomic Absorption Spectrometric Method ^[2,11] 2) Digestion, Cold vapor Atomic Absorption Spectrometric Method ^[9,11]
12	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
13	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
14	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
15	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
16	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
17	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
18	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]



COPY

ดิน...

ดิน จำนวน 95 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
3	Anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
4	Antimony	Digestion, Inductively Coupled Plasma Method ^[9,10]
5	Arsenic	Digestion, Inductively Coupled Plasma Method ^[9,10]
6	Barium	Digestion, Inductively Coupled Plasma Method ^[9,10]
7	Benz(a)anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
8	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
9	Benzo(b)fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
10	Benzo(k)fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
11	Benzo(a)pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
12	Benzo[g,h,i]perylene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
13	Beryllium	Digestion, Inductively Coupled Plasma Method ^[9,10]
14	Bis(2-chloroethyl)ether	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
15	Bis(2-ethylhexyl)phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
16	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
17	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
18	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

COPY

19 Butyl benzyl phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Butyl benzyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
20	Cadmium	Digestion, Inductively Coupled Plasma Method ^[9,10]
21	Carbazole	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
22	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
23	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
24	p-Chloroaniline	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
25	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
26	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
27	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
28	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
29	Chromium	Digestion, Inductively Coupled Plasma Method ^[9,10]
30	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[9,10]
31	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[12,13]
32	Chrysene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
33	Dibenz(a,h)anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
34	Di-n-butyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
35	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
36	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
37	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

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38 1,1-Dichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
38	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
39	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
40	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
41	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
42	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
43	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
44	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
45	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
46	Diethyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
47	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
48	2,4-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
49	2,6-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
50	Di-n-octyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
51	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
52	Fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
53	Fluorene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
54	Hexachlorobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
55	Hexachloro-1,3-butadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
57	Hexachlorocyclopentadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
58	Hexachloroethane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
59	Indeno(1,2,3-cd)pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
60	Isophorone	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
61	Lead	Digestion, Inductively Coupled Plasma Method ^[9,10]
62	Manganese	Digestion, Inductively Coupled Plasma Method ^[9,10]
63	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[9,11]
64	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
65	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
66	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
67	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
68	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
69	Nickel	Digestion, Inductively Coupled Plasma Method ^[9,10]
70	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
71	N-Nitrosodi-n-propylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
72	Phenanthrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
73	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
74	Pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
75	Selenium	Digestion, Inductively Coupled Plasma Method ^[9,10]
76	Silver	Digestion, Inductively Coupled Plasma Method ^[9,10]
77	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
78	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
79	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
80	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
81	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
82	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
83	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
84	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
85	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
86	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
87	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
88	Vanadium	Digestion, Inductively Coupled Plasma Method ^[9,10]
89	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
90	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
91	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
92	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
93	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
94	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
95	Zinc	Digestion, Inductively Coupled Plasma Method ^[9,10]

เอกสารอ้างอิง

1. กระทรวงอุตสาหกรรม. **ประกาศกระทรวงอุตสาหกรรม พ.ศ.2549** เรื่องกำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แก๊สเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.
2. กระทรวงอุตสาหกรรม. **ประกาศกระทรวงอุตสาหกรรม พ.ศ.2548** เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.
3. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
4. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater**. 23rd ed. Washington, DC : APHA, 2017
5. United States Environmental Protection Agency. **Standard of Performance for New Stationary Sources**. 40 CFR Part 60. Appendix A, 2017.
6. United States Environmental Protection Agency. **Standard of Performance for New Stationary Sources**. 40 CFR Part 60. Appendix A, 2019.
7. United States Environmental Protection Agency. **Standard of Performance for New Stationary Sources**. 40 CFR Part 60. Appendix A, 2020.
8. United States Environmental Protection Agency. **Standard of Performance for New Stationary Sources**. 40 CFR Part 60. Appendix A, 2023.
9. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Acid Digestion of Sediments Sludge and Soils. SW-846 Method 3050B**, 1996.
10. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Inductively Coupled Plasma-Atomic Emission spectrometry. SW-846 Method 6010C**, 2007.
11. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B**, 2007.
12. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Alkaline digestion for Hexavalent Chromium. SW-846 Method 3060A**, 1996.



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13. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Chromium. Hexavalent (Colorimetric). SW-846 Method 7196A**, 1992
14. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035A**, 2002
15. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Ultrasonic Extraction. SW-846 Method 3550C**, 2007
16. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260D**, 2018
17. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry. SW-846 Method 8270E**, 2018



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ที่ อก ๐๓๒๐/ ๕๖๐๕ 1



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๕ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร
ของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๕ มีนาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ และเปลี่ยนแปลง
สารมลพิษบริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด จำนวน ๑๒ แผ่น

ตามคำขอฯ ที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ห้องปฏิบัติการวิเคราะห์
เอกชน เลขทะเบียน ว-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี แจ้งขอเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษในน้ำเสีย น้ำใต้ดิน
เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นายวัฒนา โคตรหล้า ทะเบียนเลขที่ ว-๐๐๓-ค-๐๐๐๒

๒. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวอัญชลี ทะพงษ์ ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๑๒

๒) นางสาวจุฑามาศ เจริญพรหม ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๑๕

๓) นางสาวณัฐนิช นนตานอก ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๒๔

๓. ให้ยกเลิกขอบข่ายรายการสารมลพิษในน้ำเสีย และน้ำใต้ดินตามรายการเอกสารแนบท้าย
หนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนที่ อก ๐๓๒๐/๑๑๓๔๒ ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

๔. ให้วิเคราะห์สารมลพิษตามขอบข่ายที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๗ รายการ
และน้ำใต้ดิน จำนวน ๑๑๑ รายการ รวมทั้งสิ้นจำนวน ๑๕๘ รายการ ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลง
เอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร ดังสิ่งที่ส่งมาด้วย

๕. ให้วิเคราะห์สารมลพิษตามขอบข่ายที่ได้รับขึ้นทะเบียนให้วิเคราะห์เพิ่มเติมในดิน จำนวน
๑๒ รายการ ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษเปลี่ยนแปลงสารมลพิษ
ในดิน และเปลี่ยนแปลงบุคลากร ดังสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือ

COPY



อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนในวันที่ ๕ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรศ กลั่นกรอง)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

COPY



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

เลขทะเบียน ว-๐๐๓

ที่ ออก ๐๓๒๐/

ลงวันที่

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๗๐ รายการ

น้ำเสีย จำนวน 47 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
2	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
3	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
4	α -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
5	β -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
6	δ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
7	γ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[1] 2) 5-Day BOD Test, Azide Modification Method ^[1]
9	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
10	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^[1]
11	cis-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

COPY

12 trans-Chlordane ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
12	trans-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
13	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
14	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[1]
15	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
16	Cyanide	Distillation, Colorimetric Method ^[1]
17	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
18	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
19	DDT	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
20	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
21	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
22	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
23	Endosulfan sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

COPY

25 Endrin aldehyde ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
25	Endrin aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
26	Endrin ketone	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
27	Formaldehyde	Distillation, Colorimetric Method ^[4]
28	Free Chlorine	1) Iodometric Method ^[1] 2) Colorimetric Method ^[1]
29	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
30	Heptachlor Epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
31	Hexavalent Chromium	Filtration, Colorimetric Method ^[1]
32	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
33	Manganese	Digestion, Inductively Coupled Plasma Method ^[1]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1]
35	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
36	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
37	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[1]
38	pH	Electrometric Method ^[1]
39	Phenols	Distillation, Direct Photometric Method ^[1]
40	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1]

COPY

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
41	Sulfide	ZnS Precipitation, Iodometric Method ^[1]
42	Temperature	Field Method ^[1]
43	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[1] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[1]
44	Total Dissolved Solids	Dried at 180 °C ^[1]
45	Total Kjeldahl Nitrogen	Macro Kjeldahl Method ^[1]
46	Total Suspended Solids	Dried at 103-105 °C ^[1]
47	Zinc	Digestion, Inductively Coupled Plasma Method ^[1]

น้ำใต้ดิน จำนวน 111 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[1]
6	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
7	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
8	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
9	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
10	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
11	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
12	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
13	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
14	Beryllium	Digestion, Inductively Coupled Plasma Method ^[1]
15	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
16	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
17	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
18	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
19	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
20	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
21	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
22	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
23	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
24	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
25	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
26	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
27	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
28	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
29	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
30	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
31	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
32	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[1] 2) Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[1]
33	Chromium (VI)	Filtration, Colorimetric Method ^[1]
34	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
35	Cyanide	Distillation, Colorimetric Method ^[1]
36	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
37	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
38	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
39	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

40 Di-n-butyl phthalate ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
40	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
41	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
42	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
43	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
44	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
45	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
46	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
47	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
48	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
49	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
50	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
51	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
52	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
53	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
54	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

55 2,4-Dinitrotoluene ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
55	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
56	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
57	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
58	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
59	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
60	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
61	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
62	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
63	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
64	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
65	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
66	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
67	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
68	α -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
69	β -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

70 γ -HCH ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
70	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
71	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
72	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
73	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
74	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
75	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
76	Manganese	Digestion, Inductively Coupled Plasma Method ^[1]
77	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1]
78	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
79	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
80	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
81	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
82	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
83	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
84	Nickel	Digestion, Inductively Coupled Plasma Method ^[1]
85	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
86	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
87	pH	Electrometric Method ^[4]
88	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
89	Phenol	1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
90	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
92	Silver	Digestion, Inductively Coupled Plasma Method ^[4]
93	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
94	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
95	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
97	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
98	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
99	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
102	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
103	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
104	Vanadium	Digestion, Inductively Coupled Plasma Method ^[4]
105	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
107	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
108	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
109	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
110	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
111	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

ดิน จำนวน 12 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	α -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
2	β -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
3	γ -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
4	Heptachlor	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]

COPY

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
5	Aldrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
6	Heptachlor epoxide	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
7	Chlordane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
8	Dieldrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
9	Endrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
10	DDD	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
11	DDT	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
12	Methoxychlor	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]

เอกสารอ้างอิง

1. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater**. 24th ed. Washington, DC: APHA, 2023.
2. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Ultrasonic Extraction. SW-846 Method 3550C**, 2007
3. United States Environment Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry. SW-846 Method 8270E**, 2018
4. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

COPY

ภาคผนวกที่ 3

ใบรับรองความสามารถห้องปฏิบัติการวิเคราะห์



ที่ อว 0303/169

ใบรับรองความสามารถห้องปฏิบัติการทดสอบ

ใบรับรองฉบับนี้ให้ไว้เพื่อแสดงว่า

ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

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

หมายเลขการรับรองระบบงานที่ ทดสอบ - 0159

รายละเอียดการรับรองดังขอบข่ายการรับรองแนบท้าย

ออกให้ ณ วันที่ : 10 มกราคม 2568

หมดอายุ วันที่ : 6 พฤศจิกายน 2570

ลงชื่อ :



(นางจันทร์ตนี วรสรรพวิทย)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ
กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตัง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1	น้ำ	- ซีโอดี 40 mg/L ถึง 5 000 mg/L - โปรท 0.001 mg/L ถึง 0.02 mg/L - บีไอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5220 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 3112 B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1 (ต่อ)	น้ำ	<p>- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L</p> <p>- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L</p> <p>- ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L</p>	<p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-F⁻ C</p>

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1 (ต่อ)	น้ำ	- คลอไรด์ 50 mg/L ถึง 2 000 mg/L - ความกระด้างทั้งหมด (คำนวณเป็นแคลเซียมคาร์บอเนต) 50 mg/L ถึง 500 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 4500-Cl ⁻ B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2340 C

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2	น้ำเสีย	- ซีโอดี 40 mg/L ถึง 5 000 mg/L - โปรท 0.001 mg/L ถึง 0.02 mg/L - บีโอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5220 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 3112 B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2 (ต่อ)	น้ำเสีย	<p>- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L</p> <p>- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L</p> <p>- ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L</p>	<p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-F⁻ C</p>

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2 (ต่อ)	น้ำเสีย	- คลอไรต์ 50 mg/L ถึง 2 000 mg/L - ความกระด้างทั้งหมด (คำนวณเป็นแคลเซียมคาร์บอเนต) 50 mg/L ถึง 500 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 4500-Cl ⁻ B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2340 C
3	น้ำทะเล	- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 100 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2540 D

ออกให้ ณ วันที่ : 10 มกราคม 2568

ลงชื่อ :



(นางจันทร์รัตน์ วรสรรพวิทย)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5



ใบรับรองเลขที่ 23-LB0251
(Certificate No.)

ใบรับรองระบบงาน (Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด
(Eastern Thai Consulting 1992 Co., Ltd.)

ตั้งอยู่เลขที่
(Address)

๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม อำเภอสรีราชา จังหวัดชลบุรี
(683 Moo 11, Sukhapibarn 8 Road, Nongkham, Sriracha, Chonburi)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๕ - ๒๕๖๑
(Standard No. TIS 17025-2561 (2018) (ISO/IEC 17025: 2017))

ข้อกำหนดทั่วไปว่าด้วยความสามารถของ ห้องปฏิบัติการทดสอบและห้องปฏิบัติการสอบเทียบ
(General requirements for the competence of testing and calibration laboratories)

หมายเลขการรับรองที่ ทดสอบ ๑๗๑๒
(Accreditation No. Testing 1712)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้ใบรับรอง แสดงไว้ใน QR CODE และ www.tisi.go.th
(Details of the scheme and scope of the certificate are shown in QR CODE and www.tisi.go.th)

ออกให้ ณ วันที่ ๒๓ สิงหาคม พ.ศ. ๒๕๖๖
(Issue date : 23 August B.E. 2566 (2023))

(นายเอกนิติ รมยานนท์)

รองเลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



c88f6993



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ชื่อห้องปฏิบัติการ

(Laboratory Name)

บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

(Eastern Thai Consulting 1992 Co.,Ltd.)

หมายเลขการรับรองที่

(Accreditation No.)

ทดสอบ 1712

(Testing 1712)

ฉบับที่ 01

(Issue No.01)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from) (17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☒ ถาวร

(Permanent)

☐ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสังแวดล้อม (Environmental field)</p> <p>1. น้ำ (Water)</p>	<p>- โลหะหนัก (Heavy metal)</p> <ul style="list-style-type: none"> โครเมียม (Cr) 0.03 mg/L to 2.00 mg/L ทองแดง (Cu) 0.03 mg/L to 2.00 mg/L เหล็ก (Fe) 0.03 mg/L to 2.00 mg/L ตะกั่ว (Pb) 0.01 mg/L to 1.00 mg/L นิกเกิล (Ni) 0.03 mg/L to 2.00 mg/L อลูมิเนียม (Al) 0.10 mg/L to 2.00 mg/L แบเรียม (Ba) 0.03 mg/L to 2.00 mg/L แคดเมียม (Cd) 0.003 mg/L to 1.00 mg/L แมงกานีส (Mn) 0.03 mg/L to 2.00 mg/L เงิน (Ag) 0.05 mg/L to 2.00 mg/L สังกะสี (Zn) 0.03 mg/L to 2.00 mg/L 	<p>- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B</p>

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

(Ministry of Industry, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☒ ถาวร

(Permanent)

☐ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสิ่งแวดล้อม (Environmental field)</p> <p>1. น้ำ (ต่อ) (Water) (cont.)</p> <p>2. น้ำเสีย (Wastewater)</p>	<p>- ไขมันและน้ำมัน (Oil & Grease) 3.0 mg/L - 20.0 mg/L</p> <p>- โลหะหนัก (Heavy metal)</p> <ul style="list-style-type: none"> โครเมียม (Cr) 0.03 mg/L to 2.00 mg/L ทองแดง (Cu) 0.03 mg/L to 2.00 mg/L เหล็ก (Fe) 0.03 mg/L to 2.00 mg/L ตะกั่ว (Pb) 0.03 mg/L to 2.00 mg/L นิกเกิล (Ni) 0.03 mg/L to 2.00 mg/L อลูมิเนียม (Al) 0.10 mg/L to 2.00 mg/L แบเรียม (Ba) 0.03 mg/L to 2.00 mg/L แคดเมียม (Cd) 0.03 mg/L to 2.00 mg/L 	<p>- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 5520 B</p> <p>- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.01)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

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สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสังแวดล้อม (Environmental field)</p> <p>2. น้ำเสีย (ต่อ) (Wastewater) (cont.)</p>	<p>- โลหะหนัก (ต่อ) (Heavy metal) (cont.)</p> <ul style="list-style-type: none"> • แมงกานีส (Mn) 0.03 mg/L to 2.00 mg/L • เงิน (Ag) 0.05 mg/L to 2.00 mg/L • สังกะสี (Zn) 0.03 mg/L to 2.00 mg/L <p>- ไขมันและน้ำมัน (Oil & Grease) 3.0 mg/L - 20.0 mg/L</p>	<p>- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B</p> <p>- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 5520 B</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01
(Issue No.)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566
(Valid from) (17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571
(Until) (16 July B.E.2571 (2028))

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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสีงแวดล้อม (Environmental field)</p> <p>3.พื้นที่การทำงาน (Workplace)</p>	<p>- ระดับเสียง (Sound Level)</p> <ul style="list-style-type: none"> ระดับเสียงเฉลี่ย L_{eqT} ช่วง 30 - 130 dB(A) ระดับเสียงสูงสุด L_{max} ช่วง 30 - 130 dB(A) 	<p>- ISO 11202:2010</p> <p>- ประกาศกระทรวงอุตสาหกรรม เรื่องมาตรการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.2546 ลงวันที่ 6 พ.ย. 2546 (Notification of The Ministry of Industry B.E. 2546 (2003) on the Safety Protection Measures in Factory Regarding Working Area Environment, dated November 6, 2003)</p> <p>- ประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่องมาตรฐานระดับเสียงที่ยอมให้ลูกจ้างได้รับเฉลี่ยตลอดระยะเวลาการทำงานในแต่ละวัน ลงวันที่ 13 ธ.ค. 2560 (Notification of the Department of Labor Protection and Welfare on the standard of noise level that employees are allowed to receive in average period of work each day, dated December 13, 2017.)</p> <p>- ประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่องหลักเกณฑ์ วิธีการตรวจวัดและการวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภทกิจการที่ต้องดำเนินการ ลงวันที่ 8 ก.พ. 2561 (Notification of the Department of Labor Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, dated February 8, 2018.)</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.)

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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสิ่งแวดล้อม (Environmental field)</p> <p>4. บรรยากาศ (Ambient)</p>	<p>- ระดับเสียง (Sound Level)</p> <ul style="list-style-type: none"> • ระดับเสียงเฉลี่ย LeqT ช่วง 30.0 - 130.0 dB(A) • ระดับเสียงสูงสุด Lmax ช่วง 30.0 - 130.0 dB(A) 	<p>- ISO 1996 - 1 : 2016</p> <p>- ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (2540) เรื่องกำหนด มาตรฐาน ระดับเสียงโดยทั่วไป ลงวันที่ 12 มี.ค. 2540 (Notification of The National Environmental Board Volume 15 B.E. 2540 (1997) on the general noise level standards, dated March 12, 1997)</p> <p>- ประกาศกรมควบคุมมลพิษ เรื่อง การ คำนวณค่าระดับเสียง ลงวันที่ 11 ส.ค. 2540 (Notification of the Pollution Control Department on the calculation of the noise level, dated August 11, 1997.)</p> <p>- ประกาศกรมโรงงานอุตสาหกรรม เรื่อง วิธีการตรวจวัดระดับเสียงการรบกวน ระดับ เสียงเฉลี่ย 24 ชั่วโมง และระดับเสียงสูงสุดที่ เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2553 ลงวันที่ 20 ธ.ค. 2553 (Notification of the Department of Industrial Works on Methods for Measuring Noise Annoyance, Noise Levels 24-Hour Average and Maximum Noise Level from Factory B.E. 2553, dated December 20, 2010.)</p>

ภาคผนวกที่ 4

สรุปเอกสารการสอบเทียบอุปกรณ์เครื่องมือ

ANALYTICAL BALANCE (DU)

Model : XS205DU


Serial No. : 1126323724

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5846/4 - 846/5 Lasalle Rd., Bangna Tai
Bangna District, Bangkok 10260
+66 2723 0382
MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: EASTERN THAI CONSULTING 1992 CO., LTD.
Address: 683 Moo 11, Sukhaphiban 8 Rd., Nong Kham
City: Sriracha Contact: Sasiporn Nakin
Zip / Postal: 20230
State / Province: Chonburi
Order Number: 
0 3 3 3 3 1 9 6 1 9

Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: XS205DU Asset Number: LABE 05/1
Serial No.: 1126323724 Terminal Model: SAT
Building: Laboratory Terminal Serial No.: 1126323724
Floor: 1 Terminal Asset No.: N/A
Room: Analytical Balance

Range	Max. Capacity	Readability (d)
1	81 g	0.00001 g
2	220 g	0.0001 g

Procedure

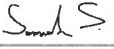

Calibration Guidelines: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W002/20

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

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

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

	Temperature		Humidity	
As Found	Start: 25.7 °C	End: 25.8 °C	Start: 50.9 %	End: 50.6 %

As Found Calibration Date: 09-Dec-2024
As Left Calibration Date: N/A
Issue Date: 11-Dec-2024
Calibrator: 
Somsak Sattanaco
Approved Signatory: 
Sirachai P.
Technical Manager / Head of Calibration Center

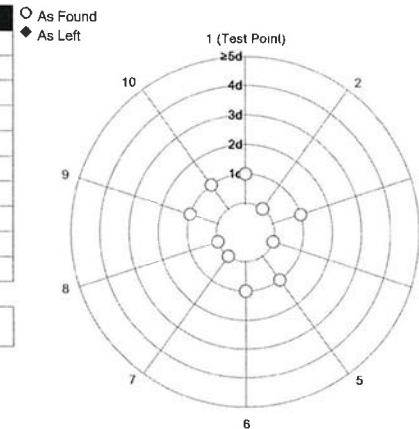
Measurement Results

Repeatability

Test Load: 70 g

	As Found	As Left
1	70.00004 g	N/A
2	70.00005 g	N/A
3	70.00004 g	N/A
4	70.00005 g	N/A
5	70.00006 g	N/A
6	70.00004 g	N/A
7	70.00005 g	N/A
8	70.00005 g	N/A
9	70.00006 g	N/A
10	70.00006 g	N/A

Standard Deviation	0.000008 g	N/A
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The "d" in the graph represents the readability of the range/interval in which the test was performed.

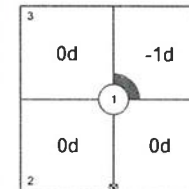
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

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

Maximum Deviation	0.0001 g	N/A
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As Found

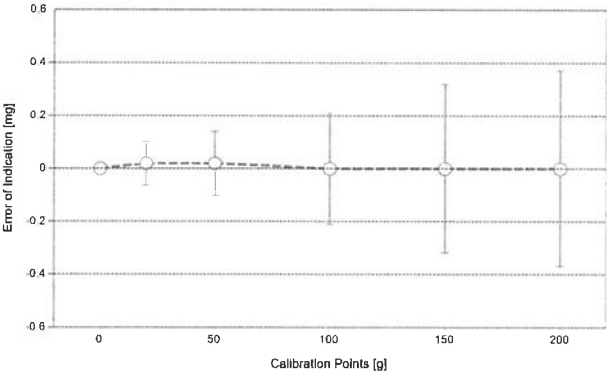
The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.017 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.020 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.023 mg	2
4	1.00000 g	1.00000 g	0.00000 g	0.032 mg	2
5	4.99998 g	5.00000 g	0.00002 g	0.048 mg	2
6	10.00001 g	10.00001 g	0.00000 g	0.061 mg	2
7	19.99999 g	20.00001 g	0.00002 g	0.082 mg	2
8 *	50.00003 g	50.00005 g	0.00002 g	0.12 mg	2
9	100.00000 g	100.00000 g	0.00000 g	0.21 mg	2
10	150.00000 g	150.00000 g	0.00000 g	0.32 mg	2
11	200.00000 g	200.00000 g	0.00000 g	0.37 mg	2

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



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

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

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

Test Equipment

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

Weight Set 1: OIML E2

Weight Set No.: WS37 Date of Issue: 17-Jun-2024
Certificate Number: 186753-1 Calibration Due Date: 20-Jan-2025

Weight Set 2: OIML E2

Weight Set No.: WS87 Date of Issue: 04-Jul-2023
Certificate Number: 186520 Calibration Due Date: 02-Jan-2025

Thermo Hygrometer

Equipment No.: IN279 Date of Issue: 19-Jun-2024
Certificate Number: SG-H-00577/67 Calibration Due Date: 17-Jun-2025

Remarks

FACT adjustment functionality activated
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory

End of Accredited Section

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

Measurement Uncertainty of the Weighing Instrument in Use

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

Temperature coefficient for the evaluation of the measurement uncertainty in use: 1.5 · 10⁻⁸ / K
Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

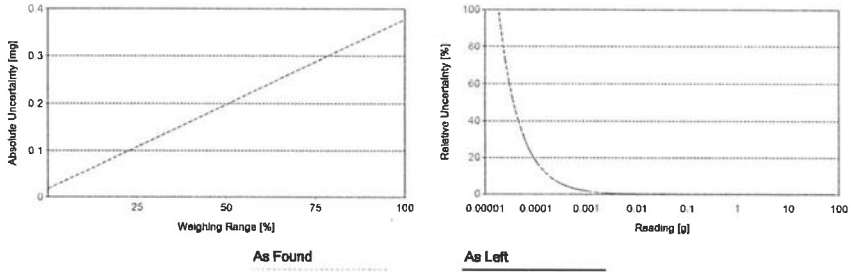
Linearization of Uncertainty Equation

Range		As Found		As Left
d	Max			
1	0.00001 g	81 g	U ₁ = 0.018 mg + 0.00444 mg/g · R	N/A
2	0.0001 g	220 g	U ₂ = 0.06 mg + 0.00439 mg/g · R	N/A

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

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

Net Indication	As Found		As Left	
0.00220 g	0.018 mg	0.82%	N/A	N/A
0.02200 g	0.018 mg	0.082%	N/A	N/A
0.22000 g	0.019 mg	0.0086%	N/A	N/A
2.20000 g	0.028 mg	0.0013%	N/A	N/A
220.0000 g	1.0 mg	0.00047%	N/A	N/A



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

GWP®
Certificate



As Found



As Left



The weighing device meets the given process requirements.

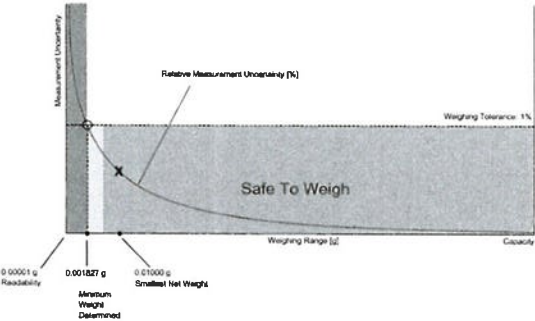
The weighing device meets the given process requirements.

Tests Performed: ☒ As Found ☐ As Left ☒ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: 1% | Smallest Net Weight: 0.01000 g | Safety Factor: 2

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

Minimum Weight

As Found Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.018339 g	0.036842 g	0.055511 g	0.093358 g	0.191052 g
0.2%	0.009149 g	0.018339 g	0.027570 g	0.046156 g	0.093358 g
0.5%	0.003655 g	0.007316 g	0.010984 g	0.018339 g	0.036842 g
1%	0.001827 g	0.003655 g	0.005485 g	0.009149 g	0.018339 g
2%	0.000913 g	0.001827 g	0.002740 g	0.004569 g	0.009149 g
5%	0.000365 g	0.000730 g	0.001096 g	0.001827 g	0.003655 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.018339 g	0.036842 g	0.055511 g	0.093358 g	0.191052 g
0.2%	0.009149 g	0.018339 g	0.027570 g	0.046156 g	0.093358 g
0.5%	0.003655 g	0.007316 g	0.010984 g	0.018339 g	0.036842 g
1%	0.001827 g	0.003655 g	0.005485 g	0.009149 g	0.018339 g
2%	0.000913 g	0.001827 g	0.002740 g	0.004569 g	0.009149 g
5%	0.000365 g	0.000730 g	0.001096 g	0.001827 g	0.003655 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed

✗ = Failed

⚠ = Safety Factor not met

Repeatability

Test Load: 70 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	0.000005 g	0.000008 g	✗	0.000008 g	✗
0.2%	0.000010 g		✓		⚠
0.5%	0.000025 g		✓		✓
1%	0.000050 g		✓		✓
2%	0.000100 g		✓		✓
5%	0.000250 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

COPY

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
19.99999 g	0.00002 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00003 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	0.0000 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
19.99999 g	0.00002 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00003 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	0.0000 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

COPY

ANALYTICAL BALANCE

Model : SECURA224-1S

Serial No. : 0036707137

Certificate No. : 24-164695
Sample Code : 24-67405-005

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd, Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : SARTORIUS

Model : SECURA224-1S

Serial No. : 0036707137

ID No. : LABE 05/2

Date of Receipt : 19 December 2024

Date of Calibration : 19 December 2024

Calibrated by Mr. Thanadol Pholthep
Scientist

Approved by (Mr. Nuttaput Timula)
Signed for Director

Issue date 20 December 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

Certificate No. : 24-164695
Sample Code : 24-67405-005

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE
Manufacturer : SARTORIUS
Model : SECURA224-1S
Capacity : Max 220 g
Resolution : 0.0001 g
Serial No. : 0036707137
ID No. : LABE 05/2

Result of Calibration

1. Test weight and repeatability of reading

Repeatability is a measure of the ability of a balance to supply the same result in repetitive weighings with one and the same load under the same measurement condition. The measurement of the repeatability must include both the balance specifications and the ambient (vibration, fluctuating air current/temperature/humidity, etc.) Operator handling of the balance is also included in the standard deviation.

Unit : g	Range : 220	<input type="checkbox"/> Before adjustment	<input type="checkbox"/> After adjustment
<input checked="" type="checkbox"/> No adjustment	Nominal value	100	200
<input type="checkbox"/> Adjustment	Standard weight	100.000016	200.000028
	Average reading of indicator	100.0000	200.0000
	Standard deviation	0.00005	0.00005
Unit : -	Range : -	<input type="checkbox"/> Before adjustment	<input type="checkbox"/> After adjustment
<input type="checkbox"/> No adjustment	Nominal value	-	-
<input type="checkbox"/> Adjustment	Standard weight	-	-
	Average reading of indicator	-	-
	Standard deviation	-	-

Certificate No. : 24-164695
Sample Code : 24-67405-005

Page 3 of 4

REPORT OF CALIBRATION

Result of Calibration

2. Sensitivity or value of a scale division

Change in the output variable of a measuring instrument divided by the associated change in the input variable.

Unit : g

Range : 220

Range :

Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	0.9998	-	-
100	0.9998	-	-
200	0.8998	-	-

3. Departure of indication from nominal value, Linearity

Unit : g

Nominal Value	Standard Value	Average Reading of Indicator	Correction Value	Expanded Uncertainty	Coverage Factor (k)
Unload	0.0000000	0.0000	0.0000	0.000094	2.01
0.01	0.0100015	0.0100	0.0000	0.000094	2.01
0.1	0.1000064	0.1000	0.0000	0.000094	2.01
1	1.0000017	1.0000	0.0000	0.000095	2.01
2	2.0000049	2.0000	0.0000	0.000095	2.01
5	5.0000012	5.0000	0.0000	0.000096	2.01
10	9.999992	10.0000	0.0000	0.000097	2.01
20	20.000042	20.0000	0.0000	0.00010	2.01
50	50.000046	50.0000	0.0000	0.00012	2.01
100	100.000016	100.0000	0.0000	0.00016	2.00
200	200.000028	200.0000	0.0000	0.00028	2.00

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

Certificate No. : 24-164695
Sample Code : 24-67405-005

Page 4 of 4

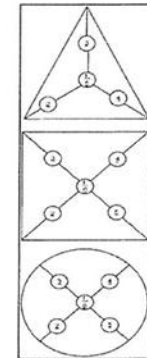
REPORT OF CALIBRATION

Result of Calibration :

4. Eccentric or off-centre loading

Deviation of the measurement value through off-center (eccentric) loading. The corner load increases with the weight of the load and its removal from the center of the pan support.

<input checked="" type="radio"/> Circle		
Weighing pan	<input type="radio"/> Triangular	Test weight : 100
	<input type="radio"/> Rectangular	Unit : g
Range	220	*
Position	Reading of indicator	Reading of indicator
1	99.9999	*
2	100.0001	*
3	99.9999	*
4	99.9998	*
5	99.9999	*
6	99.9999	*
Maximum difference	0.0002	*

☒ Circle☐ Triangular☐ Rectangular

Condition of Calibration

1. Calibration Method : WI-CL-004 base on UKAS LAB 14: 2019

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

3. Condition of Calibration item: Normal

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

- Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (Instrument number 1).

5. Reference standard instrument :

Instrument	Class	ID No.	Certificate No.	Due Date
1) STANDARD WEIGHT 1 mg to 1 kg	E2	LB-WE-78	24-097116	02 August 2025

- End of Report -

6. Ambient conditions	Min	Max
Temperature (°C)	25.0	25.4
Relative Humidity (%Rh)	39.8	41.0
Air pressure (hPa)	1011.0	1012.1

BAROMETER

Equipment : Analog Barometer

ID No. / Tag No. : BM001/41



MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD

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



CALIBRATION CERTIFICATE

Certificate No. : L202405022-0013

Date Issued : 08-May-24

Customer : Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Equipment : Analog Barometer

Manufacturer : Barigo

Model : -

Serial No. : -

ID No./Tag No. : BM001/41

Date Received : 03-May-24

Date Calibrated : 06-May-24

Calibrated by : Mr. Saruth Srichutikul

Calibration Method or Calibration Procedure Used

In-house method : CP-21 base on DKD-R 6-1: Edition 3 2014.

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

Result of Calibration

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

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

Approved by:

Sarayuth T.
(Mr. Sarayuth Tochua)



Page 1 of 2

COPY

Certificate No : L202405022-0013

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

STD Reading	UUC Reading (mbar)	UUC Reading (mbar)	UUC Error	Uncertainty	MPE	Pass
mbar	Before Adjusted	After Adjusted	mbar	\pm mbar	\pm mbar	with Gua
990.00	990	-	0.00	0.59	10.3	Pa
1000.00	1000	-	0.00	0.59	10.3	Pa
1010.00	1010	-	0.00	0.59	10.3	Pa
1020.00	1020	-	0.00	0.59	10.3	Pa
1030.00	1030	-	0.00	0.59	10.3	Pa

STD = Standard Pass = $|\text{error}| + |\text{uncertainty}| \leq |\text{MPE}|$

UUC = Unit Under Calibration Fail = $|\text{error}| + |\text{uncertainty}| > |\text{MPE}|$

MPE = Maximum Permissible Error

Calibrated condition : Pressure Medium Air : Density = 1.19 kg/m^3 @ 20°C . 1 bar
Mounting Position Vertical
Reference Level at center of its dial
Conversion Factor Multiply by 1.0 $\text{E}+02$ - Pa unit

Description of UUC : Range 950 - 1080 mbar Absolute
Calibration Range 990 - 1030 mbar Absolute
Scale Interval 1 mbar

Condition As-Received : Used Item

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

Measurement Standards Used & Traceability :

The International System of Units (SI) through

iRPC Certificate No. CL1-P230097 for Reference Pressure Monitor Serial No. 1598, Due 09-Nov-24

End of Certificate

COPY

BAROMETER

Serial No. : N/A[S41020124]



CALIBRATION LABORATORY Co.,LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
CLID. NO. : 212500828
JOB CONTROL NO. : 250507051351
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 07 May 2025

DATE OF ISSUED : 09 May 2025

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

Calibrated By : Sittipong Pimdee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
09 May 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. Q25051351

F3-011-05/12-23



CALIBRATION LABORATORY Co.,LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
DATE OF CALIBRATION : 08 May 2025

ENVIRONMENT CONDITIONS :

Temperature : (23 ± 2) °C

Relative Humidity : (55 ± 10) %RH

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-08 according to DKD-R 6-1 as calibration guidelines.
The calibration was performed by direct measurement with Reference Pressure Monitor which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Reference Pressure Monitor, Fluke Model RPM3 S/N. 829.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. MP-0245-24, Due Date 11 November 2025.

UNCERTAINTY :

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

Certificate No. Q25051351

F3-011-05/12-23

page 2 of 3





CALIBRATION LABORATORY CO., LTD.

2/10-11,14,55 Soi Prasert Manukil 29 Yaek 4, Prasert Manukil Rd., Ladphrao, Bangkok 10230
Tel: 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

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

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (hPa)	STD Reading (hPa)		Correction (hPa)	
	Up	Down	Up	Down
990	990.7	990.7	+0.7	+0.7
1000	1000.7	1000.8	+0.7	+0.8
1010	1010.8	1010.8	+0.8	+0.8
1020	1020.8	1020.9	+0.8	+0.9
1030	1030.9	1030.9	+0.9	+0.9

Uncertainty of measurement ± 0.7 hPa

Transmitting fluid : Air.

Note, The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 44 of 68

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

End of Certificate

Certificate No. Q25051351

F3-011-05/12-23

COPY



@clccalibration

BOD INCUBATOR

Model : LABE 19/3



Page 1 of 3

CERTIFICATE OF CALIBRATION

Certificate No. : 24-089291

Sample Code : 24-35676-001

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham, Sriracha,
Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)

Equipment : Temperature controlled enclosures (Incubator)

Manufacturer : พืช เครื่องเย็น Model : N/A

Serial No. : S43020027 ID No. : LABE 19/3

Date of Receipt : 16 July 2024 Date of Calibration : 16 July 2024

Condition of Calibration

1. Environment
- | | | | | | | |
|---------------------------|---|---------|-----------|---|---------|-----------|
| 1.1 Ambient temperature | : | Maximum | 30.6 °C | : | Minimum | 28.9 °C |
| 1.2 Relative humidity | : | Maximum | 76.9 % | : | Minimum | 69.4 % |
| 1.3 Line voltage supplied | : | Maximum | 219.8 VAC | : | Minimum | 217.1 VAC |

2. Calibration method

TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data acquisition with sensor (RTD-P1100)	LB-DA-12 (RTD-168 to RTD-176)	24-045389	28 April 2025

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Mr. Pattanapong Pulngern

Scientist

Approved by

(Mr. Somchai Neampunt)

Signed for Director

Issue date 17 July 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is Issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC)



Page 2 of 3

REPORT OF CALIBRATION

Certificate No. : 24-089291

Sample Code : 24-35676-001

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)									Uncertainty ± (°C)	Coverage factor <i>k</i>
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9 ^{Rev}		
20	20.0	20.0	20.56	20.45	20.01	19.85	20.21	20.25	20.17	20.05	20.11	0.24	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
20	0.08	0.50	0.87

Notes

- UUC* = Unit Under Calibration

REPORT OF CALIBRATION

Certificate No. : 24-089291

Sample Code : 24-35676-001

Results of Calibration

Notes

1. Sensor installation locations
 - 1.1 All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - 1.2 The reference sensor is preferably located of the geometric center of the chamber.
2. Interior dimensions approx of chamber :
W = 70 cm ; D = 55 cm ; H = 140 cm
3. Air valve or fresh air level : Off
4. Fan level : Open
5. The quoted uncertainty includes "Stability of chamber and loading effect in chamber at 20% of uniformity".
6. Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.
7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
10. Calibration results without adjustment.

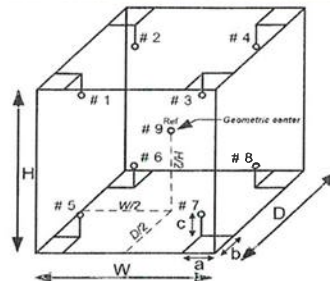


Figure: Example of sensor
installation Positions

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

COPY

BOD INCUBATOR

Model : LABE 19/5



Page 1 of 3

CERTIFICATE OF CALIBRATION

Certificate No. : 25-042561
Sample Code : 25-18090-002Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)

Equipment : Temperature controlled enclosures (Incubator)

Manufacturer : Lovibond Model : TC 445 S

Serial No. : 0520/005227 ID No. : LABE 19/5

Date of Receipt : 20 March 2025 Date of Calibration : 20 March 2025

Condition of Calibration

1. Environment
- | | |
|---------------------------|-----------------------------------------|
| 1.1 Ambient temperature | : Maximum 29.9 °C ; Minimum 27.5 °C |
| 1.2 Relative humidity | : Maximum 51.9 % ; Minimum 43.4 % |
| 1.3 Line voltage supplied | : Maximum 239.4 VAC ; Minimum 232.8 VAC |

2. Calibration method

TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data Acquisition With Sensor (RTD-Pt100)	LB-DA-11 (RTD-148 to RTD-155, RTD-227)	24-040190	03 April 2025

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Mr. Pattanapong Pulngern

Scientist

Approved by

(Mr. Somchai Neampunt)

Signed for Director

Issue date 24 March 2025

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Page 2 of 3

REPORT OF CALIBRATION

Certificate No. : 25-042561

Sample Code : 25-18090-002

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)								Uncertainty ± (°C)	Coverage factor k	
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8			# 9 ^{Ref}
20	20.5	20.5	19.91	19.78	19.82	19.86	19.78	19.85	19.93	19.63	19.79	0.38	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
20	0.28	0.25	0.83

Notes

- UUC* = Unit Under Calibration

NSC-TISI-TIS17025
CALIBRATION 0152

Page 3 of 3

REPORT OF CALIBRATION

Certificate No. : 25-042561

Sample Code : 25-18090-002

Results of Calibration

Notes

1. Sensor installation locations
 - 1.1 All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - 1.2 The reference sensor is preferably located of the geometric center of the chamber.
2. Interior dimensions approx of chamber :
W = 60 cm ; D = 56 cm ; H = 146 cm
3. Air valve or fresh air level : Off
4. Fan level : Open
5. The quoted uncertainty includes" Stability of chamber and loading effect in chamber at 20% of uniformity %.
6. Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.
7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
10. Calibration results without adjustment.

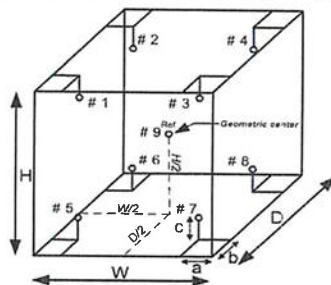


Figure: Example of sensor
Installation Positions

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

COPY

Hot Air Oven

Model : UM 400

Serial No. : 900982



Page 1 of 3

CERTIFICATE OF CALIBRATION

Certificate No. : 24-164692

Sample Code : 24-67405-002

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd, Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Hot Lab)

Equipment : Temperature controlled enclosures (Hot air oven)

Manufacturer : Memmert Model : UM 400

Serial No. : 900982 ID No. : LABE 17/1

Date of Receipt : 19 December 2024 Date of Calibration : 19 December 2024

Condition of Calibration

1. Environment
- | | |
|---------------------------|-----------------------------------------|
| 1.1 Ambient temperature | : Maximum 32.1 °C ; Minimum 30.4 °C |
| 1.2 Relative humidity | : Maximum 48.9 % ; Minimum 42.4 % |
| 1.3 Line voltage supplied | : Maximum 226.3 VAC ; Minimum 221.0 VAC |

2. Calibration method

TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data Acquisition With Sensor (RTD-Pt100)	LB-DA-11 (RTD-148 to RTD-155, RTD-227)	24-040190	03 April 2025

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Mr. Nophanon Anusak
Scientist

Approved by

(Mr. Somchai Neampunt)
Signed for Director

Issue date 20 December 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Page 2 of 3

REPORT OF CALIBRATION

Certificate No. : 24-164692

Sample Code : 24-67405-002

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)									Uncertainty ± (°C)	Coverage factor k
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9 ^{Ref}		
85	85.0	85.0	85.33	85.28	84.83	85.01	85.15	85.18	85.32	85.12	85.23	0.25	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
85	0.10	0.43	0.69

Notes

- UUC* = Unit Under Calibration

COPY

REPORT OF CALIBRATION

Certificate No. : 24-164692

Sample Code : 24-67405-002

Results of Calibration

Notes

1. Sensor installation locations

- 1.1 All sensors at any corners or walls should be positioned 5 cm ($a \times b \times c$) from the wall.
- 1.2 The reference sensor is preferably located of the geometric center of the chamber.

2. Interior dimensions approx of chamber :

W = 40 cm ; D = 28 cm ; H = 39 cm

3. Air valve or fresh air level : Off

4. Fan level : Open

5. The quoted uncertainty includes " Stability of chamber and loading effect in chamber at 20% of uniformity ".

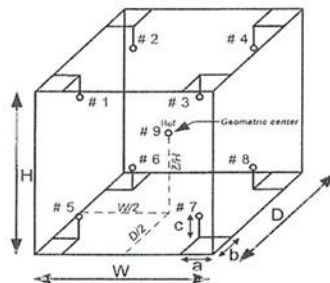
6. Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.

8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.

9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.

10. Calibration results without adjustment.

Figure: Example of sensor
installation Positions

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

- End of Report -


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ICP-OES/Avio550

Serial No. : M81S2210101

ICP-OES/Avio550 Preventive Maintenance (PM)

Company Name:	Eastern Thai Consulting 1992 Cl.,Ltd.		
Address (Instrument Location):	683 Moo 11 Sukapibal 8 Rd. Nong Kham,Si Racha, Chonburi 20230		
Serial Number:	M8152210101	PM Number:	2 of 2
Customer Name (if applicable):		Telephone Number:	
Service Engineer Name:	Khwanchai	Service Order Number:	WO-02963150
Date PM Performed: (DD-MMM-YYYY)	25-Oct-2024	Next PM Due Date: (DD-MMM-YYYY)	25-Apr-2025
Standard Labor Hours to Complete PM :		4 hours	

Part Number	Release	Publication Date	
TH09370188 Rev.2	B	July 2020	

Scope

The purpose of this PM is to ensure the continued functionality of the PerkinElmer / Avio550 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer. The customer should save their method before the PM begins.

General Instructions:

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.

Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files. The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.

Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes
NA	NA	NA

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
09995098	Air Filter-Spectrometer	N/A
N077520	Air Filter-RF Generator	N/A
09992731	Axial Window	N/A
B0810377	Radial Window	N/A
N0770438	O-ring kit, injector support adapter	N/A
N0780437	O-ring kit, torch	N/A

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	Description	Quality	Batch/Lot #	Expired Date (MM/YY)
N0691579	Muti-Element Standard	AR	61-176CRX1	06/2025
N9300221	DL Standard diluted 100 X	AR	59-091CRY1	11/2024
N0582152	Wave Cal Solution	AR	61-023CRX1	02/2025
N9302946	VIS Wavecal Solution	AR	58-145CRT1	04/2025

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Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. General:

- ☒ Ask customer about unit's performance since last visit.
- ☒ Check incoming AC line voltage under load for proper levels and grounding.
- ☒ Is the instrument operational? If not, please comment.

2. Mechanical:

- ☒ Inspect and clean all fans and filters.
- ☒ Inspect and replace torch components and necessary.
- Torch Components Replaced: ☐ Yes ☒ No
- ☐ Inspect all tubing for signs of cracking or leaking and replace as necessary.
- Tubing Replaced: ☐ Yes ☒ No

- ☒ Inspect the peristaltic pump for proper operation.
- ☒ Check and adjust if necessary, the external nitrogen, argon shear gas and water supply pressures.
- ☒ Check and adjust if necessary, the internal nitrogen, main argon, torch argon and shear gas pressures.

Regulator	Measured Pressure	Set Pressure
Nitrogen	NA	NA (calibrated in Factory)
Main Argon	76	76 psig
Torch Argon	67	67 psig
Shear Gas	65	65 psig
Water	35	35 psig

- ☒ Check shear gas nozzle for blockages and proper, uniform flow.
- ☒ Inspect nitrogen Hi/Low purge and shear gas solenoids for proper function.
- ☒ Inspect the function of all spectrometer motors. Drive the motors from the Spectrometer DCM. (slits, XY motor)
- ☒ Inspect the function of the pneumatic shutter for proper operation.
- ☒ Perform preventative maintenance on the chiller as required. Make the customer aware of the importance of maintaining the chiller fluid level and filter replacement.
- ☒ Drain air compressor surge tank.
- ☒ Clean exterior of instrument.
- ☒ Visually inspect all PC boards for cleanliness and signs of corrosion.

3. Electrical

- ☒ Check all RF generator and spectrometer power supply voltages.
- ☒ Run instrument diagnostic checks from the appropriate Device Control Module.

RF Generator:

- ☒ Check the RF generator status screens.
- ☒ Check the function of all interlocks.

Spectrometer:

- ☒ Check the spectrometer status screens. Ensure Ready mode with no fetal errors.
- ☒ Check the spectrometer optical tub temperatures (top, bottom, fin, optical base).
- ☒ Check detector temperatures.
- ☒ Check TEC voltages (6.5VDC)

4. Optical:

- ☒ Clean or replace the axial and radial view windows as necessary.
- Axial Window Replaced: ☐ Yes ☒ No
- Radial Window Replaced: ☐ Yes ☒ No

5. PM Performance Tests:

- ☒ Perform View Align.

Test Spectral Resolution:

- ☒ Measure the spectrometers ability to separate two adjacent wavelengths.

Parameter	Specification	Test Result	Pass/Fail
As 193.696 - Resolution	≤0.007	0.00528	Passed
Ni 231.604 - Resolution	≤0.008	0.00724	Passed
Ni 341.476 - Resolution	≤0.012	0.00911	Passed
La 408.672 - Resolution	≤0.020	0.01596	Passed
Ba 455.403 - Resolution	≤0.025	0.02165	Passed

Test Precision:

- ☒ Test for reproducibility of a set of measurement.

Parameter	Specification	Test Result	Pass/Fail
As 193.696	%RSD ≤ 1 %	0.26	Passed
Zn 213.856	%RSD ≤ 1 %	0.21	Passed
Mn 257.610	%RSD ≤ 1 %	0.20	Passed
La 379.478	%RSD ≤ 1 %	0.21	Passed
Ba 455.403	%RSD ≤ 1 %	0.21	Passed
Ba 493.408	%RSD ≤ 1 %	0.19	Passed

☒ Run an Axial & Radial BEC according to the A&T spec.

Test Axial BEC Cd:

Method "BEC-XL" For Samples "IB (2%HNO3)" and "IS (N930-0221/100)", record intensities.

Calculated BEC: $BEC = (IB * Conc\ of\ Std) / (IS - IB)$. Where Conc of Std = 500 PPB

Element	Conc.	IB	IS	
Cd 226	500	523.1	223029.5	
IB*Conc	IS-IB	BEC	Spec	Pass/Fail
261550	222506.4	1.18	<150 PPB	Passed

Test Radial BEC Mn:

Method "BEC-RL" For Samples "IB (2%HNO3)" and "IS (N069-1579)", record intensities.

Calculated BEC: $BEC = (IB * Conc\ of\ Std) / (IS - IB)$. Where Conc of Std = 1,000 PPB

Element	Conc.	IB	IS	
Mn 257	1,000	586.9	253416.6	
IB*Conc	IS-IB	BEC	Spec	Pass/Fail
586900	252829.7	2.32	<45 PPB	Passed

6. Review:

- ☒ Review with the customer PM work performed.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

Additional Comments

Additional Comments Regarding the PM

None

Review

The preventive maintenance checks and if applicable performance tests for ICP-OES/Avio550 have been completed.

This ICP-OES/Avio550 ☒ *Passes* ☐ *Fails* *the preventive maintenance.*

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:

KL S.

Date:

25-Oct-2024
(DD-MMM-YYYY)

Authorized Customer Representative:

Date:


25-Oct-2024
(DD-MMM-YYYY)

ICP-OES/Avio550

Serial No. : M81S221010

ICP-OES/Avio500 Preventive Maintenance (PM)

Company Name:	Eastern Thai Consulting 1992 Co.,Ltd		
Address (Instrument Location):	683 Moo 11, Nong Kham Subdistrict, Si Racha District, Chonburi		
Serial Number:	M81S221010	PM Number:	1 of 2
Customer Name (if applicable):	Channarong	Telephone Number:	0968761232
Service Engineer Name:	Khwanchai	Service Order Number:	WO-03149107
Date PM Performed: (DD-MMM-YYYY)	22-Apr-2025	Next PM Due Date: (DD-MMM-YYYY)	22-Oct-2025
Standard Labor Hours to Complete PM :		4 hours	

Part Number	Release	Publication Date	
TH09370188 Rev.1	B	July 2020	

Scope

The purpose of this PM is to ensure the continued functionality of the PerkinElmer / Avio500 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer. The customer should save their method before the PM begins.

General Instructions:

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.

Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files. The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer. Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
09995098	Air Filter-Spectrometer	1
N077520	Air Filter-RF Generator	1
09992731	Axial Window	1
B0810377	Radial Window	1
N0770438	O-ring kit, injector support adapter	1
N0780437	O-ring kit, torch	1

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	Description	Quality	Batch/Lot #	Expired Date (MM/YY)
N0691579	Muti-Element Standard	AR	62-162CRX1	Dec-25
N9300221	DL Standard diluted 100 X	AR	61-190CRY1	Aug-25
N0582152	Wave Cal Solution	AR	63-059CRX1	Oct-25
N9302946	VIS Wavecal Solution	AR	61-167CRT1	Dec-25

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Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. General:

- ☒ Ask customer about unit's performance since last visit.
- ☒ Check incoming AC line voltage under load for proper levels and grounding.
- ☒ Is the instrument operational? If not, please comment.

2. Mechanical:

- ☒ Inspect and clean all fans and filters.
- ☒ Inspect and replace torch components and necessary.
Torch Components Replaced: ☒ Yes ☐ No
- ☒ Inspect all tubing for signs of cracking or leaking and replace as necessary.
Tubing Replaced: ☐ Yes ☒ No

- ☒ Inspect the peristaltic pump for proper operation.
- ☒ Check and adjust if necessary, the external nitrogen, argon shear gas and water supply pressures.
- ☒ Check and adjust if necessary, the internal nitrogen, main argon, torch argon and shear gas pressures.

Regulator	Measured Pressure	Set Pressure
Nitrogen		NA (calibrated In Factory)
Main Argon	76	76 psig
Torch Argon	67	67 psig
Shear Gas	65	65 psig
Water	35	35 psig

- ☒ Check shear gas nozzle for blockages and proper, uniform flow.
- ☒ Inspect nitrogen Hi/Low purge and shear gas solenoids for proper function.
 - ☒ Inspect the function of all spectrometer motors. Drive the motors from the Spectrometer DCM. (slits, XY motor)
- ☒ Inspect the function of the pneumatic shutter for proper operation.
 - ☒ Perform preventative maintenance on the chiller as required. Make the customer aware of the importance of maintaining the chiller fluid level and filter replacement.
- ☒ Drain air compressor surge tank.
- ☒ Clean exterior of instrument.
- ☒ Visually inspect all PC boards for cleanliness and signs of corrosion.

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3. Electrical

- ☒ Check all RF generator and spectrometer power supply voltages.
- ☒ Run instrument diagnostic checks from the appropriate Device Control Module.

RF Generator:

- ☒ Check the RF generator status screens.
- ☒ Check the function of all interlocks.

Spectrometer:

- ☒ Check the spectrometer status screens. Ensure Ready mode with no fatal errors.
- ☒ Check the spectrometer optical tub temperatures (top, bottom, fin, optical base).
- ☒ Check detector temperatures.
- ☒ Check TEC voltages (6.5VDC)

4. Optical:

- ☒ Clean or replace the axial and radial view windows as necessary.
Axial Window Replaced: ☒ Yes ☐ No
Radial Window Replaced: ☒ Yes ☐ No

5. PM Performance Tests:

- ☒ Perform View Align.

Test Spectral Resolution:

- ☒ Measure the spectrometers ability to separate two adjacent wavelengths.

Parameter	Specification	Test Result	Pass/Fail
As 193.696 - Resolution	≤0.007	0.00530	Passed
Ni 231.604 - Resolution	≤0.008	0.00730	Passed
Ni 341.476 - Resolution	≤0.012	0.00893	Passed
La 408.672 - Resolution	≤0.020	0.01603	Passed
Ba 455.403 - Resolution	≤0.025	0.02038	Passed

Test Precision:

- ☒ Test for reproducibility of a set of measurement.

Parameter	Specification	Test Result	Pass/Fail
As 193.696	%RSD ≤ 1 %	0.32	Passed
Zn 213.856	%RSD ≤ 1 %	0.18	Passed
Mn 257.610	%RSD ≤ 1 %	0.21	Passed
La 379.478	%RSD ≤ 1 %	0.13	Passed
Ba 455.403	%RSD ≤ 1 %	0.15	Passed
Ba 493.408	%RSD ≤ 1 %	0.20	Passed

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☒ Run an Axial & Radial BEC according to the A&T spec.

Test Axial BEC Cd:

Method "BEC-XL" For Samples "IB (2%HNO3)" and "IS (N930-0221/100)", record intensities.

Calculated BEC: $BEC = (IB * Conc\ of\ Std) / (IS - IB)$. Where Conc of Std = 500 PPB

Element	Conc.	IB	IS	
Cd 226	500	1199.8	209735	
IB*Conc	IS-IB	BEC	Spec	Pass/Fail
599900	208535.2	2.88	<150 PPB	Passed

Test Radial BEC Mn:

Method "BEC-RL" For Samples "IB (2%HNO3)" and "IS (N069-1579)", record intensities.

Calculated BEC: $BEC = (IB * Conc\ of\ Std) / (IS - IB)$. Where Conc of Std = 1,000 PPB

Element	Conc.	IB	IS	
Mn 257	1,000	653.2	217211.6	
IB*Conc	IS-IB	BEC	Spec	Pass/Fail
653200	216558.4	3.02	<45 PPB	Passed

6. Review:

- ☒ Review with the customer PM work performed.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

Additional Comments

Additional Comments Regarding the PM

- Use with Sample introduction AQ for PM test

Review

The preventive maintenance checks and if applicable performance tests for ICP-OES/Avio500 have been completed.

This ICP-OES/Avio500 Passes ☒ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	<i>KLS</i>	Date: 22-Apr-2025 (DD-MMM-YYYY)
Authorized Customer Representative:		Date: 22-Apr-2025 (DD-MMM-YYYY)

LIQUID IN GLASS THERMOMETER

Model / Type : 0-100 °C

Serial No. : 43560



CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : LIQUID IN GLASS THERMOMETER
MANUFACTURER : AA PRECISION
MODEL / TYPE : 0-100 °C
SERIAL NO. : 43560[LABE 16/1]
CLID. NO. : 232403905
JOB CONTROL NO. : 241031116258
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 31 October 2024

DATE OF ISSUED : 05 November 2024

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

Calibrated By : Pimsiri Hemtanon
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
05 November 2024



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

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Certificate No. Q24116258

F3-011-05/12-23

page 1 of 3



@clccalibration



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REPORT OF CALIBRATION

FOR

NOMENCLATURE : LIQUID IN GLASS THERMOMETER
MANUFACTURER : AA PRECISION
MODEL / TYPE : 0-100 °C
SERIAL NO. : 43560[LABE 16/1]
DATE OF CALIBRATION : 04 November 2024

ENVIRONMENT CONDITIONS :

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

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

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPH-02 based on ASTM E 77-07 as calibration guidelines.
The calibration was performed by comparison with Calibration Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Calibration Bath, Kambic Model OB-22/2 ULT, OB-22/2 S/N. 17115653, 17115654.
2. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03 with IPRT S/N. L0193A-1-1, PO106346-1-18.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23136342, Q23126517. Due Date 20 December 2024, 20 November 2024.
2. The measurements are traceable to International System of Units (SI), through Thailand Institute of Scientific and Technological Research (TISTR) and National Institute of Metrology (Thailand). Certificate No. PSL-T 0203/67, TT-0136-23, TT-0110-24. Due Date 07 December 2024, 12 December 2024, 06 August 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. Q24116258

F3-011-05/12-23

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page 2 of 3



@clccalibration



CALIBRATION LABORATORY Co., LTD.

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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC Reading were recorded and the means value were reported of four times measurement in the table below.

CALIBRATION DATA

CORRECTION OF TEMPERATURE

STD Reading (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty \pm (°C)
0.039	0.00	+0.039	0.065
25.003	25.00	+0.003	
50.008	50.00	+0.008	
100.013	100.00	+0.013	

Range : 0 °C to 100 °C

Graduation : 0.1 °C

Immersion Type : Total Immersion.

Correction of Reference Temperature (0 °C) = 0.039 °C

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 56 of 67

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

End of Certificate

Certificate No. Q24116258

F3-011-05/12-23

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page 3 of 3



@dcalibration

pH Meter

Model : SevenCompact S220

Serial No. : B835349235

Certificate Number CCP-2401-24**Calibration Certificate**
SevenCompact™ pH/Ion Meter S220**Customer**

Company EASTERN THAI CONSULTING 1992 CO., LTD.
Address 683 Moo 11, Sukhaphiban 8 Rd., Nong Kham, Sriracha
Chonburi 20230
Customer ID number 301608441
Customer representative Sasiporn Nakin

Instrument

Type SevenCompact™ S220 Instrument serial number B835349235
Internal identification LABE 11/6 Firmware version 2.01.03

Technical Specifications

Measuring range -2000.0 ... 2000.0 mV -2.000 ... 20.000 pH
Resolution 0.1 mV 0.001 pH
Limit of error ± 0.2 mV; ± 0.1 mV in range -1000 ... 1000 mV ± 0.002 pH

Temperature range MTC -30.0 ... 130.0 °C
Temperature range ATC -5.0 ... 130.0 °C
Resolution 0.1 °C
Limit of error ± 0.1 °C

Procedure Statement

METTLER TOLEDO Certification SOP (Doc. No. 30027577) is used as referring documentation to adjust and certify the instrument indicated in the "Type" and "Serial number" section. The measurement results of this certification were obtained at ambient conditions.

Certificate Number CCP-2401-24**Certification Tools**

Certified digital voltmeter Manufacturer Keysight Technologies Serial number MY60051376
Type 34401A Certificate number E1U2303781
Date of certification December 10, 2023

Certified temperature resistors Manufacturer METTLER-TOLEDO Serial number A425
Type 51302410 Certificate number 71447
Date of certification September 26, 2023

Designation	Nominal value	Certified value
NTC 30 kΩ, 0 °C	94.980 kΩ	94.941 kΩ
NTC 30 kΩ, 25 °C	30.000 kΩ	29.992 kΩ
NTC 30 kΩ, 50 °C	10.969 kΩ	10.975 kΩ
NTC 30 kΩ, 75 °C	4.528 kΩ	4.528 kΩ
NTC 30 kΩ, 100 °C	2.070 kΩ	2.069 kΩ
PT1000, 0 °C	1.0000 kΩ	1.0001 kΩ
PT1000, 25 °C	1.0974 kΩ	1.0974 kΩ
PT1000, 50 °C	1.1940 kΩ	1.1940 kΩ
PT1000, 75 °C	1.2899 kΩ	1.2900 kΩ
PT1000, 100 °C	1.3851 kΩ	1.3852 kΩ

COPY**COPY**

Certificate Number CCP-2401-24

Certification Measurements

pH/mV sensor input

Designation	Certified value	Measured value	Max. tolerance	Passed / Failed
-1900 mV	-1900.0 mV	-1899.9 mV	0.2 mV	Passed
-1000 mV	-1000.0 mV	-999.9 mV	0.1 mV	Passed
-500 mV	-500.0 mV	-500.0 mV	0.1 mV	Passed
-180 mV	-180.0 mV	-180.0 mV	0.1 mV	Passed
0 mV	0.0 mV	0.0 mV	0.1 mV	Passed
180 mV	180.0 mV	179.9 mV	0.1 mV	Passed
500 mV	500.0 mV	499.9 mV	0.1 mV	Passed
1000 mV	1000.0 mV	999.9 mV	0.1 mV	Passed
1900 mV	1900.0 mV	1899.9 mV	0.2 mV	Passed

pH/mV sensor input
at high impedance

Designation	Measured low imp.	Measured high imp.	Max. difference	Passed / Failed
1900 mV	1899.9 mV	1899.9 mV	0.6 mV	Passed

Temperature sensor input

Designation	Nominal value	Measured value	Max. tolerance	Passed / Failed
NTC 30 k Ω , 0 °C	0.0 °C	0.0 °C	0.1 °C	Passed
NTC 30 k Ω , 25 °C	25.0 °C	25.0 °C	0.1 °C	Passed
NTC 30 k Ω , 50 °C	50.0 °C	50.0 °C	0.1 °C	Passed
NTC 30 k Ω , 75 °C	75.0 °C	75.0 °C	0.1 °C	Passed
NTC 30 k Ω , 100 °C	100.0 °C	100.0 °C	0.1 °C	Passed
Pt1000, 0 °C	0.0 °C	0.0 °C	0.1 °C	Passed
Pt1000, 25 °C	25.0 °C	25.0 °C	0.1 °C	Passed
Pt1000, 50 °C	50.0 °C	50.0 °C	0.1 °C	Passed
Pt1000, 75 °C	75.0 °C	75.0 °C	0.1 °C	Passed
Pt1000, 100 °C	100.0 °C	100.0 °C	0.1 °C	Passed

Digital sensor input with
pH sensor

Sensor recognition	The sensor was recognized correctly by the meter	Passed
--------------------	--------------------------------------------------	--------

Summary of Certification

Certification of instrument

Passed

The instrument referred to in this certificate has fulfilled the criteria of the certification. This is indicated by the notation Passed above.

Remarks

Service Assignment ID : 0332980040-001

Certification of the instrument was performed by

Name Thiraphong Salanoi Function Service Engineer
Company Mettler-Toledo (Thailand) Ltd.

Date February 5, 2024

Signature

Performance Test

Attachment to Certificate No. CCP-2401-24

pH Electrode

Type: InLab® Expert Pro-ISM

S/N: 2463982

Certified standards used

Standard 1:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 7/Jul/2025
	Nominal value: pH (25.00 °C):	4.01	Lot No.: 1J188G
Standard 2:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 10/Jul/2025
	Nominal value: pH (25.00 °C):	7.00	Lot No.: 1J191H
Standard 3:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 23/Nov/2024
	Nominal value: pH (25.00 °C):	10.01	Lot No.: 1H327A
Standard 4:	Type: Redox Solution	Manufacturer: METTLER TOLEDO	Exp. date: -
	Nominal value: pH (25.00 °C):	-	Lot No.: -

Adjustment

Set Calibration Buffer	B1 (25 °C) 1.68, 4.01, 7.00, 10.01							
Select Calibration Mode Segment	3-Point calibration			2-Point calibration			2-Point calibration	
3-Point Calibration	°C	pH		°C	pH		°C	pH
Cal 1	ATC	27.1	4.01	ATC	-	-	ATC	-
Cal 2	ATC	27.0	7.00	ATC	-	-	ATC	-
Offset (mV)	6.1			-			-	
Slope % (or mV/pH)	98.5			-			-	
Cal 3	ATC	27.1	10.01					
Offset (mV)	6.1							
Slope % (or mV/pH)	98.1							

Measurements

Resolution: 2 Decimal places

As Found					As Left				
Buffer Values	Measured		Difference		Buffer Values	Measured		Difference	
pH	°C	pH	pH	pH	pH	°C	pH	pH	pH
4.01	27.0	ATC	4.03	0.02	4.01	27.0	ATC	4.02	0.01
7.00	27.1	ATC	7.04	0.04	7.00	26.8	ATC	7.01	0.01
9.99	27.1	ATC	9.98	-0.01	9.99	27.1	ATC	10.01	0.02

Redox Measurement Result = - mV

Note: The difference result of calibrated electrode should be within +/- 0.05 pH

Remarks

Place: Laboratory Room

Calibration Date: 5/Feb/2024

Service Specialist: Thiraphong Salanoi

Signature:

pH Meter

Model : SevenCompact S220

Serial No. : B835349235

Certificate Number CCP-0403-25

Calibration Certificate

SevenCompact™ pH/Ion Meter S220

Customer

Company EASTERN THAI CONSULTING 1992 CO., LTD.Address 683 Moo 11, Sukhaphiban 8 Rd., Nong KhamSirachaCHONBURI 20230Customer ID number 301608441Customer representative คุณ ศิริกร นาคฉันท

Instrument

Type SevenCompact™ S220Instrument Serial Number B835349235Internal identification LABE 11/6Firmware version 1.20.06

Technical specifications

Measuring Range -1999.9 ... 1999.9 mV -2.000 ... 20.000 pHResolution 0.1 mV 0.001 pHLimit of Error ± 0.2 mV ± 0.002 pHTemperature range MTC -30.0 ... 130.0 °CTemperature range ATC -5.0 ... 130.0 °CResolution 0.1 °CLimit of Error ± 0.1 °C

Procedure Statement

METTLER TOLEDO Certification SOP (Doc. No. ME-30027577B) will be used as referring documentation to adjust and certify the instrument indicated in the "Type" and "Serial number" section. The measurement results of this certification were obtained at ambient conditions.

COPYCertificate Number CCP-0403-25

Certification Tools

Certified digital voltmeter

Manufacturer KEYSIGHT TECHNOLOGIESType 34461AControl No. ANA143Serial number MY60036967Certificate number E1U2401054Due date March 10, 2025

Certified Temperature Resistors

Manufacturer METTLER-TOLEDOType 51302410Control No. ANA114Serial number A275Certificate number 73757Due date February 12, 2026

Designation	Nominal value	Certified value
NTC 30 kΩ, 0 °C	94.980 kΩ	94.9730 kΩ
NTC 30 kΩ, 25 °C	30.000 kΩ	29.9950 kΩ
NTC 30 kΩ, 50 °C	10.969 kΩ	10.9704 kΩ
NTC 30 kΩ, 75 °C	4.528 kΩ	4.5275 kΩ
NTC 30 kΩ, 100 °C	2.070 kΩ	2.0714 kΩ
PT1000, 0 °C	1.000 kΩ	1.0001 kΩ
PT1000, 25 °C	1.0974 kΩ	1.0975 kΩ
PT1000, 50 °C	1.1940 kΩ	1.1942 kΩ
PT1000, 75 °C	1.2899 kΩ	1.2900 kΩ
PT1000, 100 °C	1.3851 kΩ	1.3851 kΩ

COPY

METTLER TOLEDO

Certificate Number **CCP-0403-25**

Certification Measurements

pH/mV Sensor Input	Designation	Certified value	Measured value	Max. Tolerance	Passed / Failed
	-1900 mV	-1900.0 mV	-1899.98 mV	0.2 mV	Passed
	-1000 mV	-1000.0 mV	-1000.00 mV	0.2 mV	Passed
	-500 mV	-500.0 mV	-499.98 mV	0.2 mV	Passed
	-180 mV	-180.0 mV	-180.00 mV	0.2 mV	Passed
	0 mV	0.0 mV	0.01 mV	0.2 mV	Passed
	180 mV	180.0 mV	179.98 mV	0.2 mV	Passed
	500 mV	500.0 mV	499.90 mV	0.2 mV	Passed
	1000 mV	1000.0 mV	1000.00 mV	0.2 mV	Passed
	1900 mV	1900.0 mV	1899.99 mV	0.2 mV	Passed

pH/mV Sensor Input at high impedance	Designation	Measured low imp.	Measured high imp.	Max. Tolerance	Passed / Failed
	1900 mV	1900.0 mV	1899.8 mV	0.6 mV	Passed

Temperature Sensor Input	Designation	Nominal value	Measured value	Max. Tolerance	Passed / Failed
	NTC 30 kΩ, 0 °C	0.0 °C	0.0 °C	0.1 °C	Passed
	NTC 30 kΩ, 25 °C	25.0 °C	25.0 °C	0.1 °C	Passed
	NTC 30 kΩ, 50 °C	50.0 °C	50.0 °C	0.1 °C	Passed
	NTC 30 kΩ, 75 °C	75.0 °C	74.9 °C	0.1 °C	Passed
	NTC 30 kΩ, 100 °C	100.0 °C	100.0 °C	0.1 °C	Passed
	PT1000, 0 °C	0.0 °C	0.1 °C	0.1 °C	Passed
	PT1000, 25 °C	25.0 °C	25.0 °C	0.1 °C	Passed
	PT1000, 50 °C	50.0 °C	50.0 °C	0.1 °C	Passed
	PT1000, 75 °C	75.0 °C	74.9 °C	0.1 °C	Passed
	PT1000, 100 °C	100.0 °C	99.9 °C	0.1 °C	Passed

Summary of Certification

Certification of instrument

Passed

The instrument referred to in this certificate has fulfilled the criteria of the certification. This is indicated by the notation Passed in the column above.

Remarks - Test high impedance at 1900.0 mV, Results : 1899.8 mV

Difference = 0.005% Within MPE (0.033%)

Certification of the instrument was performed by

Name **Khomsan Pralaung** Function **Service**

Place **Mettler-Toledo (Thailand) Ltd.**

Calibration Date: **29-Jan-2025**

Signature

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Mettler-Toledo (Thailand) Limited

METTLER TOLEDO

Performance Test

Attachment to Certificate No. **CCP-0403-25**

pH Electrode

Type **InLab Expert Pro-ISM** S/N: **2463982**

Certified standards used

Standard 1:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 3-Dec-2026
	Nominal value: pH (25.00 °C):	4.01	Lot No.: 1J338E
Standard 2:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 27-Nov-2026
	Nominal value: pH (25.00 °C):	7.00	Lot No.: 1J331B
Standard 3:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date: 11-Jan-2026
	Nominal value: pH (25.00 °C):	10.00	Lot No.: 1K011B
Standard 4:	Type: Redox Solution	Manufacturer: METTLER TOLEDO	Exp. date: -
	Nominal value: pH (25.00 °C):	-	Lot No.: -

Adjustment

Set Calibration Buffer	B1 (25 °C) 1.68, 4.01, 7.00, 10.01					
Select Calibration Mode	3-Point calibration		2-Point calibration		2-Point calibration	
Segment	°C	pH	°C	pH	°C	pH
Cal 1	ATC 25.5	7.00	ATC		ATC	
Cal 2	ATC 25.5	4.00	ATC		ATC	
Offset (mV)	-27.2					
Slope % (or mV/pH)	95.9					
Cal 3	ATC 25.5	10.01				
Offset (mV)	-27.2					
Slope % (or mV/pH)	97.4					

Measurements

Resolution: **2** Decimal places

As Found					As Left				
Buffer Values	Measured		Difference		Buffer Values	Measured		Difference	
pH	°C	pH	pH		pH	°C	pH	pH	
4.01	25.3	ATC	4.02	0.01	4.01	25.3	ATC	4.01	0.00
7.00	25.2	ATC	6.98	-0.02	7.00	25.2	ATC	7.01	0.01
9.99	25.3	ATC	10.11	0.12	9.99	25.2	ATC	10.00	0.01

Redox Measurement Result = **-** mV

Note: The difference result of calibrated electrode should be within +/- 0.05 pH

Remarks: **N/A**

Place: **Laboratory**

Calibration Date: **29-Jan-2025**

Service Specialist: **Khomsan Pralaung**

Signature

COPY

STANDARD WEIGHT 50 g

Certificate No. : 24-062445
Sample Code : 24-25551-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 50 g

Manufacturer : METTLER TOLEDO

Class : F1

Serial No. : N/A

ID No. : LABE 10/1

Date of Receipt : 23 May 2024

Date of Calibration : 03 June 2024

Calibrated by Mr. Somwang Sangdee
Scientist

Approved by (Mr. Somchai Neampunt)
Signed for Director

Issue date 04 June 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

Certificate No. : 24-062445
Sample Code : 24-25551-001

REPORT OF CALIBRATION

Equipment : Standard Weight 50 g
Manufacturer : METTLER TOLEDO
Class : F1
Serial No. : N/A
ID No. : LABE 10/1

Result of Calibration :

☒ Without adjustment☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_0) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
	(mg)		(mg)	± (mg)	
50 g	-0.343	49.999657 g	0.10	0.30	LABE 10/1

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

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Certificate No. : 24-062445

Sample Code : 24-25551-001

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature $20^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$, Relative humidity $50\% \pm 10\%$ and air density 1.19 kg/m^3

2. Calibration Method : Direct comparison weighing according to OIML R111-1 : 2004(E)

3. Reference standard instrument

Instrument	Class	ID No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited

(Instrument number 1).

5. Condition of Calibration item: Normal

6. Description of Calibrated Item :

Type and Nominal Value :	Standard Weight 50 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -

COPY

STANDARD WEIGHT 100 g



Certificate No. : 24-079772
Sample Code : 24-31841-002

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., NongKham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 100 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/2

Date of Receipt : 25 June 2024

Date of Calibration : 30 June 2024

Calibrated by Mr. Nawa Sisuwan Approved by (Mr. Somchai Neampunt)
Scientist Signed for Director

Issue date 03 July 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and photo of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 24-079772
Sample Code : 24-31841-002

REPORT OF CALIBRATION

Equipment : Standard Weight 100 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/2

Result of Calibration : ☒ Without adjustment ☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
	(mg)		(mg)	± (mg)	
100 g	-0.173	99.999827 g	0.16	0.50	LABE 10/2

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003



Certificate No. : 24-079772
Sample Code : 24-31841-002

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature $20^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$, Relative humidity $50\% \pm 10\%$ and air density 1.19 kg/m^3

2. Calibration Method : WI-CL-007 base on OIML R 111-1 : 2004(E)

3. Reference standard instrument

Instrument	Class	ID No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited

(Instrument number 1).

5. Condition of Calibration item: Normal

6. Description of Calibrated Item :

Type and Nominal Value :	Standard Weight 100 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -

COPY

STANDARD WEIGHT 50 g



Certificate No. : 24-079773
Sample Code : 24-31841-003

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., NongKham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 50 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/4

Date of Receipt : 25 June 2024

Date of Calibration : 30 June 2024

Calibrated by Mr. Nawa Sisuwan Approved by (Mr. Somchai Neampunt)
Scientist Signed for Director

Issue date 03 July 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 24-079773
Sample Code : 24-31841-003

REPORT OF CALIBRATION

Equipment : Standard Weight 50 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/4

Result of Calibration : ☒ Without adjustment ☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_0) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
	(mg)		(mg)	± (mg)	
50 g	-0.176	49.999824 g	0.10	0.30	LABE 10/4

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

Certificate No. : 24-079773

Sample Code : 24-31841-003

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature $20^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$, Relative humidity $50\% \pm 10\%$ and air density 1.19 kg/m^3
2. Calibration Method : WI-CL-007 base on OIML R 111-1 : 2004(E)
3. Reference standard instrument

Instrument	Class	ID No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited

(Instrument number 1).

5. Condition of Calibration item: Normal

6. Description of Calibrated Item :

Type and Nominal Value :	Standard Weight 50 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -



COPY

THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737

CERTIFICATE OF CALIBRATION

Certificate No. : 24-062442
Sample Code : 24-25546-002Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital thermo-hygrometer

Manufacturer : testo Model : 608-H1
Serial No. : 45106737 ID No. : LABE 09/7
Date of Receipt : 23 May 2024 Date of Calibration : 27-28 May 2024

Condition of Calibration

1. Environment 1.1 Ambient temperature : 23.0 °C ± 3.0 °C
1.2 Relative humidity : 55.0 % ± 15.0 %

2. Calibration method

- 2.1 In-house method: WI-CL-045 By comparison with thermometer standard / chilled mirror hygrometer in controlled chamber.
- 2.2 The calibration by comparison unit under calibration (UUC) to the thermometer standard / chilled mirror hygrometer in a chamber at the controlled temperature / relative humidity.

3. Reference standard instrument

Instrument	Model	ID No.	Certificate No.	Due Date
3.1 Chilled Mirror	Optidew 401	LB-DP-03 & LB-DP-03 (DP)	TH-0064-23	07 August 2024
3.2 Digital Thermometer	Optidew 401	LB-DP-03 & LB-DP-03 (Temp.)	23-103423	03 September 2024
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-89	23-101374	05 September 2024

4. This certificate is traceable to the international system of unit (SI Unit).

- 4.1 Instrument No. 3.1 through National Institute of Metrology (Thailand).
- 4.2 Instrument No. 3.2 and 3.3 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Miss Pornsuda Lohabal Approved by

Scientist

Issue date 30 May 2024


(Mr. Somchai Neampunt)
Signed for Director

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The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Certificate No. : 24-062442
Sample Code : 24-25546-002

Results of Calibration

Temperature measurement

Resolution : 0.1 °C
Range : 0 °C to 50 °C

Calibration point °C	Average of standard reading		Unit under calibration		Expanded uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.00	20.1	- 0.10	± 0.39
25	50	25.00	25.0	0.00	± 0.39
30	50	30.00	29.9	+ 0.10	± 0.39

Humidity measurement

Resolution : 0.1 %RH
Range : 10 %RH to 95 %RH

Calibration point %RH	Average of standard reading		Unit under calibration		Expanded uncertainty %RH
	Air temperature °C	Calculated humidity %RH	Average reading %RH	Correction value %RH	
45	25.02	45.10	48.4	- 3.30	± 1.3
60	25.01	60.07	63.4	- 3.33	± 1.5
75	25.01	75.15	78.5	- 3.35	± 1.7

Notes

- Calibration results without adjustment.

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

COPY

THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737

CERTIFICATE OF CALIBRATION

Certificate No. : 25-090091

Sample Code : 25-39161-001

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapiarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital thermo-hygrometer

Manufacturer : testo Model : 608-H1

Serial No. : 45106737 ID No. : LABE 09/7

Date of Receipt : 21 May 2025 Date of Calibration : 23 May 2025

Condition of Calibration

1. Environment 1.1 Ambient temperature : 23.0 °C ± 3.0 °C
1.2 Relative humidity : 55.0 % ± 15.0 %

2. Calibration method

- 2.1 In-house method: WI-CL-045 By comparison with thermometer standard / chilled mirror hygrometer in controlled chamber.
2.2 The calibration by comparison unit under calibration (UUC) to the thermometer standard / chilled mirror hygrometer in a chamber at the controlled temperature / relative humidity.

3. Reference standard instrument

Instrument	Model	ID No.	Certificate No.	Due Date
3.1 Chilled Mirror	Optidew 401	LB-DP-03 & LB-DP-03 (DP)	TH-0122-24	25 September 2025
3.2 Digital Thermometer	Optidew 401	LB-DP-03 & LB-DP-03 (Temp.)	24-138856	28 October 2025
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-89	24-106857	21 August 2025

4. This certificate is traceable to the international system of unit (SI Unit).

- 4.1 Instrument No. 3.1 through National Institute of Metrology (Thailand).
4.2 Instrument No. 3.2 and 3.3 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Miss Pornsuda Lohabal

Scientist

Approved by

(Mr. Somchai Neampunt)

Signed for Director

Issue date 26 May 2025

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Certificate No. : 25-090091

Sample Code : 25-39161-001

Results of Calibration

Temperature measurement

Resolution : 0.1 °C

Range : 0 °C to 50 °C

Calibration point °C	Average of standard reading		Unit under calibration		uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.01	20.2	- 0.19	± 0.39
25	50	25.01	25.0	+ 0.01	± 0.39
30	50	30.01	30.0	+ 0.01	± 0.39

Humidity measurement

Resolution : 0.1 %RH

Range : 10 %RH to 95 %RH

Calibration point %RH	Average of standard reading		Unit under calibration		uncertainty %RH
	Air temperature °C	Calculated humidity %RH	Average reading %RH	Correction value %RH	
45	25.02	45.10	50.2	- 5.10	± 1.3
60	25.02	60.15	65.2	- 5.05	± 1.5
75	25.02	75.01	82.1	- 7.09	± 1.7

Notes

- Calibration results without adjustment.

The result expanded uncertainty of measurement U 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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

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UV/VIS SPECTROPHOTOMETER

Model : UV-1800

Serial No. : A11635101643 CD



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-146/24
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 CD
ID No. LABE 03/2
Date of receipt 22 April 2024
Date of calibration 22 April 2024
Date of issue 29 April 2024

Customer name Eastern Thai Consulting 1992 Co., Ltd.

Address 683 Moo 11, Sukkhaphibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (22.9-24.1) °C (On site)
Humidity (41.7-46.9) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method WI-UV-702-01 based on ASTM E275-01

Traceability Wavelength Accuracy is traceable to certificate No. 116614 and 116613
Photometric Accuracy is traceable to certificate No. 116210 and 116224
Stray Light is traceable to certificate No. 116616
The above certificate are traceable to SI unit through Starna Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr.Poomjai Korsawatvorakul

Approved by

Mr.Sonthi Temboonsakdi
Service Manager

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Certificate of Calibration

Certificate No. BSCC-UV-146/24

Number of Page(s) 2 of 3

Calibration Results:

1.Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (\pm nm)
287.71	287.75	0.04	0.18
445.82	445.89	0.07	0.18
536.52	536.50	-0.02	0.18
741.02	741.01	-0.01	0.18
879.41	879.33	-0.08	0.18

2.Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (\pm A)
235	0.0000 0.7415	0.0000 0.7387	0.0000 -0.0028	0.0075 0.0075
257	CNR CNR	CNR CNR	CNR CNR	CNR CNR
313	CNR CNR	CNR CNR	CNR CNR	CNR CNR
350	0.0000 0.6406	0.0000 0.6395	0.0000 -0.0011	0.0075 0.0075

*CNR = Customer not request

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Certificate of Calibration

Certificate No. **BSCC-UV-146/24** Number of Page(s) **3 of 3**

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty ($\pm A$)
420.0	0.0000	0.0000	0.0000	0.0042
	0.5715	0.5729	0.0014	0.0042
	0.7087	0.7087	0.0000	0.0042
	1.0987	1.1005	0.0018	0.0042
440.0	0.0000	0.0000	0.0000	0.0042
	0.5561	0.5578	0.0017	0.0042
	0.6968	0.6969	0.0001	0.0042
	1.0757	1.0774	0.0017	0.0042
465.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
546.1	0.0000	0.0000	0.0000	0.0042
	0.5193	0.5213	0.0020	0.0042
	0.6937	0.6940	0.0003	0.0042
	1.0411	1.0428	0.0017	0.0042
590.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
635.0	0.0000	0.0000	0.0000	0.0042
	0.5605	0.5624	0.0019	0.0042
	0.7579	0.7583	0.0004	0.0042
	1.1131	1.1138	0.0007	0.0042

*CNR = Customer not request

4. Stray Light*

Standard cut-off wavelength (nm)	Unit Under Calibration(UUC)		
	Wavelength (nm)	Transmission (%T)	Absorbance (A)
201.33 \pm 0.11nm	200.80	0.9750	2.0111

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A

*Stray Light not NSC-ONSC Accredited.

The measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%.

End of Certificate

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UV/VIS SPECTROPHOTOMETER

Model : UV-1800

Serial No. : A11635101643 CD

Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-153/25
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 CD
ID No. LABE 03/2
Date of receipt 21 April 2025
Date of calibration 21 April 2025
Date of issue 25 April 2025

Customer name Eastern Thai Consulting 1992 Co., Ltd.

Address 683 Moo 11, Sukkaphibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (24.7-26.8) °C (On site)
Humidity (36.9-46.2) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method WI-UV-702-01 based on ASTM E275-01

Traceability Wavelength Accuracy is traceable to certificate No. 114485 and 114511
Photometric Accuracy is traceable to certificate No. 119612 and 114653
Stray Light is traceable to certificate No. 114484
The above certificate are traceable to SI unit through Starna Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr.Phongpak Sonbunchu

Approved by



Mr. Panhaphong Phanmekakul
Technical Manager

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Certificate of Calibration

Certificate No. BSCC-UV-153/25

Number of Page(s) 2 of 3

Calibration Results:

1.Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (±nm)
287.71	287.70	-0.01	0.18
445.82	445.87	0.05	0.18
536.52	536.52	0.00	0.18
741.02	741.05	0.03	0.18
879.41	879.33	-0.08	0.18

2.Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
235	0.0000	-0.0001	-0.0001	0.0075
	0.7404	0.7416	0.0012	0.0075
257	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
313	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
350	0.0000	0.0000	0.0000	0.0075
	0.6397	0.6398	0.0001	0.0075

*CNR = Customer not request

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www.barascientific.com



Certificate of Calibration

Certificate No. BSCC-UV-153/25

Number of Page(s) 3 of 3

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty ($\pm A$)
420.0	0.0000	0.0001	0.0001	0.0042
	0.5733	0.5712	-0.0021	0.0042
	0.7113	0.7097	-0.0016	0.0042
	1.0164	1.0150	-0.0014	0.0042
440.0	0.0000	0.0000	0.0000	0.0042
	0.5581	0.5559	-0.0022	0.0042
	0.6996	0.6975	-0.0021	0.0042
	1.0000	0.9984	-0.0016	0.0042
465.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
546.1	0.0000	0.0000	0.0000	0.0042
	0.5217	0.5202	-0.0015	0.0042
	0.6970	0.6947	-0.0023	0.0042
	0.9982	0.9969	-0.0013	0.0042
590.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
635.0	0.0000	0.0000	0.0000	0.0042
	0.5630	0.5620	-0.0010	0.0042
	0.7615	0.7594	-0.0021	0.0042
	1.0953	1.0943	-0.0010	0.0042

*CNR = Customer not request

4. Stray Light*

Standard cut-off wavelength (nm)	Unit Under Calibration(UUC)		
	Wavelength (nm)	Transmission (%T)	Absorbance (A)
201.10 \pm 0.11nm	200.85	0.9740	2.0116

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A

*Stray Light not NSC-ONSC Accredited.

The measurement uncertainty is base on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%.

End of Certificate

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ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : 1126323724

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5846/4 - 846/5 Lasalle Rd., Bangna Tai
Bangna District, Bangkok 10260
+66 2723 0382
MT-TH.ServiceSupport@mt.com



Accuracy Calibration Certificate

Customer

Company: EASTERN THAI CONSULTING 1992 CO., LTD.
Address: 683 Moo 11, Sukhaphiban 8 Rd., Nong Kham
City: Sriracha Contact: Sasiporn Nakin
Zip / Postal: 20230
State / Province: Chonburi
Order Number: 

Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: XS205DU Asset Number: LABE 05/1
Serial No.: 1126323724 Terminal Model: SAT
Building: Laboratory Terminal Serial No.: 1126323724
Floor: 1 Terminal Asset No.: N/A
Room: Analytical Balance

Range	Max. Capacity	Readability (d)
1	81 g	0.00001 g
2	220 g	0.0001 g

Procedure

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

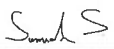
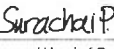
METTLER TOLEDO Work Instruction: CP/W002/20

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

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

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

	Temperature		Humidity	
As Found	Start: 25.7 °C	End: 25.8 °C	Start: 50.9 %	End: 50.6 %

As Found Calibration Date: 09-Dec-2024 Calibrator: 
As Left Calibration Date: N/A
Issue Date: 11-Dec-2024
Approved Signatory: 
Technical Manager / Head of Calibration Center

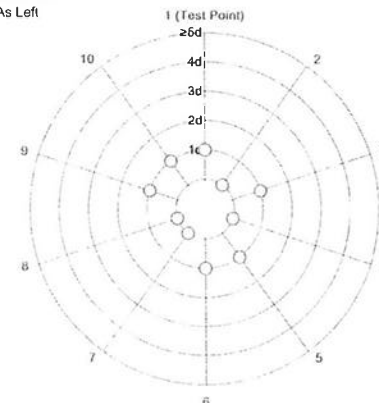
Measurement Results

Repeatability

Test Load: 70 g

	As Found	As Left
1	70.00004 g	N/A
2	70.00005 g	N/A
3	70.00004 g	N/A
4	70.00005 g	N/A
5	70.00006 g	N/A
6	70.00004 g	N/A
7	70.00005 g	N/A
8	70.00005 g	N/A
9	70.00006 g	N/A
10	70.00006 g	N/A
Standard Deviation	0.000008 g	N/A

○ As Found
◆ As Left



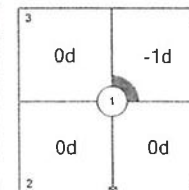
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	100.0000 g	N/A
4	99.9999 g	N/A
5	100.0000 g	N/A
Maximum Deviation	0.0001 g	N/A



As Found

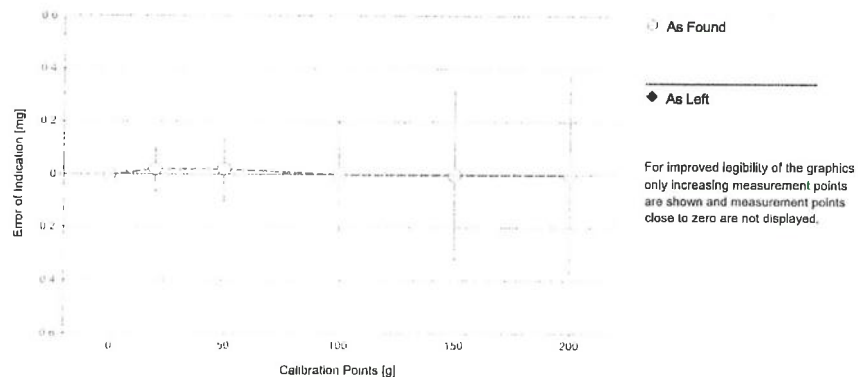
The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.017 mg	2
2	0.01000 g	0.01000 g	0.00000 g	0.020 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.023 mg	2
4	1.00000 g	1.00000 g	0.00000 g	0.032 mg	2
5	4.99998 g	5.00000 g	0.00002 g	0.048 mg	2
6	10.00001 g	10.00001 g	0.00000 g	0.061 mg	2
7	19.99999 g	20.00001 g	0.00002 g	0.082 mg	2
8	50.00003 g	50.00005 g	0.00002 g	0.12 mg	2
9	100.00000 g	100.00000 g	0.00000 g	0.21 mg	2
10	150.00000 g	150.00000 g	0.00000 g	0.32 mg	2
11	200.00000 g	200.00000 g	0.00000 g	0.37 mg	2

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



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

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

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Test Equipment

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

Weight Set 1: OIML E2

Weight Set No.: WS37 Date of Issue: 17-Jun-2024
Certificate Number: 186753-1 Calibration Due Date: 20-Jan-2025

Weight Set 2: OIML E2

Weight Set No.: WS87 Date of Issue: 04-Jul-2023
Certificate Number: 186520 Calibration Due Date: 02-Jan-2025

Thermo Hygrometer

Equipment No.: IN279 Date of Issue: 19-Jun-2024
Certificate Number: SG-H-00577/67 Calibration Due Date: 17-Jun-2025

Remarks

FACT adjustment functionality activated
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory

End of Accredited Section

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

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Measurement Uncertainty of the Weighing Instrument in Use

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

Temperature coefficient for the evaluation of the measurement uncertainty in use: 1.5 · 10⁻⁶ / K

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

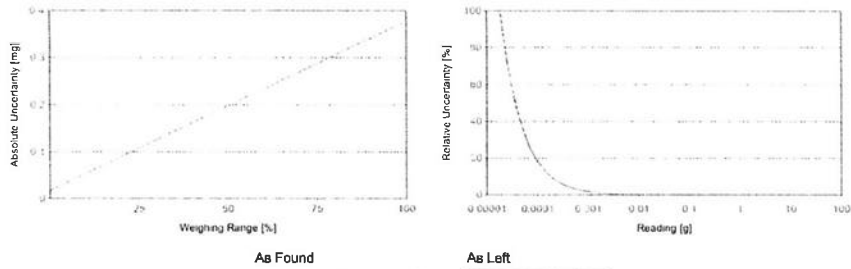
Linearization of Uncertainty Equation

Range		As Found	As Left
d	Max		
1	0.00001 g	U ₁ = 0.018 mg + 0.00444 mg/g · R	N/A
2	0.0001 g	U ₂ = 0.06 mg + 0.00439 mg/g · R	N/A

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

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

Net Indication	As Found		As Left	
0.00220 g	0.018 mg	0.82%	N/A	N/A
0.02200 g	0.018 mg	0.082%	N/A	N/A
0.22000 g	0.019 mg	0.0086%	N/A	N/A
2.20000 g	0.028 mg	0.0013%	N/A	N/A
220.0000 g	1.0 mg	0.00047%	N/A	N/A



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

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GWP®
Certificate



As
Found



As
Left



The weighing device meets the given process requirements.

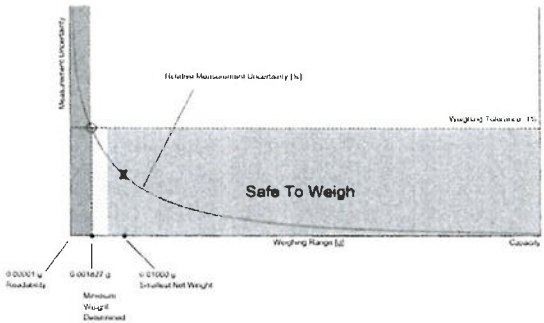
The weighing device meets the given process requirements.

Tests Performed: ☒ As Found ☐ As Left ☒ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: 1% | Smallest Net Weight: 0.01000 g | Safety Factor: 2

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.018339 g	0.036842 g	0.055511 g	0.093358 g	0.191052 g
0.2%	0.009149 g	0.018339 g	0.027570 g	0.046156 g	0.093358 g
0.5%	0.003655 g	0.007316 g	0.010984 g	0.018339 g	0.036842 g
1%	0.001827 g	0.003655 g	0.005485 g	0.009149 g	0.018339 g
2%	0.000913 g	0.001827 g	0.002740 g	0.004569 g	0.009149 g
5%	0.000365 g	0.000730 g	0.001096 g	0.001827 g	0.003655 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Range 1

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.018339 g	0.036842 g	0.055511 g	0.093358 g	0.191052 g
0.2%	0.009149 g	0.018339 g	0.027570 g	0.046156 g	0.093358 g
0.5%	0.003655 g	0.007316 g	0.010984 g	0.018339 g	0.036842 g
1%	0.001827 g	0.003655 g	0.005485 g	0.009149 g	0.018339 g
2%	0.000913 g	0.001827 g	0.002740 g	0.004569 g	0.009149 g
5%	0.000365 g	0.000730 g	0.001096 g	0.001827 g	0.003655 g

The minimum weight table applies to the fine range of the weighing device.

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with $k = 2$ and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability			Eccentricity		Error of Indication	
	As Found	As Left					
	✓	✓		✓	✓	✓	✓

✓ = Passed

✗ = Failed

N/A = Safety Factor not met

Repeatability

Test Load: 70 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	0.000005 g	0.000008 g	✗	0.000008 g	✗
0.2%	0.000010 g		✓		N/A
0.5%	0.000025 g		✓		✓
1%	0.000050 g		✓		✓
2%	0.000100 g		✓		✓
5%	0.000250 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
19.99999 g	0.00002 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00003 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
100.00000 g	0.00000 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
150.00000 g	0.00000 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
200.00000 g	0.00000 g	0.10000 g	0.20000 g	0.50000 g	1.00000 g	2.00000 g	5.00000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
19.99999 g	0.00002 g	0.01000 g	0.02000 g	0.05000 g	0.10000 g	0.20000 g	0.50000 g
50.00003 g	0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
100.00000 g	0.00000 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
150.00000 g	0.00000 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
200.00000 g	0.00000 g	0.10000 g	0.20000 g	0.50000 g	1.00000 g	2.00000 g	5.00000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

COPY

ANALYTICAL BALANCE

Model : MS204TS/00

Serial No. : B904136539

Mettler-Toledo (Thailand) Ltd.

846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District

Bangna District, Bangkok 10260

+66 2723 0382


MT-TH.ServiceSupport@mtl.com



NSC-TIS-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company: EASTERN THAI CONSULTING 1992 CO., LTD.
Address: 683 Moo 11, Sukhaphiban 8 Rd., Nong Kham
City: Sriracha Contact: Sasiporn Nakin
Zip / Postal: 20230
State / Province: Chonburi
Order Number:  0333352196

Weighing Device

Manufacturer: Mettler Toledo Instrument Type: Weighing Instrument
Model: MS204TS/00 Asset Number: LABE 05/4
Serial No.: B904136539 Terminal Model: N/A
Building: Laboratory Terminal Serial No.: N/A
Floor: 1 Terminal Asset No.: N/A
Room: Balance

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

Procedure



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

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

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

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

As Found	Temperature		Humidity	
	Start: 24.2 °C	End: 24.3 °C	Start: 37.9 %	End: 37.9 %

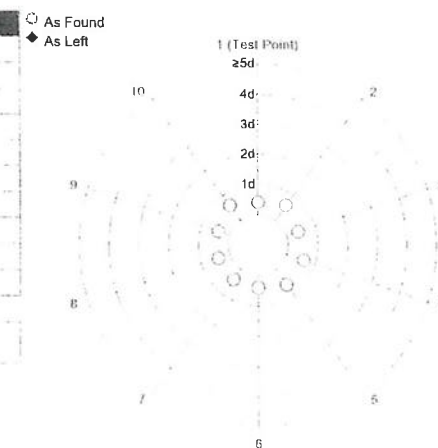
As Found Calibration Date: 29-Jan-2025
As Left Calibration Date: N/A
Issue Date: 01-Feb-2025
Calibrator: 
Khomsan Prataung
Approved Signatory: 
Naruephon C.
Technical Manager / Head of Calibration Center

Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	99.9999 g	N/A
3	100.0000 g	N/A
4	99.9999 g	N/A
5	99.9999 g	N/A
6	100.0000 g	N/A
7	100.0000 g	N/A
8	100.0000 g	N/A
9	100.0000 g	N/A
10	99.9999 g	N/A
Standard Deviation	0.00005 g	N/A



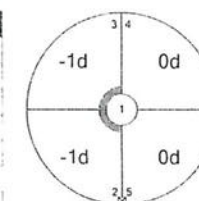
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	100.0000 g	N/A
Maximum Deviation	0.0001 g	N/A



As Found

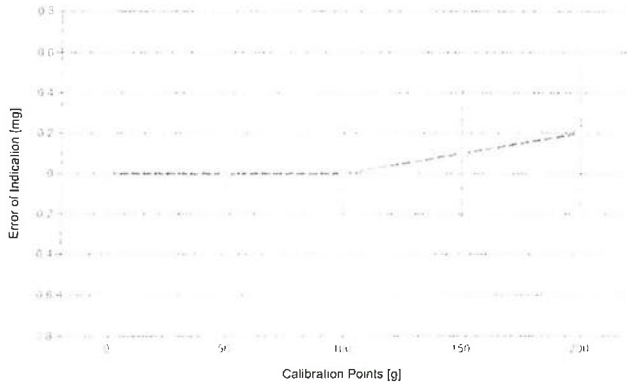
The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.12 mg	2
2	0.0100 g	0.0100 g	0.0000 g	0.13 mg	2
3	0.0500 g	0.0500 g	0.0000 g	0.13 mg	2
4	0.1000 g	0.1000 g	0.0000 g	0.13 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.13 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.14 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.14 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.16 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.24 mg	2
10 *	150.0000 g	150.0001 g	0.0001 g	0.31 mg	2
11 *	200.0000 g	200.0002 g	0.0002 g	0.35 mg	2

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



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

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

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

Test Equipment

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

Weight Set 1: OIML E2

Weight Set No.: WS32 Date of Issue: 07-Aug-2024
Certificate Number: 193673 Calibration Due Date: 30-Jan-2026

Weight Set 2: OIML E2

Weight Set No.: WS32-1 Date of Issue: 06-Sep-2024
Certificate Number: C436717337 Calibration Due Date: 26-Jan-2026

Thermo Hygrometer

Equipment No.: IN277 Date of Issue: 19-Jun-2024
Certificate Number: SG-H-00575/67 Calibration Due Date: 18-Jun-2025

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

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

Measurement Uncertainty of the Weighing Instrument In Use

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

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

Temperature range on site for the evaluation of the measurement uncertainty in use: $5 K$

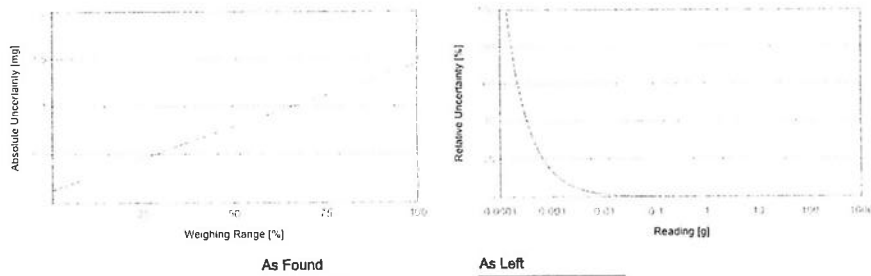
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.13 \text{ mg} + 0.00598 \text{ mg/g} \cdot R$	N/A

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

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

Net Indication	As Found		As Left	
0.0220 g	0.13 mg	0.59%	N/A	N/A
0.2200 g	0.13 mg	0.060%	N/A	N/A
2.2000 g	0.14 mg	0.0065%	N/A	N/A
22.0000 g	0.26 mg	0.0012%	N/A	N/A
220.0000 g	1.4 mg	0.00066%	N/A	N/A



GWP®
Certificate



As Found



As Left



The weighing device meets the given process requirements.

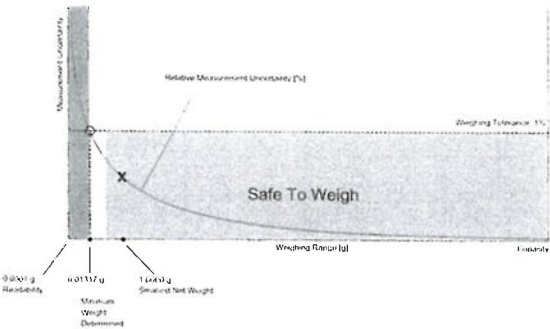
The weighing device meets the given process requirements.

Tests Performed: ☒ As Found ☐ As Left ☐ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: 1% | Smallest Net Weight: 1.0000 g | Safety Factor: 2

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.13245 g	0.26650 g	0.40219 g	0.67859 g	1.40037 g
0.2%	0.06603 g	0.13245 g	0.19927 g	0.33414 g	0.67859 g
0.5%	0.02636 g	0.05279 g	0.07928 g	0.13245 g	0.26650 g
1%	0.01317 g	0.02636 g	0.03957 g	0.06603 g	0.13245 g
2%	0.00658 g	0.01317 g	0.01977 g	0.03296 g	0.06603 g
5%	0.00263 g	0.00527 g	0.00790 g	0.01317 g	0.02636 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.13245 g	0.26650 g	0.40219 g	0.67859 g	1.40037 g
0.2%	0.06603 g	0.13245 g	0.19927 g	0.33414 g	0.67859 g
0.5%	0.02636 g	0.05279 g	0.07928 g	0.13245 g	0.26650 g
1%	0.01317 g	0.02636 g	0.03957 g	0.06603 g	0.13245 g
2%	0.00658 g	0.01317 g	0.01977 g	0.03296 g	0.06603 g
5%	0.00263 g	0.00527 g	0.00790 g	0.01317 g	0.02636 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with $k = 2$ and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

- If "N/A" is shown above, no appropriate value could be calculated.
- METTLER TOLEDO is not responsible for the definition of the process requirements.

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed

✗ = Failed

f = Safety Factor not met

Repeatability

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	0.00050 g	0.00005 g	✓	0.00005 g	✓
0.2%	0.00100 g		✓		✓
0.5%	0.00250 g		✓		✓
1%	0.00500 g		✓		✓
2%	0.01000 g		✓		✓
5%	0.02500 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
100.0000 g	0.0000 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

Area Heat Stress Monitor

Model : HD32.2

Serial No. : 22004318

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-042-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 22004318
ID NUMBER : NO. 16
CONDITION AS-RECEIVED : Used item
CUSTOMER : Eastern thai consulting 1992 Co.,Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE : 23 Jan 2025
MEASUREMENT DATE : 29 Jan 2025
ISSUE DATE : 30 Jan 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

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-0113-24

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100 AS00, 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: 21 Oct 2025

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'

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 22010218.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.073	20.1	0.0	0.099
80	25.064	25.1	0.0	0.099
80	30.055	30.1	0.0	0.099
80	35.046	35.1	0.1	0.099
80	40.036	40.1	0.1	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3276.2, S/N: 22014929.
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.074	20.1	0.0	0.099
110	25.064	25.1	0.0	0.099
110	30.055	30.1	0.0	0.099
110	35.046	35.1	0.1	0.099
110	40.036	40.1	0.1	0.099

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 22015205.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.073	20.2	0.1	0.099
75	25.064	25.1	0.0	0.099
75	30.054	30.1	0.0	0.099
75	35.046	35.0	0.0	0.099
75	40.036	39.9	-0.1	0.099

UUC*: Unit Under Calibration

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

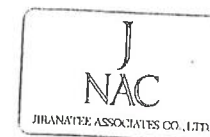


Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

COPY

End of Certificate of Calibration



COPY

Area Heat Stress Monitor

Model : HD32.2

Serial No. : 22004319



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
Petchkasem 7,7/1, Rd Wattlapra, Bangkokkay,
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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.



JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number CDT-043-68

Page 2 of 2 Pages

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-043-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 22004319
ID NUMBER : NO. 17
CONDITION AS-RECEIVED : Used item
CUSTOMER : Eastern thai consulting 1992 Co.,Ltd.
683 Moo 11, Sukhapiarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE : 23 Jan 2025
MEASUREMENT DATE : 30 Jan 2025
ISSUE DATE : 30 Jan 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 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-0113-24

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: 21 Oct 2025

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'

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 22010215.
Dimension: Diameter 3.3 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.063	20.0	-0.1	0.099
80	25.062	25.0	-0.1	0.099
80	30.052	30.0	-0.1	0.099
80	35.042	35.0	0.0	0.099
80	40.024	40.0	0.0	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3276.2, S/N: 22014940.
Dimension: Diameter 3.3 mm. Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.063	20.1	0.0	0.099
110	25.062	25.1	0.0	0.099
110	30.052	30.1	0.0	0.099
110	35.042	35.1	0.1	0.099
110	40.024	40.1	0.1	0.099

Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 22003554.
Dimension: Diameter 14 mm. Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.063	20.3	0.2	0.099
75	25.062	25.0	-0.1	0.099
75	30.052	29.9	-0.2	0.099
75	35.042	34.8	-0.2	0.099
75	40.024	39.7	-0.3	0.099

UUC*: Unit Under Calibration

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

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End of Certificate of Calibration



COPY

Area Heat Stress Monitor

Model : HD32.2

Serial No. : 22004320

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-044-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : Delta OHM
MODEL/TYPE : HD32.2
SERIAL NUMBER : 22004320
ID NUMBER : NO. 18
CONDITION AS-RECEIVED : Used item
CUSTOMER : Eastern thai consulting 1992 Co.,Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE : 23 Jan 2025
MEASUREMENT DATE : 30 Jan 2025
ISSUE DATE : 30 Jan 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 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-0113-24

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: 21 Oct 2025

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'

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2, S/N: 22010220.
Dimension: Diameter 3.3 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.063	20.1	0.0	0.099
80	25.062	25.1	0.0	0.099
80	30.052	30.1	0.0	0.099
80	35.043	35.1	0.1	0.099
80	40.025	40.1	0.1	0.099

Table 2: This equipment was connected with Globe thermometer probe Model: TP3276.2, S/N: 22014931.
Dimension: Diameter 3.3 mm, Length 205 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.063	20.1	0.0	0.099
110	25.062	25.1	0.0	0.099
110	30.052	30.1	0.0	0.099
110	35.043	35.1	0.1	0.099
110	40.025	40.1	0.1	0.099

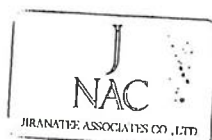
Table 3: This equipment was connected with temperature probe Model: TP3207.2, S/N: 22015196.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
75	20.063	20.2	0.1	0.099
75	25.062	25.2	0.1	0.099
75	30.052	30.1	0.0	0.099
75	35.043	35.1	0.1	0.099
75	40.025	40.1	0.1	0.099

UUC*: Unit Under Calibration

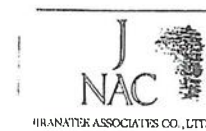
End of Certificate of Calibration

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoornmit



Approved signatory:

Mr. Parinya Booncharoen
Mr. Parinya Booncharoen
Calibration Department Manager



BAROMETER

Equipment : Analog Barometer

ID No. / Tag No. : BM001/41



MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD

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



CALIBRATION CERTIFICATE

Certificate No. : L202405022-0013

Date Issued : 08-May-24

Customer : Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Equipment : Analog Barometer

Manufacturer : Barigo

Model : -

Serial No. : -

ID No./Tag No. : BM001/41

Date Received : 03-May-24

Date Calibrated : 06-May-24

Calibrated by : Mr. Saruth Srichutikul

Calibration Method or Calibration Procedure Used

In-house method : CP-21 base on DKD-R 6-1: Edition 3 2014.

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

Result of Calibration

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

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

Approved by:

Sarayuth T.
(Mr. Sarayuth Tochua)



Page 1 of 2

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Certificate No : L202405022-0013

Environment Ambient Temperature : $(25 \pm 2)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 15)\%\text{RH}$

STD Reading	UUC Reading (mbar)	UUC Reading (mbar)	UUC Error	Uncertainty	MPE	Pass / Fail
mbar	Before Adjusted	After Adjusted	mbar	\pm mbar	\pm mbar	with Guard Band
990.00	990	-	0.00	0.59	10.3	Pass
1000.00	1000	-	0.00	0.59	10.3	Pass
1010.00	1010	-	0.00	0.59	10.3	Pass
1020.00	1020	-	0.00	0.59	10.3	Pass
1030.00	1030	-	0.00	0.59	10.3	Pass

STD = Standard Pass = $|\text{error}| + |\text{uncertainty}| \leq |\text{MPE}|$

UUC = Unit Under Calibration Fail = $|\text{error}| + |\text{uncertainty}| > |\text{MPE}|$

MPE = Maximum Permissible Error

Calibrated condition :
Pressure Medium Air : Density = $1.19 \text{ kg/m}^3 @ 20^{\circ}\text{C}$, 1 bar
Mounting Position Vertical
Reference Level at center of its dial
Conversion Factor Multiply by $1.0 \text{ E}+02$ - Pa unit

Description of UUC :
Range 950 - 1080 mbar Absolute
Calibration Range 990 - 1030 mbar Absolute
Scale Interval 1 mbar

Condition As-Received : Used Item

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

Measurement Standards Used & Traceability :

The International System of Units (SI) through

iRPC Certificate No. CL1-P230097 for Reference Pressure Monitor Serial No. 1598. Due 09-Nov-24

End of Certificate

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Page 2 of 2

CERTIFICATE OF ANALYSIS

EPA PROTOCOL GAS

Cylinder No. : EB0145030

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E03NI99E15AC0U4 Reference Number: 160-402242242-1
Cylinder Number: EB0145030 Cylinder Volume: 144.4 CF
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2015 PSIG
PGVP Number: A12021 Valve Outlet: 350
Gas Code: CH4,PPN,BALN Certification Date: Oct 15, 2021

Expiration Date: Oct 15, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 000/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
METHANE	180.0 PPM	177.0 PPM	G1	+/- 1.0% NIST Traceable	10/15/2021
PROPANE	185.0 PPM	187.0 PPM	G1	+/- 1.0% NIST Traceable	10/15/2021
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08011503	K002564	246.7 PPM METHANE/AIR	+/- 0.6%	May 15, 2025
NTRM	200602-06	6162660Y	243.3 PPM PROPANE/AIR	+/- 0.5%	Mar 17, 2027

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2110295 CH4	FTIR	Oct 13, 2021
Nicolet iS50 FTIR AUP2110295 C3H8	FTIR	Oct 14, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.0 Kg
Net Weight: 4.9 Kg
PO# 5221004861



Michael A. Hines
Approved for Release



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CERTIFICATE OF ANALYSIS

EPA PROTOCOL GAS

Cylinder No. : EB0062815

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15ACX9C Reference Number: 82-401135335-1
Cylinder Number: EB0062815 Cylinder Volume: 144.4 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2015 PSIG
PGVP Number: B52018 Valve Outlet: 660
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Mar 13, 2018

Expiration Date: Mar 13, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

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

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	50.55 PPM	G1	+/- 1.4% NIST Traceable	03/06/2018, 03/13/2018
NITRIC OXIDE	50.00 PPM	50.50 PPM	G1	+/- 1.4% NIST Traceable	03/06/2018, 03/13/2018
SULFUR DIOXIDE	50.00 PPM	51.01 PPM	G1	+/- 1.0% NIST Traceable	03/06/2018, 03/13/2018
CARBON MONOXIDE	2000 PPM	1977 PPM	G1	+/- 1.0% NIST Traceable	03/06/2018
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	16060607	CC442564	50.42 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jun 27, 2020
PRM	12367	APEX1099237	9.82 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Jun 02, 2017
GMIS	0315201604	CC503358	4.975 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.6%	Mar 15, 2019
NTRM	16011025	CC473218	49.02 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jun 07, 2022
NTRM	12060735	CC356192	2498 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Dec 14, 2026

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 APW1100391 CO	FTIR	Feb 08, 2018
Nicolet 6700 APW1100391 NO	FTIR	Feb 15, 2018
Nicolet 6700 APW1100391 NO2	FTIR	Feb 16, 2018
Nicolet 6700 APW1100391 SO2	FTIR	Mar 01, 2018

Triad Data Available Upon Request

NOTES: NET WEIGHT: 10.43lbs

GROSS WEIGHT: 60.93lbs

PO# 5218000763

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2000 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Don Morris
Approved for Release

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DRY GAS METER XC-572-V

Serial No. : 1110070



WISDOM SCIENCE
SALE AND SERVICE GROUP COMPANY LIMITED

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : XC-572-V
Console serial : 1110070
DGM Model #: SK25EX
DGM Serial #: 00006432

Calibration Condition

Cal. Date: 28-Jun-24
Due Date: 28-Jun-25
Cal. Report No.: WDS-SV6706007
Ambient Temp (°C): 25
Pressure (mm Hg): 758
Relative Humidity (%): 60

Factors/Conversion

Std. Temp. (°K): 298
Std. Pressure (mm Hg): 760
K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NKoDa-5B WTM Cal. Due Date: Dec. 2024
WTM Serial: 600245 Gamma: 1.0000

UUT Meter (DGM)

Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
0	P _{mitg}	V _{mi}	V _{mf}	t _{mi}	t _{mf}	V _{wi}	V _{wf}	t _{wi}	t _{wf}
15.00	13.0	239.7603	239.9212	27	27	63.63889	63.79843	27	27
10.00	25.0	239.9406	240.0979	27	27	63.81777	63.97353	27	27
8.00	50.0	240.1147	240.2952	27	28	63.99028	64.16968	26	26
7.00	80.0	240.3308	240.5352	28	28	64.20536	64.40956	26	26
5.00	120.0	240.5641	240.7422	29	29	64.43852	64.61730	26	26

Standardized Data

Test Meter		Reference Meter		Correction Factor		Flow Rate		ΔH@ (mm H ₂ O)	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Std & Corr	0.0212 SCMM	Variation	
V _{m(std)} (m ³)	Q _{m(std)} m ³ /min	V _{w(std)} (m ³)	Q _{w(std)} m ³ /min	(Y)	(ΔY)	Q _{m(std/corr)}	ΔH _g	ΔΔH _g	
0.157	0.010	0.155	0.010	0.991	-0.003	0.010	53.303	6.250	
0.154	0.015	0.152	0.015	0.989	-0.005	0.015	47.860	0.807	
0.176	0.022	0.175	0.022	0.993	-0.001	0.022	46.233	-0.820	
0.200	0.029	0.199	0.028	0.997	0.003	0.028	43.895	-3.158	
0.174	0.035	0.175	0.035	1.001	0.007	0.035	43.973	-3.080	

Pass/Fail Result: Pass

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

Note: For ΔH_g, orifice pressure differential that equates to 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2 inches (5.1mm) H₂O

Approved By:

(Patpasu Chaisana)
Service Manager

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Date: 28-Jun-24

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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

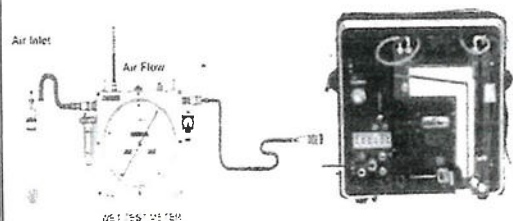
Nomenclature

P_b - Barometric Pressure
DGM - Dry Gas Meter
K₁ - Constant based on standard temp and press
t - Run time, in minutes
P_m - ΔH (Meter Pressure, gauge)
V_m - Volume collected by test meter, corrected for STP
Q_{m(std)} - Calculated flow rate of test meter
K' - Critical orifice coefficient
P_w - Measured pressure of reference meter
t_w - Temperature measured in reference meter
t_m - Temperature measured in test meter
Y - Ratio of volume collected from test meter and orifice
sc - Scaling Factor
Counts_{std} - Number of pulse counts, standardized
C_{total} - Number of raw pulse counts of a calibration run

Equations

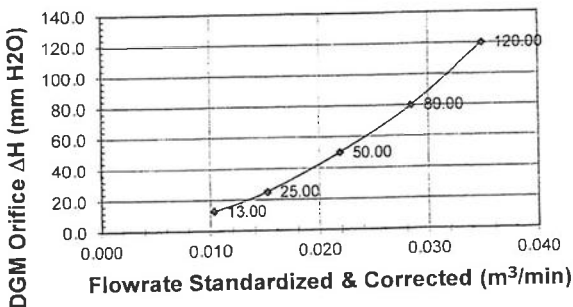
$$V_{w(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_w}$$
$$V_{m(std)} = Counts_{std} * Y_{sc(avg)}$$
$$Counts_{std} = K_1 \frac{C_{total} * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_m}$$
$$Q_{w(std)} = \frac{V_{w(std)}}{t}$$
$$Y_{sc} = \frac{V_{w(std)}}{Counts_{std}}$$
$$Y = \frac{V_{m(std)}}{V_{w(std)}}$$
$$Metric \Delta H_g = \frac{P_{m(std)} * 0.0011325 * (T_w + \frac{t_w}{13.6})}{T_m} * \left(\frac{T_w + t_w}{V_w * P_w} \right)$$

Calibration Train



Calibration Graphs

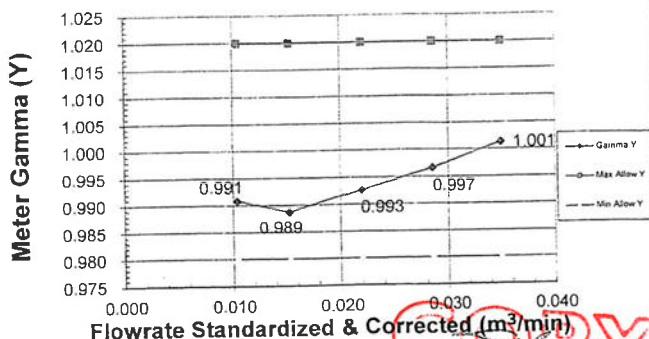
Meter Pressure vs Flowrate



Console Serial: 1110070

Console Model: XC-572-V

Meter Gamma vs Flowrate



Console Serial: 1110070

Console Model: XC-572-V

TEMPERATURE DISPLAY CALIBRATION

Meter Console Information

Console Model	XC-572-V
Console serial	1110070
Temp Indicator Model	ID-85
Temp Indicator Serial	-

Calibration Conditions

Cal. Date :	28-Jun-24
Due Date	28-Jun-25
Cal. Report No	WDS-SV6706007
Ambient Temp (°C)	25
Pressure (mm Hg)	758
Humidity (%)	60

Reference Equipment

Temp. Meter Model :	Fluke 714B
Serial No. :	60590035
Cal. Date :	07-Apr-24
Temp. Meter Model :	Fluke 179
Serial No. :	58620112
Cal. Date :	08-Feb-24

Temperature Sensor Calibration

Reference Point	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	-18.0	-17.0	1.0
2	38.0	39.0	-1.0
3	93.0	94.0	-1.0
4	149.0	150.0	-1.0
5	260.0	261.0	-1.0
6	371.0	372.0	-1.0
7	482.0	483.0	-1.0
8	593.0	593.0	0.0
9	816.0	815.0	1.0
10	1038.0	1038.0	0.0
Maximum ¹			1.0

PASS

Note

¹ For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1.1.8).
Perform all TC Channel calibrations. Except meter (DGM) channel

DGM Out Temperature Sensor Calibration

Temperature point	Ref Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
Ice	1.0	2.0	-1.0
Ambient	24.2	25.0	-0.8
Heat	110.5	111.0	-0.5

Difference Rang

Temp. Difference $\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$. (EPA Method 5, section 10.5)

Approved By :

Patpasu Chaisana

(Patpasu Chaisana)

Service Manager

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DRY GAS METER MC-572-V

Serial No. : 1007055

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : MC-572-V
Console serial : 1007055
DGM Model #: SK25EX
DGM Serial #: 0009799

Calibration Condition

Cal. Date: 04-Aug-24
Due Date: 04-Aug-25
Cal Report No.: WDS-SV6707001
Ambient Temp (°C): 25
Pressure (mm Hg): 758
Relative Humidity (%): 60

Factors/Conversion

Std. Temp. (°K): 298
Std. Pressure (mm Hg): 760
K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NKoDa-5B WTM Cal. Due Date: Dec. 2024
WTM Serial: 600245 Gamma: 1.0000

Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
0	P _{man}	V _{ini}	V _{fin}	t _{ini}	t _{fin}	V _{ini}	V _{fin}	t _{ini}	t _{fin}
15.00	13.0	107.7550	107.9221	29	30	68.41024	68.57350	28	27
10.00	25.0	107.9308	108.0876	30	30	68.58202	68.73488	27	27
8.00	50.0	108.1027	108.2822	30	30	68.74958	68.92516	27	27
7.00	80.0	108.3029	108.5061	30	30	68.94550	69.14488	27	27
5.00	120.0	108.5139	108.6908	30	30	69.15251	69.32550	27	27

Standardized Data

Test Meter		Reference Meter		Correction Factor		Calibration Results		
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Flow Rate	0.0212 SCMM	Variation
V _{std} (m ³)	Q _{std} (m ³ /min)	V _{ref} (m ³)	Q _{ref} (m ³ /min)	(Y)	(ΔY)	Q _{std} (m ³ /min)	ΔH _{sc}	ΔΔH _{sc}
0.162	0.011	0.159	0.011	0.982	0.000	0.011	50.751	2.535
0.152	0.015	0.149	0.015	0.982	0.001	0.015	49.300	1.084
0.174	0.022	0.171	0.021	0.983	0.002	0.021	48.061	-0.155
0.197	0.028	0.194	0.028	0.983	0.002	0.028	45.922	-2.293
0.173	0.035	0.169	0.034	0.976	-0.005	0.034	47.046	-1.170

Pass/Fail Result: **Pass**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02

Note: For ΔH_{sc}, orifice pressure differential that equates to 0.75cm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O

Approved By:

[Signature]

(Patpasu Chaisana)
Service Manager

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WISDOM SCIENCE SALE AND SERVICE GROUP COMPANY LIMITED

Date: 04-Aug-24

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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature

P_b - Barometric Pressure
DGM - Dry Gas Meter
K₁ - Constant based on standard temp and press
D - Run time, in minutes
P_m - ΔH (Meter Pressure, gauge)
V_m - Volume collected by test meter, corrected for STP
Q_m - Calculated flow rate of test meter
K - Critical orifice coefficient
P_w - Measured pressure of reference meter
T_w - Temperature measured in reference meter
T_m - Temperature measured in test meter
Y - Ratio of volume collected from test meter and orifice
sc - Scaling Factor
Counts_{std} - Number of pulse counts, standardized
Counts_{total} - Number of raw pulse counts of a calibration run

Equations

$$V_{m(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_m}{1.36})}{T_w}$$

$$V_{m(std)} = Counts_{std} * Y_{avg}$$

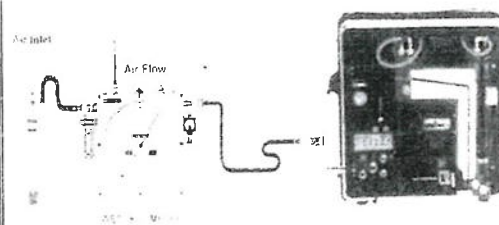
$$Counts_{std} = K_1 \frac{Counts_{total} * (P_{bar} + \frac{P_m}{1.36})}{T_w}$$

$$Q_{std} = \frac{V_{m(std)}}{D} \quad Y = \frac{V_{m(std)}}{Counts_{std}}$$

$$K_1 = \frac{T_{std}}{P_{std}} \quad Y = \frac{V_{m(std)}}{Counts_{std}}$$

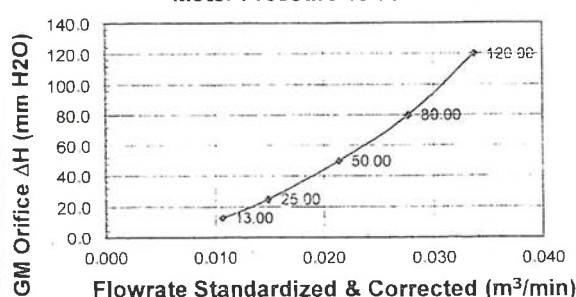
$$\Delta H_{sc} = \frac{P_m}{1.36} * \left(\frac{T_{std}}{T_w} \right)$$

Calibration Train



Calibration Graphs

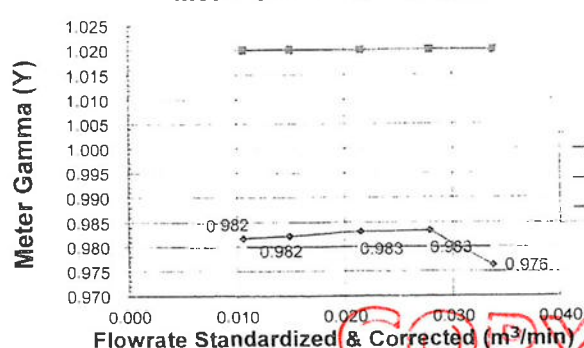
Meter Pressure vs Flowrate



Console Serial: 1007055

Console Model: MC-

Meter Gamma vs Flowrate



Console Serial: 1007055

Console Model: MC-572-V

TEMPERATURE DISPLAY CALIBRATION

Meter Console Information

Console Model	MC-572-V
Console serial	1007055
Temp Indicator Model	765-KF
Temp Indicator Serial	JC17852

Calibration Conditions

Cal Date	04-Aug-24
Due Date	04-Aug-25
Cal Report No	WDS-SV8707001
Ambient Temp (°C)	25
Pressure (mm Hg)	758
Humidity (%)	60

Reference Equipment

Temp Meter Model	Fluke 714B
Serial No	60590035
Cal Date	07-Apr-24
Temp Meter Model	Fluke 179
Serial No	58620112
Cal Date	06-Feb-24

Temperature Sensor Calibration

Reference Point	Ref Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	-18.0	-18.0	0.0
2	38.0	38.0	0.0
3	93.0	94.0	-1.0
4	149.0	149.0	0.0
5	260.0	261.0	-1.0
6	371.0	372.0	-1.0
7	482.0	482.0	0.0
8	593.0	593.0	0.0
9	816.0	816.0	0.0
10	1038.0	1038.0	0.0
Maximum ¹			1.0

PASS

Note

¹ For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1 1.8). Perform all TC Channel calibrations. Except meter (DGM) channel

DGM Out Temperature Sensor Calibration

Temperature point	Ref Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
Ice	0.0	0.0	0.0
Ambient	28.9	27.0	-0.1
Heat	114.5	115.0	-0.5

Difference Rang

Temp Difference $\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$ (EPA Method 5, section 10.5)

Approved By :

Patpasu Chaisana

(Patpasu Chaisana)

Service Manager

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บริษัท วิสคอม ไซนส์ แอนด์ เซอร์วิส จำกัด
WISDOM SCIENCE SALE AND SERVICE GROUP COMPANY LIMITED

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DRY GAS METER XC-572-V

Serial No. : A2007510



WISDOM SCIENCE

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model: XC-572-V
 Console serial: A2007510
 DGM Model #: SK25EX
 DGM Serial #: 00005115

Calibration Condition

Cal Date: 30-Aug-24
 Due Date: 30-Aug-25
 Cal. Report No.: WDS-SV6708010
 Ambient Temp (°C): 25
 Pressure (mm Hg): 758
 Relative Humidity (%): 60

Factors/Conversion

Std. Temp (°K): 298
 Std. Pressure (mm Hg): 760
 K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NK0Da-5B WTM Cal. Due Date: Dec. 2024
 WTM Serial: 600245 Gamma: 1.0000

UUT Meter (DGM)				Reference Meter (WTM)			
Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume	
a	P _{meas}	Initial	Final	Initial	Final	Initial	Final
		V _{mi}	V _{mf}	t _{mi}	t _{mf}	V _{ri}	V _{rf}
15.00	13.0	814.2810	814.4438	26	26	77.39845	77.56182
10.00	25.0	814.4657	814.6233	26	27	77.58371	77.74136
8.00	50.0	814.6427	814.8218	27	27	77.76069	77.93943
7.00	80.0	815.2310	815.4323	28	28	78.34575	78.54534
5.00	120.0	815.4512	815.6222	28	28	78.56461	78.73859

Standardized Data				Calibration Results			
Test Meter		Reference Meter		Correction Factor		Flow Rate	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Std & Corr	ΔH@ (mm H ₂ O)
V _{m(std)} (m ³)	Q _{m(std)} m ³ /min	V _{r(std)} (m ³)	Q _{r(std)} m ³ /min	(Y)	(ΔY)	Q _{m(std)} m ³ /min	ΔH _g
0.159	0.011	0.159	0.011	0.997	0.002	0.011	51.276
0.154	0.015	0.154	0.015	0.996	0.002	0.015	46.891
0.175	0.022	0.174	0.022	0.994	-0.001	0.022	46.793
0.197	0.028	0.193	0.028	0.982	-0.013	0.028	46.623
0.168	0.034	0.169	0.034	1.005	0.010	0.034	47.211
				0.995	= Y Avg		47.759
							ΔH@ Avg

Pass/Fail Result: **Pass**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02

Note: For ΔH_g, orifice pressure differential that equates to 0.75sfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2 inches (5.1mm) H₂O

Approved By:
 (Palpasu Chaisana)
 Service Manager

Date: 30-Aug-24

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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature

P_b - Barometric Pressure
 DGM - Dry Gas Meter
 K₁ - Constant based on standard temp and press
 θ - Run time, in minutes
 P_m - ΔH (Meter Pressure, gauge)
 V_m - Volume collected by test meter, corrected for STP
 Q_{m(std)} - Calculated flow rate of test meter
 K' - Critical orifice coefficient
 P_w - Measured pressure of reference meter
 t_w - Temperature measured in reference meter
 t_m - Temperature measured in test meter
 Y - Ratio of volume collected from test meter and orifice
 sc - Scaling Factor
 Counts_{std} - Number of pulse counts, standardized
 Counts_{raw} - Number of raw pulse counts of a calibration run

Equations

$$V_{w(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_{m(g)}}{13.6})}{T_w}$$

$$V_{m(std)} = Counts_{std} * Y_{sc(avg)}$$

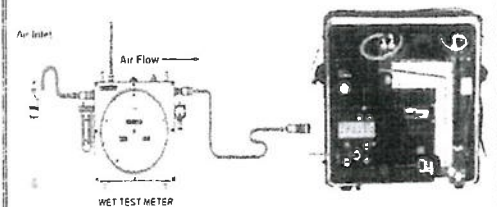
$$Counts_{std} = K_1 \frac{Counts_{raw} * (P_{bar} + \frac{P_{m(g)}}{13.6})}{V_m}$$

$$Q_{w(std)} = \frac{V_{w(std)}}{\theta} \quad Y_{sc} = \frac{V_{w(std)}}{Counts_{std}}$$

$$K_1 = \frac{T_{std}}{P_{std}} \quad Y = \frac{V_{cr(std)}}{V_{m(std)}}$$

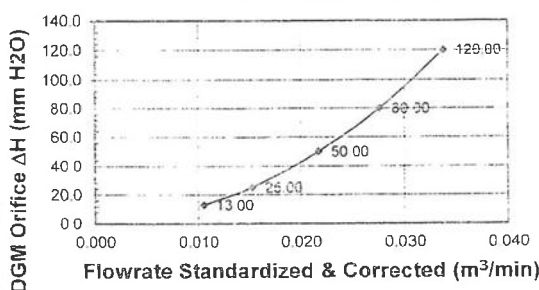
$$Actual \Delta H_g = \frac{P_{m(g)} * Counts_{std} * (P_{bar} + \frac{P_{m(g)}}{13.6})}{T_w} * \left(\frac{T_w * \theta}{V_w * P_{bar}} \right)^2$$

Calibration Train



Calibration Graphs

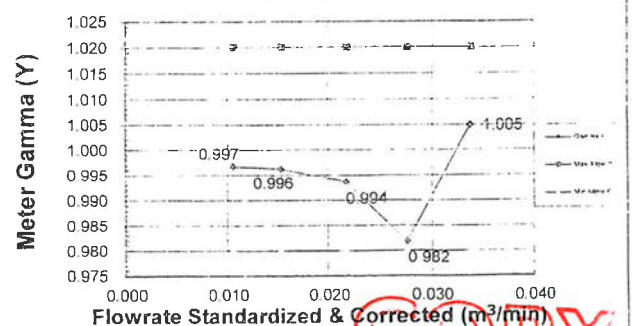
Meter Pressure vs Flowrate



Console Serial: A2007510

Console Model: XC-

Meter Gamma vs Flowrate



Console Serial: A2007510

Console Model: XC-572-V

TEMPERATURE DISPLAY CALIBRATION

Meter Console Information

Console Model	XC-572-V
Console Serial	A2007510
Temp Indicator Model	765-KF
Temp Indicator Serial	JC17819

Calibration Conditions

Cal Date	30-Aug-24
Due Date	30-Aug-25
Cal Report No	WDS-SV6708010
Ambient Temp (°C)	25
Pressure (mm Hg)	758
Humidity (%)	60

Reference Equipment

Temp. Meter Model	Fluke 714B
Serial No.	60590035
Cal Date	07-Apr-24
Temp Meter Model	Fluke 179
Serial No	56520112
Cal Date	06-Feb-24

Temperature Sensor Calibration

Reference Point	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	-18.0	-18.0	0.0
2	38.0	38.0	0.0
3	93.0	93.0	0.0
4	149.0	149.0	0.0
5	260.0	260.0	0.0
6	371.0	372.0	-1.0
7	482.0	482.0	0.0
8	593.0	593.0	0.0
9	816.0	817.0	-1.0
10	1038.0	1039.0	-1.0
Maximum ¹			1.0

PASS

Note

¹ For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1.1.8). Perform all TC Channel calibrations. Except meter (DGM) channel

DGM Out Temperature Sensor Calibration

Temperature point	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
Ice	0.0	0.0	0.0
Ambient	27.6	28.0	-0.4
Heat	116.3	116.0	0.3

Difference Range

Temp. Difference $\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$ (EPA Method 5, section 10.5)

Approved By :



(Patpasu Chaisana)

Service Manager

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Flue gas Analyzer

Testo 350 New

Serial No. 63455616/0722

Certificate No: G 670713
Date of issue : 09-Oct-24

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350 New
Instrument serial no. : 63455616/0722
Control unit serial no. : 03600177/0722
ID no. or control no. : -
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial no. : -
Customer name : Eastern Thai Consulting 1992 Company Limited
Customer address : 683 Moo 11, Sukhapibarn 8 Road, Nongkham, Si Racha, Chon Buri 20280

Total pages of certificate : 3 Pages
Receiving no. : L-243862
Receiving date. : 03-Oct-24
Parameter of calibration : Gas Calibration(Oxygen 2.50,10.04,21.02 %vol, Carbon Monoxide 80.18,302,1007 ppm, Nitrogen Dioxide 30.68, 81.8, 201.9 ppm, Nitric Oxide 30.0, 151.5, 322.5 ppm, Sulphur Dioxide 50.36, 100.8, 600.8 ppm)
Condition of UUC. : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : 23 ±5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND
Calibration procedure no. : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. This certificate is applied only to item under test Environmental condition. This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated. This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 09-Oct-24

Kwanchai K.
Mr. Kwanchai Khamdoung
Calibration Technician

D. Nongluck
Mrs. Nongluck Wongsettee
Technical Manager

Certificate No.: G 670713

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O2) 10.04 % Vol	CG-0153-21	Nimt	18-Nov-26
Oxygen (O2) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.18 ppm	CG-0002-24	Nimt	11-Jan-29
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1007 ppm	1870/24	Linde	17-Jun-26
Nitrogen Dioxide (NO2) 30.68 ppm	2832/24	Linde	08-Sep-24
Nitrogen Dioxide (NO2) 81.8 ppm	2330/24	Linde	01-Aug-26
Nitrogen Dioxide (NO2) 201.9 ppm	1975/23	Linde	17-Jul-25
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Nimt	06-May-26
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jan-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulphur Dioxide (SO2) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO2) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO2) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

Temperature : 22.9 °C Humidity : 66.4 %RH Pressure : 1011.5 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,300 ml/min Gas pressure : 1014.8 mbar

Calibration Results (Before adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.50	2.43	-0.07	0.15
O2 (%Vol)	10.04	9.92	-0.12	0.20
O2 (%Vol)	21.02	21.11	0.09	0.30
CO (ppm)	80.18	74	-6.18	3.0
CO (ppm)	302	295	-7	6.0
CO (ppm)	1007	996	-11	12
NO2 (ppm)	30.68	32.2	1.52	8.0
NO2 (ppm)	81.8	81.5	-0.3	8.0
NO2 (ppm)	201.9	204.3	2.4	12
NO (ppm)	30.0	27	-3.0	8.0
NO (ppm)	151.5	146	-5.5	8.0
NO (ppm)	322.5	305	-17.5	12
SO2 (ppm)	50.36	48	-2.36	6.0
SO2 (ppm)	100.8	97	-3.8	6.0
SO2 (ppm)	600.8	591	-9.8	13

Calibration Results (After adjustment) (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.50	2.43	-0.70	0.15
O2 (%Vol)	10.04	9.92	-0.12	0.20
O2 (%Vol)	21.02	21.11	0.09	0.30
CO (ppm)	80.18	80	-0.18	3.0
CO (ppm)	302	303	1	6.0
CO (ppm)	1007	1008	1	12
NO2 (ppm)	30.68	32.2	1.52	8.0
NO2 (ppm)	81.8	81.5	-0.3	8.0
NO2 (ppm)	201.9	204.3	2.4	12
NO (ppm)	30.0	31	1.0	8.0
NO (ppm)	151.5	153	1.5	8.0
NO (ppm)	322.5	321	-1.5	12
SO2 (ppm)	50.36	51	0.64	6.0
SO2 (ppm)	100.8	102	1.2	6.0
SO2 (ppm)	600.8	604	3.2	13

Remark : 1 cmol/mol = 1 %vol, 1 µmol/mol = 1 ppm.

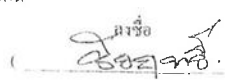
End of Report

เรื่อง อายุการใช้งานโดยประมาณของ Gas Sensor

เรียน ท่านผู้ใช้งาน/ฝ่ายจัดซื้อทราบ

เนื่องจากเครื่องมือวัด/วิเคราะห์แก๊สที่ทางบริษัท เอนเทค อินดัสเทรียล โซลูชั่น จำกัด ได้จำหน่ายให้แก่ท่านประกอบไปด้วย Sensor ที่มีโครงสร้างจาก Electrochemical หรือ วัดดูที่มีการเสื่อมอายุได้ ดังนั้น Sensor ที่ติดตั้งในเครื่อง จึงสามารถเสื่อมสภาพ ตามอายุการใช้งานได้

บริษัทฯ ได้ตระหนักถึงความสำคัญ ในการใช้งานเครื่องมือของท่าน ซึ่งจำเป็นต้องใช้งานอย่างต่อเนื่องและต้องการความถูกต้องแม่นยำตลอดเวลา บริษัทฯ จึงได้จัดทำตารางสำหรับตรวจสอบอายุการใช้งานและระยะเวลา ที่จะเปลี่ยน Sensor ครั้งต่อไปให้กับท่าน เพื่อความสะดวกในการดูแลรักษาและสั่งซื้อ Spare Sensor ก่อนที่ Sensor จะหมดอายุการใช้งาน ดังนี้

ใบรายงานอายุการใช้งานของ Gas Sensor									
อ้างอิงเอกสารเลขที่				AI-SV-RP-2407044		ชื่อลูกค้า		บริษัท อีสเทิร์น ไทยคอนซัลติง 1992 จำกัด	
ชื่อเครื่องมือ				Testo 350NEW		S/N		63455616/0722	
ส่วนที่ 1 : ตารางอายุการใช้งาน Sensor					ส่วนที่ 2 : Sensor ที่ติดตั้งในเครื่องของท่าน				
ข้อ	ชื่อ Sensor	ใช้สำหรับ	อายุ Sensor (เดือน)	การรับประกัน (เดือน)	Sensor (Part number)	วันที่สิ้นสุดการรับประกัน	วันที่หมดอายุตามปกติ	วันที่แนะนำให้สั่งซื้อครั้งต่อไป	หมายเหตุ
1	All sensor	Testo 3xx	24-36	12					
2	O2 (0390 0070)	Testo 300,315,350 M/XL	18-24	18					
3	O2,CO	Testo 327-1/-2, 320, 310	30	24					
4	O2 (0393 0000)	Testo 340/ 350 2010	18-24	18	O2 (0393 0000)	30/4/2569	30/10/2569	30/8/2569	
5	O2,CO	Testo 330LL, L.L., 2010	48-60	48	CO (0393 0104)	30/8/2566	30/8/2567	30/6/2567	
6	NO,NO_low	Testo 330LL, L.L., 2010	36-48	24	NO (0393 0150)	30/8/2566	30/8/2568	30/6/2568	
7	CO2 IR	Testo 350 M/XL,350, 2010	48-60	24	NO2 (0393 0200)	30/8/2566	30/8/2568	30/6/2568	
8	O2 (0393 0000)	Testo 340,350 2010	18-24	18	SO2 (0393 0250)	30/8/2566	30/8/2568	30/6/2568	
หมายเหตุ					รายละเอียดอื่น ๆ				
อายุการใช้งานของ Sensor อาจเสื่อมสภาพขึ้นหรือเร็วกว่าที่แนบมา ทั้งนี้ขึ้นอยู่กับคุณภาพ ปริมาณความเข้มข้นแก๊ส จำนวนครั้ง และปัจจัยอื่นๆของการใช้งานด้วย					เนื่องจาก CO sensor วัดค่าได้ไม่เกิน 10,000 ppm หากวัดค่าเกินถือว่าอยู่นอกเหนือการรับประกัน ลงชื่อ  Service Engineer วันที่ 3 / 10 / 2561				

GAS CHROMATOGRAPH

Model : GC-2010 PLUS AF

Serial No. : C12095200986

SHIMADZU GAS CHROMATOGRAPH SYSTEM

GC-2010Plus Series

Operational Qualification

Operational Qualification Report

System Name _____

System ID No. Gas Chromatograph LABE 0413

Installation Site Instrument Room GC/IC

The undersigned performer reports that the Operational Qualification Protocol has been successfully completed for the system stated above.

• Performer

Signature Thammat Pumpakun Date 15/08/2024Print Thammat PumpakunTitle Service EngineerCompany Brown Scientific Co., Ltd

The undersigned reviewer and manager report that the performer has completed the Operational Qualification Protocol successfully.

• Reviewer

Signature Pongpisit Boonwonges Date 15/08/2024Print Pongpisit BoonwongesTitle ScientistCompany Eastern Thai Consulting 1942 Co., Ltd

• Manager

Signature Nuramphat Bakhuntat Date 15/08/2024Print Nuramphat BakhuntatTitle HSCompany Eastern Thai Consulting 1942 Co., Ltd

Operational Qualification

Operational Qualification Record

3. Operational Qualification Record

If the unit is included in the system to be inspected, place a checkmark in the "Applicable" box. If the unit is not included in the system, place a checkmark in the "Not Applicable" box. Enter a diagonal line in the Pass/Fail checkbox for "Not applicable" items.

Here, Inspection results are recorded along the procedure of Chapter 4 in Operational Qualification Protocol.

3-1 Gas Chromatograph GC-2010Plus

☒ Applicable ☐ Not Applicable

Component ID		Model Name		GC-2010Plus		
Serial Number (S/N)		LABE 0413		C 1 2 0 9 5 2 0 0 9 2 C		
No.	Item	Criteria	Results	Pass	Fail	
1	Display, LED test	Verify the display and LED operation. All LEDs light. Screen contrast adjustment is possible.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	Standard self-diagnostic test	Verify the status and operation of all parts. "Good" displayed as the result of the self-diagnostic test.	Good	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Firmware version check	Verify the program version. Version number and build number are displayed. The version No. and build No. matches the controlled version number.	Ver. Controlled Ver. No.	Version: 2.1.0 Build No.: 262 Version: 2.1.0 Build No.: 262	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Temperature test	Verify that temperature control is normal. TEMP LED lights green. Displayed actual values agree to the set values within $\pm 1.0^{\circ}\text{C}$.	Temperature controller (Name) Set value Measured value <input checked="" type="checkbox"/> COL Column 50.0°C 50.0°C <input checked="" type="checkbox"/> INJ1 50.0°C 50.0°C <input type="checkbox"/> INJ2 $^{\circ}\text{C}$ $^{\circ}\text{C}$ <input checked="" type="checkbox"/> DET1 50.0°C 50.0°C <input type="checkbox"/> DET2 $^{\circ}\text{C}$ $^{\circ}\text{C}$ <input type="checkbox"/> AUX3 $^{\circ}\text{C}$ $^{\circ}\text{C}$ <input type="checkbox"/> AUX4 $^{\circ}\text{C}$ $^{\circ}\text{C}$ <input type="checkbox"/> AUX5 $^{\circ}\text{C}$ $^{\circ}\text{C}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	Column inlet pressure test	Verify the accuracy of the column inlet pressure. Inspection pressure gauge reading $\pm 10.0 \pm 3.0\text{kPa}$ Inspection pressure gauge reading $\pm 200.0 \pm 20.0\text{kPa}$ Inspection pressure gauge reading $\pm 500.0 \pm 35.0\text{kPa}$	Pressure gauge correction value Pressure gauge reading Post-correction reading Pressure gauge correction value Pressure gauge reading Post-correction reading Pressure gauge correction value Pressure gauge reading Post-correction reading	0.0kPa 9.3kPa 9.3kPa 0.4kPa 197.4kPa 197.0kPa 0.3kPa 497.1kPa 496.3kPa	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature): Thammat PumpakunDate: 15/08/2024Reviewer (signature): Pongpisit BoonwongesDate: 15/08/2024

Operational Qualification Record

No.	Item	Criteria	Results	Pass	Fail																		
6	Pressure program test	Verify that the pressure program operates normally	<table border="1"> <tr> <td>Monitored pressure 6 minutes after start 250.0 ± 5.0 kPa</td> <td>250.1 kPa</td> </tr> <tr> <td>Inspection pressure gauge reading 8 minutes after start 250.0 ± 20.0 kPa</td> <td>250.0 kPa</td> </tr> </table>	Monitored pressure 6 minutes after start 250.0 ± 5.0 kPa	250.1 kPa	Inspection pressure gauge reading 8 minutes after start 250.0 ± 20.0 kPa	250.0 kPa	✓	□														
Monitored pressure 6 minutes after start 250.0 ± 5.0 kPa	250.1 kPa																						
Inspection pressure gauge reading 8 minutes after start 250.0 ± 20.0 kPa	250.0 kPa																						
7	Flowrate test	Verify the accuracy of the full-flow and septum purging.	<table border="1"> <tr> <td>Septum purge 3.0 l 1.0 ml/min</td> <td>Septum purge 2.0 ml/min</td> </tr> <tr> <td><input type="checkbox"/> Total of septum purge and split vent flow rate values 10.0 l 3.0 ml/min</td> <td>Split vent 2.0 ml/min</td> </tr> <tr> <td></td> <td>Total 1.0 ml/min</td> </tr> <tr> <td><input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 20.0 ± 20 ml/min</td> <td>Split vent 1.0 ml/min</td> </tr> <tr> <td></td> <td>Total 1.0 ml/min</td> </tr> <tr> <td><input type="checkbox"/> Total of septum purge and split vent flow rate values 300 ± 28 ml/min (Carrier gas N₂)</td> <td>Split vent 1.0 ml/min</td> </tr> <tr> <td><input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 500 ± 15 ml/min (Carrier gas: He)</td> <td>Total 1.0 ml/min</td> </tr> </table>	Septum purge 3.0 l 1.0 ml/min	Septum purge 2.0 ml/min	<input type="checkbox"/> Total of septum purge and split vent flow rate values 10.0 l 3.0 ml/min	Split vent 2.0 ml/min		Total 1.0 ml/min	<input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 20.0 ± 20 ml/min	Split vent 1.0 ml/min		Total 1.0 ml/min	<input type="checkbox"/> Total of septum purge and split vent flow rate values 300 ± 28 ml/min (Carrier gas N ₂)	Split vent 1.0 ml/min	<input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 500 ± 15 ml/min (Carrier gas: He)	Total 1.0 ml/min	✓	□				
Septum purge 3.0 l 1.0 ml/min	Septum purge 2.0 ml/min																						
<input type="checkbox"/> Total of septum purge and split vent flow rate values 10.0 l 3.0 ml/min	Split vent 2.0 ml/min																						
	Total 1.0 ml/min																						
<input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 20.0 ± 20 ml/min	Split vent 1.0 ml/min																						
	Total 1.0 ml/min																						
<input type="checkbox"/> Total of septum purge and split vent flow rate values 300 ± 28 ml/min (Carrier gas N ₂)	Split vent 1.0 ml/min																						
<input checked="" type="checkbox"/> Total of septum purge and split vent flow rate values 500 ± 15 ml/min (Carrier gas: He)	Total 1.0 ml/min																						
8	Column oven test	Verify the accuracy of the column oven temperature.	<table border="1"> <tr> <td>Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 50.0 ± 3.2 °C</td> <td>Temp. correction value 0.4 °C</td> </tr> <tr> <td></td> <td>Temp. sensor reading 52.0 °C</td> </tr> <tr> <td></td> <td>Corrected temp. value 51.6 °C</td> </tr> <tr> <td>Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 150.0 ± 14.2 °C</td> <td>Temp. correction value -0.7 °C</td> </tr> <tr> <td></td> <td>Temp. sensor reading 151.4 °C</td> </tr> <tr> <td></td> <td>Corrected temp. value 152.1 °C</td> </tr> <tr> <td>Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 280.0 ± 5.5 °C</td> <td>Temp. correction value -0.4 °C</td> </tr> <tr> <td></td> <td>Temp. sensor reading 279.6 °C</td> </tr> <tr> <td></td> <td>Corrected temp. value 280.0 °C</td> </tr> </table>	Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 50.0 ± 3.2 °C	Temp. correction value 0.4 °C		Temp. sensor reading 52.0 °C		Corrected temp. value 51.6 °C	Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 150.0 ± 14.2 °C	Temp. correction value -0.7 °C		Temp. sensor reading 151.4 °C		Corrected temp. value 152.1 °C	Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 280.0 ± 5.5 °C	Temp. correction value -0.4 °C		Temp. sensor reading 279.6 °C		Corrected temp. value 280.0 °C	✓	□
Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 50.0 ± 3.2 °C	Temp. correction value 0.4 °C																						
	Temp. sensor reading 52.0 °C																						
	Corrected temp. value 51.6 °C																						
Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 150.0 ± 14.2 °C	Temp. correction value -0.7 °C																						
	Temp. sensor reading 151.4 °C																						
	Corrected temp. value 152.1 °C																						
Inspection temperature sensor displayed value <input checked="" type="checkbox"/> 280.0 ± 5.5 °C	Temp. correction value -0.4 °C																						
	Temp. sensor reading 279.6 °C																						
	Corrected temp. value 280.0 °C																						
9	Temperature program test	Verify that the column temperature program operates normally.	<table border="1"> <tr> <td>Monitored temperature 6 minutes after start 200 ± 1 °C</td> <td>200.0 °C</td> </tr> <tr> <td><input checked="" type="checkbox"/> Inspection temperature reading 8 minutes after start 200.0 ± 4.7 °C</td> <td>200.1 °C</td> </tr> <tr> <td><input type="checkbox"/> Using a temperature sensor with 1 °C minimum display increment 200 ± 3 °C</td> <td>— °C</td> </tr> </table>	Monitored temperature 6 minutes after start 200 ± 1 °C	200.0 °C	<input checked="" type="checkbox"/> Inspection temperature reading 8 minutes after start 200.0 ± 4.7 °C	200.1 °C	<input type="checkbox"/> Using a temperature sensor with 1 °C minimum display increment 200 ± 3 °C	— °C	✓	□												
Monitored temperature 6 minutes after start 200 ± 1 °C	200.0 °C																						
<input checked="" type="checkbox"/> Inspection temperature reading 8 minutes after start 200.0 ± 4.7 °C	200.1 °C																						
<input type="checkbox"/> Using a temperature sensor with 1 °C minimum display increment 200 ± 3 °C	— °C																						
10	Sensitivity test	Verify the detector sensitivity.	<table border="1"> <tr> <td>FID (<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable) Calculated S value Inj. unit (5 µl) <input checked="" type="checkbox"/> Make-up gas: N₂ 10.0 × 10³ C/g min. <input type="checkbox"/> Make-up gas: He 7.00 × 10³ C/g min.</td> <td>C₁₀ AREA value 47787</td> </tr> <tr> <td></td> <td>µV·s</td> </tr> <tr> <td></td> <td>1.0 × 10³ C/g</td> </tr> <tr> <td>FID (<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not Applicable) Calculated S value Inj. unit () 4.00 × 10³ mV·ml/zone min.</td> <td>C₁₀ AREA value µV·s</td> </tr> <tr> <td></td> <td>Flowrate at vent ml/min</td> </tr> <tr> <td></td> <td>Calculated S value × 10³ mV·ml/mg</td> </tr> </table>	FID (<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable) Calculated S value Inj. unit (5 µl) <input checked="" type="checkbox"/> Make-up gas: N ₂ 10.0 × 10 ³ C/g min. <input type="checkbox"/> Make-up gas: He 7.00 × 10 ³ C/g min.	C ₁₀ AREA value 47787		µV·s		1.0 × 10 ³ C/g	FID (<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not Applicable) Calculated S value Inj. unit () 4.00 × 10 ³ mV·ml/zone min.	C ₁₀ AREA value µV·s		Flowrate at vent ml/min		Calculated S value × 10 ³ mV·ml/mg	✓	□						
FID (<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable) Calculated S value Inj. unit (5 µl) <input checked="" type="checkbox"/> Make-up gas: N ₂ 10.0 × 10 ³ C/g min. <input type="checkbox"/> Make-up gas: He 7.00 × 10 ³ C/g min.	C ₁₀ AREA value 47787																						
	µV·s																						
	1.0 × 10 ³ C/g																						
FID (<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not Applicable) Calculated S value Inj. unit () 4.00 × 10 ³ mV·ml/zone min.	C ₁₀ AREA value µV·s																						
	Flowrate at vent ml/min																						
	Calculated S value × 10 ³ mV·ml/mg																						

Performer (signature):

Date: 15 / 08 / 2024

Reviewer (signature):

Date: 1.5 / 8 / 2014

Operational Qualification

Operational Qualification Record

3-2 AOC-20i Auto Injector

☒ Applicable ☐ Not Applicable

☒ Single ☐ Dual system, main injector

Model Name		AOC-50i			
Component ID		LRAE 0413			
Serial No. (S/N)		C 1 2 1 2 5 4 1 0 2 0 9			
No.	Item	Criteria	Results	Pass	Fail
1	Display, LED test	Verify the display and LED operation.	All LEDs light, except decimal point.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	ROM, RAM self diagnosis	Verify that ROM and RAM memory operates normally.	Display shows "000".	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Firmware version check.	Verify the program version	Version number is displayed.	3.4	<input checked="" type="checkbox"/>
		The version number matches the controlled version number.	Controlled Ver. No.	3.4	<input type="checkbox"/>
4	Basic operation test	Verify that the auto injector basic operation is correct.	Sample injected into the GC and GC operation starts.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

☒ Not Applicable ☐ Dual system, sub injector

Model Name		AOC-20i				
Component ID						
Serial No. (S/N)						
No.	Item	Criteria	Results	Pass	Fail	
1	Display, LED test	Verify the display and LED operation.	All LEDs light, except decimal point.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	ROM, RAM self diagnosis	Verify that ROM and RAM memory operates normally.	Display shows "000".	Display:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Firmware version check	Verify the program version	Version number is displayed.	Version No.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			The version number matches the controlled version number.	Controlled Ver. No.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Basic operation test	Verify that the auto injector basic operation is correct.	Sample No.1 transferred to the main injector, sample No. 2 transferred to the sub-injector. Sub-injector injects into the GC simultaneously with the main AOC.		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature):

Date: 15 / 02 / 2024

Reviewer (signature):

Date: 11/1/2024

Operational Qualification Operational Qualification Record

3-3 AOC-20s Auto Sampler

☒ Applicable ☐ Not Applicable

Model Name		AOC-20s			
Component ID		L06E 0217			
Serial No. (S/N)		C 1 2 1 3 5 4 0 5 9 1 0			
No.	Item	Criteria	Results	Pass	Fail
1	Initial operation test	Verify that the auto sampler basic operation is correct.	LED lights green, not red.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Firmware version check	Verify the program version.	Version number is displayed. The version number matches the controlled version number.	Version No. 3.5 Controlled Ver. No. 3.5	<input checked="" type="checkbox"/> <input type="checkbox"/>

Operational Qualification

Operational Qualification Record

3-4 SPL-2010Plus Split/Splitless Injection Unit

☐ Applicable ☒ Not Applicable

Model Name		SPL-2010Plus			
Component ID					
Serial No. (S/N)					
No.	Item	Criteria	Results	Pass	Fail
1	Column inlet pressure test	Verify the accuracy of the column inlet pressure. <div> Inspection pressure gauge reading <input type="checkbox"/> 10.0±3.0kPa Pressure gauge correction value Post-correction reading kPa </div> <div> Inspection pressure gauge reading <input type="checkbox"/> 200.0±20.0kPa Pressure gauge correction value Post-correction reading kPa </div> <div> Inspection pressure gauge reading <input type="checkbox"/> 500.0±35.0kPa Pressure gauge correction value Post-correction reading kPa </div>	<div> kPa kPa kPa </div> <div> kPa kPa kPa </div> <div> kPa kPa kPa </div>	<input type="checkbox"/>	<input type="checkbox"/>
2	Pressure program test	Verify that the pressure program operates normally. <div> Monitored pressure 6 minutes after start 250.0 ± 5.0 kPa Inspection pressure gauge reading 8 minutes after start 250.0 ± 20.0 kPa </div>	<div> kPa kPa </div>	<input type="checkbox"/>	<input type="checkbox"/>
3	Flowrate test	Verify the accuracy of the full-flow and septum purging. <div> Septum purge vent measured flow rate 3.0 ± 1.0mL/min <input type="checkbox"/> Total of septum purge and split vent flow rate values 10.0±3.0mL/min </div> <div> <input type="checkbox"/> Total of septum purge and split vent flow rate values 200.120ml/min </div> <div> <input type="checkbox"/> Total of septum purge and split vent flow rate values 300±28mL/min(Carrier gas: N₂) <input type="checkbox"/> Total of septum purge and split vent flow rate values 500±35mL/min(Carrier gas: He) </div>	<div> Septum purge mL/min Split vent mL/min Total mL/min </div> <div> Split vent mL/min Total mL/min </div> <div> Split vent mL/min Total mL/min </div>	<input type="checkbox"/>	<input type="checkbox"/>

Performer (signature):

Date: 15 / 08 / 2024

Reviewer (signature):

Date: 15 / 08 / 2024

Performer (signature):

Date: 15 / 08 / 2024

Reviewer (signature):

Date: 15 / 08 / 2024

Hot Air Oven

Model : UFE 500

Serial No. : G511.0182

NSC-TISI-TS17025
CALIBRATION 0152

Page 1 of 3

CERTIFICATE OF CALIBRATION

Certificate No. : 24-164691
Sample Code : 24-67405-001Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd, Nongkham,
Sriracha, Chonburi 20230
Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Hot Lab)

Equipment : Temperature controlled enclosures (Hot air oven)

Manufacturer : Memmert

Serial No. : G511.0182

Date of Receipt : 19 December 2024

Model : UFE 500

ID No. : LABE 17/4

Date of Calibration : 19 December 2024

Condition of Calibration

1. Environment
- 1.1 Ambient temperature : Maximum 32.0 °C ; Minimum 31.0 °C
- 1.2 Relative humidity : Maximum 48.5 % ; Minimum 43.5 %
- 1.3 Line voltage supplied : Maximum 225.3 VAC ; Minimum 222.0 VAC
2. Calibration method
- TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data Acquisition With Sensor (RTD-Pt100)	LB-DA-11 (RTD-138 to RTD-146)	24-040191	07 April 2025

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by

Mr. Nophanon Anusak
Scientist

Approved by

(Mr. Sornchai Neampunt)
Signed for Director

Issue date

20 December 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

361 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
FM CL-114TEL 02-516-2422
FAX 02-516-6949
Rev 01CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21NSC-TISI-TS17025
CALIBRATION 0152

Page 2 of 3

REPORT OF CALIBRATION

Certificate No. : 24-164691
Sample Code : 24-67405-001

Results of Calibration

Resolution : 0.5 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)									Uncertainty ± (°C)	Coverage factor k
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9 ^{ref}		
104	103.5	103.5	104.14	104.15	103.80	104.15	104.09	104.19	103.85	103.65	104.22	0.47	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
104	0.07	0.63	0.69

Notes

UUC* = Unit Under Calibration

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361 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
FM CL-018TEL 02-516-2422
FAX 02-516-6949
Rev 09CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH

REPORT OF CALIBRATION

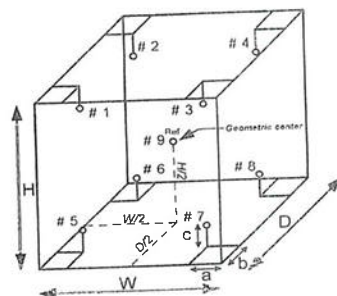
Certificate No. : 24-164691

Sample Code : 24-67405-001

Results of Calibration

Notes

1. Sensor installation locations
 - 1.1 All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - 1.2 The reference sensor is preferably located of the geometric center of the chamber.
2. Interior dimensions approx of chamber :
W = 56 cm ; D = 40 cm ; H = 48 cm
3. Air valve or fresh air level : Off
4. Fan level : Open
5. The quoted uncertainty includes " Stability of chamber and loading effect in chamber at 20% of uniformity ".
6. Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.
7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
10. Calibration results without adjustment.

Figure: Example of sensor
installation Positions

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

- End of Report -

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INDUCTIBELY COUPLED PLASMA SPECTROMETER

Model : Prodigy 7

Serial No. : P70177



Instrument Performance Certificate For ICP-OES

PRODUCT ID
Serial Number

Prodigy 7, Teledyne Leeman Labs
P70177

Customer Name
Address

Eastern Thai Consulting 1992 Co.,Ltd
683 Moo 11 Tambon Nong Khaun, Si Racha, Chonburi 20230

Date of Qualified
Next Due date

Nov 4, 2024
May 3, 2025

This certifies for products which was performed in acceptable criteria specifications

Gas supply /Water chiller/Exhaust hood	PASSED
Spectrometer	PASSED
RF Generator	PASSED
Sample Introduction & Autosampler	PASSED
Software & Computer	PASSED
Hardware Diagnostics Test	PASSED
Analytical Test	PASSED

Provided by

Scientist Instrument Co.,Ltd.
113 Soi Ekachai 44, Ekachai Road
Khlong Bang Phran, Bangbon
Bangkok 10150 Thailand

Certified by
Thunraphol Sakdayos

Service Engineer



Preventive Maintenance Report

Customer Name:	Eastern Thai Consulting 1992 Co.,Ltd	Date:	Nov 4, 2024
Instrument/Equipment:	ICP-OES	Model:	Prodigy 7
Brand:	Teledyne Leeman Labs	S/N:	P70177

1. Gas Supply / Water Chiller / Exhaust Hood:	Status
Gas systems:	
Argon Pressure (80-95 psi): 50 psi	OK <input checked="" type="checkbox"/>
Nitrogen Pressure (80-95 psi): - psi	OK <input type="checkbox"/>
No leak inspected	OK <input checked="" type="checkbox"/>
Replace camera purge gas Dehydrator	OK <input checked="" type="checkbox"/> checked
Water Chiller for RF generator	OK <input checked="" type="checkbox"/>
Pressure 30 psi (2 L/min)	OK <input checked="" type="checkbox"/>
Temperature: ~40 °C	OK <input checked="" type="checkbox"/>
No leak inspected	OK <input checked="" type="checkbox"/>
Water Chiller for Detector	OK <input checked="" type="checkbox"/>
Check water level and refill	OK <input checked="" type="checkbox"/>
Change water	OK <input checked="" type="checkbox"/>
Temperature: 26 °C	OK <input checked="" type="checkbox"/>
Exhaust Hood:	OK <input checked="" type="checkbox"/>
Air Flow rate (> 105 cfm)	OK <input checked="" type="checkbox"/>
2.Spectrometer	Status
Optical view position	
Axial peak positions x3320 y1200	OK <input checked="" type="checkbox"/>
Radial peak positions x4224 y1190	OK <input checked="" type="checkbox"/>
Hg lamp peak positions x2245 y2615	OK <input checked="" type="checkbox"/>
Wavelength Calibrate with HG Lamp	OK <input checked="" type="checkbox"/>
Full Frame Image	OK <input checked="" type="checkbox"/>
Temperature controlled °C	OK <input checked="" type="checkbox"/>
Purge gas flow control Low/High	OK <input checked="" type="checkbox"/>
Camera Support Module	OK <input checked="" type="checkbox"/>

Engineer Sign

.....

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3.RF Generator		Status
Plasma Control		
Auto Start	OK <input checked="" type="checkbox"/>	
Extinguish	OK <input checked="" type="checkbox"/>	
RF power setting	OK <input checked="" type="checkbox"/>	
Igniter	OK <input checked="" type="checkbox"/>	
Air Knife	OK <input checked="" type="checkbox"/>	
Coolant/Plasma Flow control	OK <input checked="" type="checkbox"/>	
Aux Flow	OK <input checked="" type="checkbox"/>	
Optimize sample introduction function	OK <input checked="" type="checkbox"/>	
Camera Support Module	OK <input checked="" type="checkbox"/>	
4.Sample Introduction & Autosampler		Status
Plasma torch		
Plasma Torch	OK <input checked="" type="checkbox"/>	
Spray chamber	OK <input checked="" type="checkbox"/>	
Injector	OK <input checked="" type="checkbox"/>	
Nebulizer pressure	OK <input checked="" type="checkbox"/>	
Peristaltic pump and control		
speed control	OK <input checked="" type="checkbox"/>	
Sample tubing	OK <input checked="" type="checkbox"/>	
Drain tubing	OK <input checked="" type="checkbox"/>	
Autosampler Control		
Position movement	OK <input checked="" type="checkbox"/>	
Drain tubing	OK <input checked="" type="checkbox"/>	
Auto Rinse	OK <input checked="" type="checkbox"/>	
5.Computer & Software Check:		Status
Interface Cable USB	OK <input checked="" type="checkbox"/>	
Software Version 5.2	OK <input checked="" type="checkbox"/>	
Operation function check	OK <input checked="" type="checkbox"/>	
Open /Save /Edit method	OK <input checked="" type="checkbox"/>	
Instrument Control	OK <input checked="" type="checkbox"/>	
Sequence	OK <input checked="" type="checkbox"/>	
Full Frame Capture	OK <input checked="" type="checkbox"/>	
Auto alignment /Hg alignment	OK <input checked="" type="checkbox"/>	
Calibration Curve	OK <input checked="" type="checkbox"/>	
Re-Calculation	OK <input checked="" type="checkbox"/>	
Print Report	OK <input checked="" type="checkbox"/>	

Engineer Sign

Esamir

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6.Hardware Diagnostics Test				
Power Supply	Reference Value	Reading Value		Status
	-12 VDC (+/- 5 %)	-13.7	V	Passed <input checked="" type="checkbox"/>
	+12 VDC (+/- 5 %)	11.91	V	Passed <input checked="" type="checkbox"/>
	+3.3VDC (+/- 5 %)	3.304	V	Passed <input checked="" type="checkbox"/>
	+5.0 VDC (+/- 5 %)	4.995	V	Passed <input checked="" type="checkbox"/>
	+13.5 VDC (+/- 7.5 %)	13.4	V	Passed <input checked="" type="checkbox"/>
Plasma Generator				
	ICP Current 0.500A = 1kW	0.502	A	Passed <input checked="" type="checkbox"/>
	ICP Ref 5.0Vdc = 1kW	5.007	V	Passed <input checked="" type="checkbox"/>
	ICP Current 0.00 Vdc = 0kW	0	A	Passed <input checked="" type="checkbox"/>
	ICP Ref 0.00Vdc = 0kW	0	V	Passed <input checked="" type="checkbox"/>
	RF Water (Hz) OFF (1 Hz)	0	Hz	Passed <input checked="" type="checkbox"/>
	RF Water (Hz) ON (25-35 Hz)	25	Hz	Passed <input checked="" type="checkbox"/>
	Air Knife Pres (0.00V) OFF	0	V	Passed <input checked="" type="checkbox"/>
	Air Knife Pres. (3.0 – 7.0 V) ON	4.15	V	Passed <input checked="" type="checkbox"/>
	Neb pressure setting of 25 psi	25.3	psi	Passed <input checked="" type="checkbox"/>
	Cool flowrate setting of 16 lpm	16.0	lpm	Passed <input checked="" type="checkbox"/>
	Aux flowrate setting of 0.3 lpm	0.33	lpm	Passed <input checked="" type="checkbox"/>
Camera Support Module				
	Pump Current (0.000 A) OFF	0	A	Passed <input checked="" type="checkbox"/>
	Pump Voltage (0.000 V) OFF	0	V	Passed <input checked="" type="checkbox"/>
	Pump Current (0.8 to 4.0A) ON	1.01	A	Passed <input checked="" type="checkbox"/>
	Pump Voltage (8 to 13 V) ON	12.5	V	Passed <input checked="" type="checkbox"/>
	Water chiller pre Setting 28 °C	28.02	°C	Passed <input checked="" type="checkbox"/>
	Cam Tec Temperature Setting 27 °C	-30	°C	Passed <input checked="" type="checkbox"/>
Optical purge flowrate				
	Optical Purge Low Setting 5 lpm	5.1	lpm	Passed <input checked="" type="checkbox"/>
	Optical Purge High Setting 10 lpm	10.1	lpm	Passed <input checked="" type="checkbox"/>

7.Cleaning & Replacement		Status
O-Ring Torch replacement	OK <input checked="" type="checkbox"/>	checked Replace Injector-O-RING
Pump Tubing replacement	OK <input checked="" type="checkbox"/>	
Glassware cleaning	OK <input checked="" type="checkbox"/>	
Lubricate the roll peristaltic pump	OK <input checked="" type="checkbox"/>	
Optical windows cleaning	OK <input checked="" type="checkbox"/>	
Change & refilled Detector water chiller	OK <input checked="" type="checkbox"/>	
Change & refilled RF Generator water Chiller	OK <input checked="" type="checkbox"/>	

Engineer Sign

Esamir

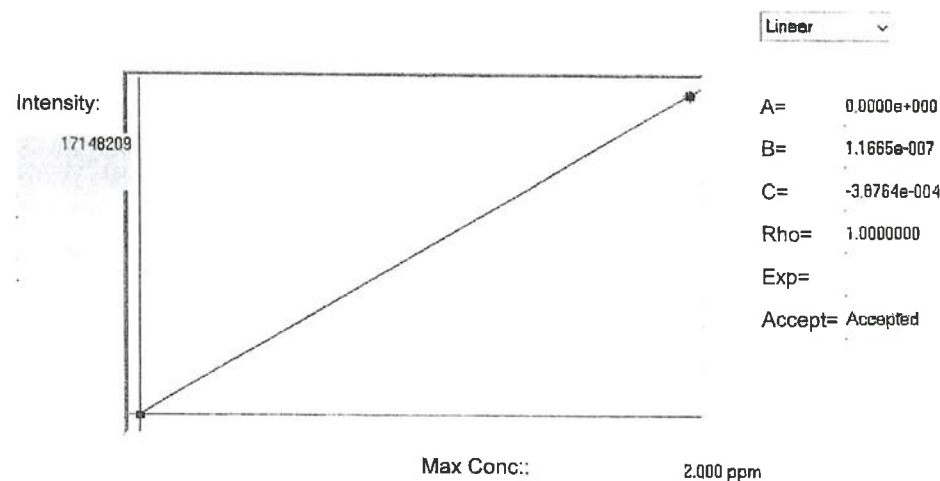
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Mn Setup - Mn 257.610

8. Safety Interlock		Status
Argon pressure	OK	<input checked="" type="checkbox"/>
Air Knife	OK	<input checked="" type="checkbox"/>
RF power regulator	OK	<input checked="" type="checkbox"/>
RF power temp	OK	<input checked="" type="checkbox"/>
RF power current	OK	<input checked="" type="checkbox"/>
RF water	OK	<input checked="" type="checkbox"/>
Oscillator cover	OK	<input checked="" type="checkbox"/>
Door switch	OK	<input checked="" type="checkbox"/>
Camera purge	OK	<input checked="" type="checkbox"/>
Camera TE cooler	OK	<input checked="" type="checkbox"/>
Water chiller	OK	<input checked="" type="checkbox"/>
Heater Fans	OK	<input checked="" type="checkbox"/>

9. Analytical Test		Details	Status
Method Name	Mn Setup		
SRM Standard	Mn 2 ppm		
Calibration curve type	Linear	Linear	
Rho	1.0		OK <input checked="" type="checkbox"/>
Element	Mn		
QC standard Check	2 ppm		OK <input checked="" type="checkbox"/>

Customer Sign	Engineer Sign
<u> </u>	<u> </u>



Std ID	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3	Rep 4
Mn	2.000	2.000	0.000	17148209	0.7 %	17029613	17322997	17092019	
Blank	0	-7.36e-017	-0.000	3323	142.925	3466	3128	3376	

COPY

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PM 4 November 2024

Method: Mn Setup

Operator: Admin

Date Printed: 04 Nov 2024 14:49:54

Sample ID	Line	Conc.	Intensity
Blank - 1	Mn 257.610	-	3466
Blank - 1	Mn 257.610 r	-	39
Blank - 2	Mn 257.610	-	3128
Blank - 2	Mn 257.610 r	-	176
Blank - 3	Mn 257.610	-	3376
Blank - 3	Mn 257.610 r	-	74
Mn - 1	Mn 257.610	-	17029613
Mn - 1	Mn 257.610 r	-	67529
Mn - 2	Mn 257.610	-	17322997
Mn - 2	Mn 257.610 r	-	68498
Mn - 3	Mn 257.610	-	17092019
Mn - 3	Mn 257.610 r	-	68105
2 ppm Mn - 1	Mn 257.610	1.9708	16898276
2 ppm Mn - 1	Mn 257.610 r	2.0394	69383
2 ppm Mn - 2	Mn 257.610	1.9831	17003092
2 ppm Mn - 2	Mn 257.610 r	2.0807	70787
2 ppm Mn - 3	Mn 257.610	1.9465	16689317
2 ppm Mn - 3	Mn 257.610 r	2.0766	70645
2 ppm Mn - 4	Mn 257.610	1.9587	16794208
2 ppm Mn - 4	Mn 257.610 r	2.1068	71671
2 ppm Mn - 5	Mn 257.610	1.9732	16918788
2 ppm Mn - 5	Mn 257.610 r	2.1349	72626
2 ppm Mn - 6	Mn 257.610	2.0087	17222884
2 ppm Mn - 6	Mn 257.610 r	2.1936	74622
2 ppm Mn - 7	Mn 257.610	1.9985	17135673
2 ppm Mn - 7	Mn 257.610 r	2.1526	73227
2 ppm Mn - 8	Mn 257.610	2.0058	17197635
2 ppm Mn - 8	Mn 257.610 r	2.1767	74046
2 ppm Mn - 9	Mn 257.610	2.0039	17181636
2 ppm Mn - 9	Mn 257.610 r	2.1634	73597
2 ppm Mn - 10	Mn 257.610	2.0026	17170534
2 ppm Mn - 10	Mn 257.610 r	2.2148	75342

COPY

IC-THERMO

Serial No. : 20053176



Certificate of Calibration

Integriion RFIC: Anion and Cation (ID#960)

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

Integriion	S/N: 20053176
AS-DV	S/N: 2008880131

for

Eastern Thai Consulting 1992 Co., Ltd.

Operator Signature : _____


ARCHEMICA LAB CO., LTD.

Date : October 15, 2024

(Mr. Soranat Thongnop)

Applications Chemist

COPY

ORIFICE TRANSFER STANDARD CERTIFICATION

WORKSHEET TE-5025A

ROOTSMETER S/N 0438320



TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVELAND, OH
44102
513.467.9000
877.263.7810 TOLL FREE
513.467.9008 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 24, 2016 Rootsmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 0136 Pa (mm) - 742.95

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3400	3.2	2.00
2	NA	NA	1.00	0.9510	6.3	4.00
3	NA	NA	1.00	0.8510	7.8	5.00
4	NA	NA	1.00	0.8130	8.6	5.50
5	NA	NA	1.00	0.6690	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9832	0.7337	1.4054	0.9957	0.7430	0.8911
0.9791	1.0296	1.9875	0.9915	1.0426	1.2603
0.9770	1.1481	2.2221	0.9894	1.1626	1.4090
0.9760	1.2006	2.3305	0.9884	1.2157	1.4778
0.9707	1.4510	2.8107	0.9830	1.4694	1.7823
Qstd slope (m) = 1.96262			Qa slope (m) = 1.22896		
intercept (b) = -0.03249			intercept (b) = -0.02060		
coefficient (r) = 0.99993			coefficient (r) = 0.99993		

y axis = SQRT[H2O(Pa/760) (298/Ta)]

y axis = SQRT[H2O(Ta/Pa)]

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760) (298/Ta))] - b}
Qa = 1/m{[SQRT H2O(Ta/Pa)] - b}

COPY

Primary Flow Calibrator

Serial No. : 110619 , 207510



CALIBRATION LABORATORY Co.,LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : FLOW METER
MANUFACTURER : BIOS INTERNATIONAL
MODEL / TYPE : DEFENDER 510-L
SERIAL NO. : 110619
CLID. NO. : 212500238
JOB CONTROL NO. : 250128010260
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 28 January 2025

DATE OF ISSUED : 31 January 2025

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

Calibrated By : Supphakit Sakuntaharn

Calibration Engineer

Approved By : Mongkol Yotsoontorn

Authorized Signatory

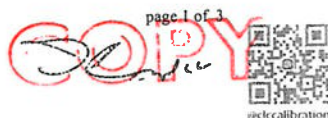
31 January 2025



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. Q25010260

F3-011-05/12-23



CALIBRATION LABORATORY Co.,LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : FLOW METER
MANUFACTURER : BIOS INTERNATIONAL
MODEL / TYPE : DEFENDER 510-L
SERIAL NO. : 110619
DATE OF CALIBRATION : 29 January 2025

ENVIRONMENT CONDITIONS :

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

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

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPF-03. The calibration was performed by comparison with Gas Flow Meter which refers to the standard condition of 101.325 kPa and $0 ^\circ\text{C}$.

REFERENCE STANDARD USED :

Gas Flow Meter, Alicat Scientific Model M-500SCCM-D-DB15 S/N. 261329.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Chell Instrument Ltd.

Certificate No. N037063, Due Date 26 February 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table 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. Q25010260

F3-011-05/12-23





CALIBRATION LABORATORY CO., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4 Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax 02-578-2672 www.cal-laboratory.com E-mail sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring flow meter.

CALIBRATION DATA

FLOW METER RESULT

Nominal Value (cc/min)	STD Applied (cc/min)	DUC Reading (cc/min)	Correction (cc/min)	Uncertainty ± (cc/min)
0	0.00	0.00	0.00	-
50	50.00	48.75	+1.25	2.10
100	100.00	97.66	+2.34	2.10
200	200.00	195.22	+4.78	2.10
300	300.00	292.56	+7.44	2.10
400	400.00	390.82	+9.18	2.10
500	500.00	490.04	+9.96	2.10

Technical Note. Media of Gas : Air

Setting Temperature 0 ° C ; Pressure 101.3 kPa

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 49 of 68

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

End of Certificate

Certificate No. Q25010260

F3-011-05/12-23





CALIBRATION LABORATORY Co., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : FLOW METER
MANUFACTURER : MESALABS
MODEL / TYPE : DEFENDER 510-M
SERIAL NO. : 207510
CLID. NO. : 212500237
JOB CONTROL NO. : 250128010259
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 28 January 2025

DATE OF ISSUED : 31 January 2025

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

Calibrated By : Supphakit Sakuntaharn
Calibration Engineer



Approved By : Mongkol Yotsoontorn
Authorized Signatory
31 January 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. Q25010259

F3-011-05/12-23



CALIBRATION LABORATORY Co., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : FLOW METER
MANUFACTURER : MESALABS
MODEL / TYPE : DEFENDER 510-M
SERIAL NO. : 207510
DATE OF CALIBRATION : 29 January 2025

ENVIRONMENT CONDITIONS :

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

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

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPF-03. The calibration was performed by comparison with Gas Flow Meter which refers to the standard condition of 101.325 kPa and 0 °C.

REFERENCE STANDARD USED :

Gas Flow Meter, Alicat Scientific Model M-500SCCM-D-DB15 S/N. 261329.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Chell Instrument Ltd.

Certificate No. N037063, Due Date 26 February 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table 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. Q25010259

F3-011-05/12-23





CALIBRATION LABORATORY CO., LTD.

2/10-11,14, 55 Soi Prasert Manukit 29 Yaek 4 Prasert Manukit Rd., Lauphrad, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring flow meter.

CALIBRATION DATA

FLOW METER RESULT

Nominal Value (cc/min)	STD Applied (cc/min)	DUC Reading (cc/min)	Correction (cc/min)	Uncertainty ± (cc/min)
0	0.00	0.00	0.00	-
50	50.00	45.81	+4.19	2.10
100	100.00	99.10	+0.90	2.10
200	200.00	198.03	+1.97	2.10
300	300.00	298.30	+1.70	2.10
400	400.00	396.50	+3.50	2.10
500	500.00	495.31	+4.69	2.10

Technical Note. Media of Gas : Air

Setting Temperature 0 ° C ; Pressure 101.3 kPa

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 49 of 68

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

End of Certificate

Certificate No. Q25010259

F3-011-05/12-23



THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737

CERTIFICATE OF CALIBRATION

Page 1 of 2

Certificate No. : 24-062442

Sample Code : 24-25546-002

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital thermo-hygrometer

Manufacturer : testo Model : 608-H1
Serial No. : 45106737 ID No. : LABE 09/7
Date of Receipt : 23 May 2024 Date of Calibration : 27-28 May 2024

Condition of Calibration

1. Environment
 - 1.1 Ambient temperature : 23.0 °C ± 3.0 °C
 - 1.2 Relative humidity : 55.0 % ± 15.0 %

2. Calibration method

- 2.1 In-house method: WI-CL-045 By comparison with thermometer standard / chilled mirror hygrometer in controlled chamber.
- 2.2 The calibration by comparison unit under calibration (UUC) to the thermometer standard / chilled mirror hygrometer in a chamber at the controlled temperature / relative humidity.

3. Reference standard instrument

Instrument	Model	ID No.	Certificate No.	Due Date
3.1 Chilled Mirror	Optidew 401	LB-DP-03 & LB-DP-03 (DP)	TH-0064-23	07 August 2024
3.2 Digital Thermometer	Optidew 401	LB-DP-03 & LB-DP-03 (Temp.)	23-103423	03 September 2024
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-89	23-101374	05 September 2024

4. This certificate is traceable to the international system of unit (SI Unit).

- 4.1 Instrument No. 3.1 through National Institute of Metrology (Thailand).
- 4.2 Instrument No. 3.2 and 3.3 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Miss Pornsuda Lohabal
Scientist
Issue date 30 May 2024

Approved by (Mr. Somchai Neampunt)
Signed for Director

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Page 2 of 2

Certificate No. : 24-062442

Sample Code : 24-25546-002

Results of Calibration

Temperature measurement

Resolution : 0.1 °C
Range : 0 °C to 50 °C

Calibration point °C	Average of standard reading		Unit under calibration		Expanded uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.00	20.1	- 0.10	± 0.39
25	50	25.00	25.0	0.00	± 0.39
30	50	30.00	29.9	+ 0.10	± 0.39

Humidity measurement

Resolution : 0.1 %RH
Range : 10 %RH to 95 %RH

Calibration point %RH	Average of standard reading		Unit under calibration		Expanded uncertainty %RH
	Air temperature °C	Calculated humidity %RH	Average reading %RH	Correction value %RH	
45	25.02	45.10	48.4	- 3.30	± 1.3
60	25.01	60.07	63.4	- 3.33	± 1.5
75	25.01	75.15	78.5	- 3.35	± 1.7

Notes

- Calibration results without adjustment.

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M0003.

- End of Report -

Calibrated by Miss Pornsuda Lohabal
Scientist
Issue date 30 May 2024

Approved by (Mr. Somchai Neampunt)
Signed for Director

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

UV/VIS SPECTROPHOTOMETER

Model : UV-1800

Serial No. : A11635101643 CD



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-146/24
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 CD
ID No. LABE 03/2
Date of receipt 22 April 2024
Date of calibration 22 April 2024
Date of issue 29 April 2024

Customer name Eastern Thai Consulting 1992 Co., Ltd.

Address 683 Moo 11, Sukkaphibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (22.9-24.1) °C (On site)
Humidity (41.7-46.9) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method WI-UV-702-01 based on ASTM E275-01

Traceability Wavelength Accuracy is traceable to certificate No. 116614 and 116613
Photometric Accuracy is traceable to certificate No. 116210 and 116224
Sray Light is traceable to certificate No. 116616
The above certificate are traceable to SI unit through Starna Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr.Poomjai Korsawatvorakul

Approved by

Mr.Sonthi Temboonsakdi
Service Manager

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced
except in full, without written approval of the Bara Scientific Co., Ltd.



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com



Certificate of Calibration

Certificate No. BSCC-UV-146/24

Number of Page(s) 2 of 3

Calibration Results:

1.Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (±nm)
287.71	287.75	0.04	0.18
445.82	445.89	0.07	0.18
536.52	536.50	-0.02	0.18
741.02	741.01	-0.01	0.18
879.41	879.33	-0.08	0.18

2.Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
235	0.0000	0.0000	0.0000	0.0075
	0.7415	0.7387	-0.0028	0.0075
257	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
313	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
350	0.0000	0.0000	0.0000	0.0075
	0.6406	0.6395	-0.0011	0.0075

*CNR = Customer not request

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
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Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor7 Rama4 Road
Silom Bangrak Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375496-7
www.barascientific.com



Certificate of Calibration

Certificate No. BSCC-UV-146/24

Number of Page(s) 3 of 3

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty ($\pm A$)
420.0	0.0000	0.0000	0.0000	0.0042
	0.5715	0.5729	0.0014	0.0042
	0.7087	0.7087	0.0000	0.0042
	1.0987	1.1005	0.0018	0.0042
440.0	0.0000	0.0000	0.0000	0.0042
	0.5561	0.5578	0.0017	0.0042
	0.6968	0.6969	0.0001	0.0042
	1.0757	1.0774	0.0017	0.0042
465.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
546.1	0.0000	0.0000	0.0000	0.0042
	0.5193	0.5213	0.0020	0.0042
	0.6937	0.6940	0.0003	0.0042
	1.0411	1.0428	0.0017	0.0042
590.0	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
635.0	0.0000	0.0000	0.0000	0.0042
	0.5605	0.5624	0.0019	0.0042
	0.7579	0.7583	0.0004	0.0042
	1.1131	1.1138	0.0007	0.0042

*CNR = Customer not request

4. Stray Light*

Standard cut-off wavelength (nm)	Unit Under Calibration(UUC)		
	Wavelength (nm)	Transmission (%T)	Absorbance (A)
201.33 \pm 0.11nm	200.80	0.9750	2.0111

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A

*Stray Light not NSC-ONSC Accredited.

The measurement uncertainty is base on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%.

End of Certificate

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced except in full, without written approval of the Bara Scientific Co., Ltd.

COPY

SOUND LEVEL CALIBRATOR

MODEL : NC-75

SERIAL No. : 34802645

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

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

SITHIPORN
ASSOCIATES



Cert. No. : ACC24043

Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 34802645
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 09 SEPTEMBER 2024
Calibration Date : 26 SEPTEMBER 2024
Date of Issue : 26 SEPTEMBER 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :


(Thanakul Petchurai)

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CALIBRATION LABORATORY

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Tel. +66 2433 8331 Email : calibration@sithiporn.com

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Cert. No. : ACC24043

Job No. : VC67AC0150

Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by follow on IEC-60942-2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

Condition of this result of calibration :

1. Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	33461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25
Audio Analyzer	AVR-3360A	V744B6069	EF-0009-24	09-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACC24043
Job No. : VC67AC0150
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.97	-0.03	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
0.15	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

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SOUND LEVEL METER

MODEL : CR:172A

SERIAL No. : G300957

Cert. No. : ACL25123

Pages : 1 of 9

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : CIRRUS
Model : CR172 A / Microphone PMP21/ Preamplifier -
Serial No.: G300957 / 230004 / 9371F
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 30 -31 JANUARY 2025
Date of Issue : 31 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Signature)
(Thanakul Petchurai)

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Cert. No. : ACL25123

Job No. : VC67AC0048

Pages : 2 of 9

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-4	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programnable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Job No. : VC67AC0048
Pages : 3 of 9

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25123
Job No. : VC67AC0048
Pages : 4 of 9

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
17.3

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

Frequency Weighting	Measured value (dB)
A - weight	14.6
C - weight	20.5
Flat	29.4

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.4	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.7	0.5	0.3	±5.0

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Job No. : VC67AC0048
Pages : 5 of 9

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Pages : 6 of 9

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.3	0.1	0.4	±2.0
125	0.1	0.1	0.3	±1.5
250	0.1	0.2	0.3	±1.5
500	0.1	0.2	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.1	0.0	-0.2	±2.0
4000	0.1	-0.2	-0.4	±3.0
8000	0.0	-0.3	-0.5	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
138.0	137.8	-0.2	± 1.1
137.0	136.7	-0.3	± 1.1
136.0	135.7	-0.3	± 1.1
135.0	134.8	-0.2	± 1.1
134.0	133.9	-0.1	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.8	-0.2	± 1.1
131.0	130.7	-0.3	± 1.1
130.0	129.8	-0.2	± 1.1
129.0	128.6	-0.4	± 1.1
124.0	124.0	0.0	± 1.1
119.0	118.7	-0.3	± 1.1
114.0	114.0	0.0	± 1.1
109.0	108.7	-0.3	± 1.1
104.0	103.8	-0.2	± 1.1
99.0	98.9	-0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.1	0.1	± 1.1
34.0	34.1	0.1	± 1.1
33.0	33.0	0.0	± 1.1
32.0	32.2	0.2	± 1.1
31.0	31.1	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.1	0.1	± 1.1
28.0	28.2	0.2	± 1.1
27.0	27.2	0.2	± 1.1
26.0	26.2	0.2	± 1.1
25.0	25.3	0.3	± 1.1

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Pages : 7 of 9

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Pages : 8 of 9

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Level linearity on each level range

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	43.0	43.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	107.0	106.9	-0.1	1.5 ; -5.0
	2	8	116.0	116.0	0.0	1.0 ; -2.5
	200	800	133.0	133.1	0.1	±1.0
Slow	2	8	107.0	107.0	0.0	1.5 ; -5.0
	200	800	126.6	126.6	0.0	±1.0
SEL	0.25	1	98.0	98.0	0.0	1.5 ; -5.0
	2	8	107.0	107.6	0.6	1.0 ; -2.5
	200	800	127.0	127.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{epc} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.3	-0.1	±3.0
One	129.8	131.1	1.3	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.5	0.1	±2.0
Positive half cycle	128.8	129.8	1.0	±2.0
Negative half cycle	128.8	129.8	1.0	±2.0

11. Overload indication

Measured value (dB)		Deviated	Acceptance
Positive	Negative	Value	Limits
one-half cycle	one-half cycle	(dB)	(dB)
87.9	87.9	0.0	±1.5

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Pages : 9 of 9

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	136.9	0.1	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation,providing a level of confidence of approximately 95 %

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SOUND LEVEL METER

MODEL : CR:172A

SERIAL No. : G301660



Cert. No. : ACL25126
Pages : 1 of 9

Cert. No. : ACL25126
Job No. : VC67AC0048
Pages : 3 of 9

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : CIRRUS
Model : CR-172 A / Microphone PM 21 / Preamplifier -
Serial No.: G301660 / 23007 / 10093F
ID No.: -


Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 30 -31 JANUARY 2025
Date of Issue : 31 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by : 
(Thanakul Petchurai)

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Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1



Cert. No. : ACL25126
Job No. : VC67AC0048
Pages : 2 of 9

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighing with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-4	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-34	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Job No. : VC67AC0048
Pages : 4 of 9

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.0

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

Frequency Weighting	Measured value (dB)
A - weight	14.6
C - weight	16.9
Flat	27.3

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.0	-0.2	-0.4	± 5.0

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Job No. : VC67AC0048
Pages : 5 of 9

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.1	0.4	±2.0
125	0.0	0.1	0.3	±1.5
250	0.0	0.2	0.2	±1.5
500	0.0	0.2	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	-0.2	±2.0
4000	0.0	-0.2	-0.4	±3.0
8000	-0.1	-0.3	-0.5	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Lcq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Cert. No. : ACL25126
Job No. : VC67AC0048
Pages : 6 of 9

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
136.0	135.5	-0.5	± 1.1
135.0	134.6	-0.4	± 1.1
134.0	133.6	-0.4	± 1.1
133.0	132.7	-0.3	± 1.1
132.0	131.6	-0.4	± 1.1
131.0	130.6	-0.4	± 1.1
130.0	129.8	-0.2	± 1.1
129.0	128.8	-0.2	± 1.1
124.0	123.7	-0.3	± 1.1
119.0	118.8	-0.2	± 1.1
114.0	113.8	-0.2	± 1.1
109.0	108.8	-0.2	± 1.1
104.0	103.8	-0.2	± 1.1
99.0	98.9	-0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	83.9	-0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34	0.0	± 1.1
33.0	33.0	0.0	± 1.1
32.0	32	0.0	± 1.1
31.0	31.1	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.1	0.1	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.2	0.2	± 1.1

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Pages : 7 of 9

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Level linearity on each level range

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	43.0	43.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	107.0	106.9	-0.1	1.5 ; -5.0
	2	8	116.0	115.9	-0.1	1.0 ; -2.5
	200	800	133.0	133.0	0.0	±1.0
Slow	2	8	107.0	107.0	0.0	1.5 ; -5.0
	200	800	126.6	126.6	0.0	±1.0
SEL	0.25	1	98.0	98.0	0.0	1.5 ; -5.0
	2	8	107.0	107.6	0.6	1.0 ; -2.5
	200	800	127.0	127.1	0.1	±1.0

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Pages : 8 of 9

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.4	0.0	±3.0
One	129.8	129.9	0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.4	0.0	±2.0
Positive half cycle	128.8	128.7	-0.1	±2.0
Negative half cycle	128.8	128.7	-0.1	±2.0

11. Overload indication

Measured value (dB)		Deviated	Acceptance
Positive	Negative	Value	Limits
one-half cycle	one-half cycle	(dB)	(dB)
86.5	86.6	0.1	±1.5

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Job No. : VC67AC0048
Pages : 9 of 9

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

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SOUND LEVEL METER

MODEL : CR:172A

SERIAL No. : G301661

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
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Cert. No. : ACL24349

Pages : 1 of 9

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : CIRRUS
Model : CR:172 A / Microphone PMP 22 / Preamplicifier -
Serial No.: G301661 / 240061 / 12349F
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 18 OCTOBER 2024
Calibration Date : 11-12 NOVEMBER 2024
Date of Issue : 13 NOVEMBER 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

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Cert. No. : ACL24349

Job No. : VC68AC0014

Pages : 2 of 9

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL24349
 Job No. : VC68AC0014
 Pages : 3 of 9

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Cert. No. : ACL24349
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 Page : 4 of 9

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.8

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

Frequency Weighting	Weighting (dB)
A - weight	14.4
C - weight	18.3
Flat	29.6

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.1	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	2.3	2.1	1.9	±5.0

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 Job No. : VC68AC0014
 Pages : 5 of 9

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.1	0.4	±2.0
125	0.0	0.1	0.3	±1.5
250	0.0	0.2	0.3	±1.5
500	0.0	0.2	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	-0.2	±2.0
4000	0.0	-0.2	-0.4	±3.0
8000	-0.1	-0.3	-0.5	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

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 Job No. : VC68AC0014
 Pages : 6 of 9

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
132.0	131.0	-1.0	±1.1
131.0	130.0	-1.0	±1.1
130.0	129.0	-1.0	±1.1
129.0	128.0	-1.0	±1.1
124.0	123.1	-0.9	±1.1
119.0	118.3	-0.7	±1.1
114.0	113.4	-0.6	±1.1
104.0	103.7	-0.3	±1.1
99.0	98.6	-0.4	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.1	0.1	±1.1
33.0	33.1	0.1	±1.1
32.0	32.1	0.1	±1.1
31.0	31.1	0.1	±1.1
30.0	30.1	0.1	±1.1
29.0	29.1	0.1	±1.1
28.0	28.1	0.1	±1.1
27.0	27.1	0.1	±1.1
26.0	26.1	0.1	±1.1
25.0	25.1	0.1	±1.1

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Cert. No. : ACL24349
 Job No. : VC68AC0014
 Pages : 7 of 9

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	43.0	43.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	107.0	106.9	-0.1	1.5 ; -5.0
	2	8	116.0	116.0	0.0	1.0 ; -2.5
	200	800	133.0	133.1	0.1	±1.0
Slow	2	8	107.0	107.0	0.0	1.5 ; -5.0
	200	800	126.6	126.6	0.0	±1.0
SEL	0.25	1	98.0	98.0	0.0	1.5 ; -5.0
	2	8	107.0	107.1	0.1	1.0 ; -2.5
	200	800	127.0	127.1	0.1	±1.0

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 Pages : 8 of 9

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.4	0.0	±3.0
One	129.8	129.9	0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	126.4	126.4	0.0	±2.0
Positive half cycle	128.8	128.7	-0.1	±2.0
Negative half cycle	128.8	128.8	0.0	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
86	85.9	-0.1	±1.5

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Cert. No. : ACL24349
Job No. : VC68AC0014
Pages : 9 of 9

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation,providing a lavel of confidence of approximately 95 %

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00222593

Cert. No. : ACL25042

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00222593 / 195906 / 15426
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 15 - 16 JANUARY 2025
Date of Issue : 17 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

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Cert. No. : ACL25042

Job No. : VC68AC0048

Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference
Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL25042
Job No. : VC68AC0048
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25042
Job No. : VC68AC0048
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (92.94)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.8

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

Frequency Weighting	Weighting (dB)
A - weight	9.9
C - weight	16.8
Flat	22.5

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.6	0.6	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.8	0.8	0.8	±5.0

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Cert. No. : ACL25042
Job No. : VC68AC0048
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.0	0.0	±2.0
125	0.1	0.1	0.0	±1.5
250	0.1	0.0	0.0	±1.5
500	0.1	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.1	0.1	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

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Job No. : VC68AC0048
Pages : 6 of 8

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Cert. No. : ACL25042
Job No. : VC68AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

Cert. No. : ACL25042
Job No. : VC68AC0048
Pages : 8 of 8

10. Peak C' sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.6	0.1	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95%

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322751

Cert. No. : ACL25047
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preampfier NH-24
Serial No.: 00322751 / 196474 / 15483
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 15 - 16 JANUARY 2025
Date of Issue : 17 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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Calibration Procedure : CP-AC-01

Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 2 of 8

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25047
Job No. : VC68AC0048
Page : 4 of 8

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A - weight	10.8
C - weight	16.7
Flat	22.5

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.5
1000	0.1	0.1	0.1	± 1.0
3000	0.5	0.5	0.5	±5.0

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Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.1	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.1	0.1	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.2	0.2	± 1.1

Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

Cert. No. : ACL25047
Job No. : VC68AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.6	0.1	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322750

Cert. No. : ACL25046

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322750 / 196473 / 15482
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 15 - 16 JANUARY 2025
Date of Issue : 17 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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

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Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL25046
Job No. : VC68AC0048
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25046
Job No. : VC68AC0048
Page : 4 of 8

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
14.8

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

Frequency Weighting	Weighting (dB)
A - weight	12.6
C - weight	17.4
Flat	23.4

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.2	0.2	0.2	± 1.0
8000	0.6	0.6	0.6	±5.0

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Cert. No. : ACL25046
Job No. : VC68AC0048
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	-0.1	±1.5
250	-0.1	-0.1	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Cert. No. : ACL25046
Job No. : VC68AC0048
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.1	0.1	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.1	0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL25046
Job No. : VC68AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.1	0.1	1.5 ; -5.0
	200	800	127.6	127.7	0.1	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

Cert. No. : ACL25046
Job No. : VC68AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$

or any value following calculation, providing a level of confidence of approximately 95%

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322748



Cert. No. : ACL25045

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322748 / 196471 / 15480
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

Received Date : 06 JANUARY 2025
Calibration Date : 15 - 16 JANUARY 2025
Date of Issue : 17 JANUARY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

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Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL25045
Job No. : VC68AC0048
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25045
Job No. : VC68AC0048
Page : 4 of 8

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A - weight	10.8
C - weight	17.1
Flat	22.9

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.5	0.5	0.5	± 5.0

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Cert. No. : ACL25045
Job No. : VC68AC0048
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

Cert. No. : ACL25045
Job No. : VC68AC0048
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

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Cert. No. : ACL25045
Job No. : VC68AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

Cert. No. : ACL25045
Job No. : VC68AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.6	0.1	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322749

Certificate of Calibration

Certificate No.: S2502-1000

Customer: EASTERN THAI CONSULTING 1992 CO.,LTD.
683 Moo 11, Sukhaphibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

Date of calibration: 2025-02-26
Date of issue: 2025-02-27
Instrument calibrated: Sound Level Meter
Manufacturer: Rion
Model: NL-42A (Meter), N11-24 (Preamplifier), UC-52 (Microphone)
Serial number: 00322749 (Meter), 15481 (Preamplifier), 196472 (Microphone)

Calibration and verification performed:

Acoustical levels are stated relative to 20 μ Pa. Other dB levels are relative values.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.

The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

Preconditioning:

The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

Instruments and Program:

A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

Equipment standards used:

- Sound measuring equipment calibration unit 483B S/N31083
- Digital multimeter Keysight S/N HP34401A
- Ultra-low distortion function generator Stanford SRS DS360 S/N123625
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

Traceability

The measured values are traceable to following the ISO/IEC 17025 laboratories:

Sound Pressure Level: EEI, Thailand

Reference Pressure, Humidity and Temperature: TPA, Thailand

Voltage: TPA, Thailand

Frequency: TPA, Thailand

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Environmental conditions: Pressure: Temperature: Relative humidity:
Reference conditions: 101.325 kPa 23.0 °C 50 %RH
Measurement conditions: 101.36 \pm 0.10 kPa 22.4 \pm 1.0 °C 56.3 \pm 2.0 %RH

1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)		Deviated value (dB)	Acceptance limit (dB)
	Before adjust	After adjust		
94.0	94.4	94.0	0.0	\pm 1.0

Note: Indication at the checked calibration frequency was adjusted to 94.0 dB by the sound calibrator

2. Self-generated noise

Frequency weightings	Measured value (dB)
A-Weighting	11.8
C-Weighting	17.8
Z-Weighting	23.1

3. Electrical signal test of frequency weighting at 91 dB

Nominal Frequency (Hz)	Deviation from various frequency weighting response curve			
	A-Weighting (dB)	C-Weighting (dB)	Z-Weighting (dB)	Acceptance limit (dB)
63	-0.1	-0.1	0.0	\pm 2.0
125	0.0	0.0	0.0	\pm 1.5
250	0.0	0.0	0.0	\pm 1.5
500	0.0	0.0	0.0	\pm 1.5
1000	0.0	0.0	0.0	\pm 1.0
2000	-0.2	-0.2	-0.2	\pm 2.0
4000	-0.3	-0.3	-0.3	\pm 3.0
8000	0.0	0.0	0.0	\pm 5.0

Date of calibration : 2025-02-26

Date of issue : 2025-02-27

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Certificate No.: S2502-1000

4. Frequency and time weighting at 1 kHz

4.1 Frequency weighting at 1 kHz

Frequency weightings	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
A	94.0	0.0	±0.3
C	94.0	0.0	±0.3
Z	94.0	0.0	±0.3

4.2 Time weighting at 1 kHz

Time weightings	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
Fast	94.0	0.0	±0.3
Slow	94.1	0.1	±0.3
Leq	94.0	0.0	±0.3

5. Long term stability

Time interval (mm:ss)	Start level (dB)	Stop level (dB)	Deviated value (dB)	Acceptance limit (dB)
33:38	94.0	94.0	0.0	±0.3

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

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Certificate No.: S2502-1000

6. Level linearity on the reference level range

6.1 Measured at 31.5 Hz

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
84.0	84.0	0.0	±1.1
89.0	89.1	0.1	±1.1
92.6	92.7	0.1	±1.1
93.6	93.7	0.1	±1.1
94.6	94.6	0.0	±1.1
95.6	95.7	0.1	±1.1
96.6	96.7	0.1	±1.1
84.0	84.0	0.0	±1.1
79.0	79.1	0.1	±1.1
74.0	74.1	0.1	±1.1
69.0	69.1	0.1	±1.1
64.0	64.1	0.1	±1.1
59.0	59.1	0.1	±1.1
54.0	54.1	0.1	±1.1
49.0	49.1	0.1	±1.1
44.0	44.1	0.1	±1.1
40.0	40.1	0.1	±1.1
39.0	39.0	0.0	±1.1
38.0	38.1	0.1	±1.1
37.0	37.0	0.0	±1.1
36.0	36.1	0.1	±1.1

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

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6.2 Measured at 1 kHz

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
124.0	124.0	0.0	±1.1
129.0	129.0	0.0	±1.1
132.0	132.0	0.0	±1.1
133.0	133.0	0.0	±1.1
134.0	134.0	0.0	±1.1
135.0	135.0	0.0	±1.1
136.0	136.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	83.9	-0.1	±1.1
79.0	78.9	-0.1	±1.1
74.0	74.0	0.0	±1.1
69.0	68.9	-0.1	±1.1
64.0	63.9	-0.1	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

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6.3 Measured at 8 kHz

Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.1	0.1	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.1	0.1	±1.1
124.0	124.0	0.0	±1.1
129.0	129.0	0.0	±1.1
130.9	130.9	0.0	±1.1
131.9	131.9	0.0	±1.1
132.9	132.9	0.0	±1.1
133.9	133.9	0.0	±1.1
134.9	134.9	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

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7. Tone burst response

Time weightings	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
Fast	200	133.0	0.0	±1.0
	2	115.9	-0.1	+1.0,-2.5
	0.25	106.9	-0.1	+1.5,-5.0
Slow	200	126.6	0.0	±1.0
	2	107.0	0.0	+1.0,-5.0
SEL	200	127.0	0.0	±1.0
	2	107.0	0.0	+1.0,-2.5
	0.25	97.9	-0.1	+1.5,-5.0

8. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit (dB)
Complete cycle	128.4	128.4	0.0	±3.0
Positive half cycle	130.4	130.3	-0.1	±2.0
Negative half cycle	130.4	130.3	-0.1	±2.0

9. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit (dB)
Positive one half cycle	Negative one half cycle		
139.2	139.1	0.1	±1.5

10. High level stability

Initial level (dB)	Final level (dB)	Deviated value (dB)	Acceptance limit (dB)
135.0	135.0	0.0	±0.3

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

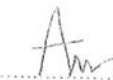
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Uncertainty of measurement

Parameters	Uncertainty
1. Indication at the calibration check frequency	0.12 dB
2. Self-generated noise	
- Frequency Weighting A	0.060 dB
- Frequency Weighting C	0.060 dB
- Frequency Weighting Z	0.060 dB
3. Electrical signal test of frequency weighting	0.13 dB
4. Frequency and time weightings at 1 kHz	0.13 dB
5. Long term stability test	0.10 dB
6. Level linearity on the reference level range	0.14 dB
7. Tone burst response	0.14 dB
8. Peak C sound level	0.13 dB
9. Overload indication	0.13 dB
10. High level stability test	0.10 dB

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%

Remark : The acoustical signal test of frequency weighting at 125Hz, 1kHz, and 8kHz is not included, along with correction values for environmental conditions in a free-field or diffuse field, and the effect of reflection and diffraction on the measurement microphone and the sound level meter.

Calibrated By: 
(Mr. Anusorn Whangphuklang)

Approved By: 
(Mr. Pitupong Sarapho)

Date of calibration : 2025-02-26
Date of issue : 2025-02-27

----- End of Calibration Certificate -----

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322756



Cert. No. : ACL24142
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322756 / 196480 / 15488
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

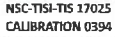
Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 29 APRIL 2024
Calibration Date : 13-17 MAY 2024
Date of Issue : 20 MAY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : 
(Thanakul Petchurai)

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



Cert. No. : ACL24142
Job No. : VC67AC0083
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-4	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL.BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL.BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL.BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

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

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

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

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

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Cert. No. : ACL24142
 Job No. : VC67AC0083
 Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Cert. No. : ACL24142
 Job No. : VC67AC0083
 Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.9

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

Frequency Weighting	Measured value (dB)
A - weight	12.5
C - weight	18.6
Flat	24.1

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.3	0.3	± 1.5
1000	-0.1	-0.1	-0.1	± 1.0
8000	0.1	0.1	0.2	±5.0

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Cert. No. : ACL24142
Job No. : VC67AC0083
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	+ 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

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Job No. : VC67AC0083
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

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Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

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Job No. : VC67AC0083
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

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ภาคผนวกที่ 5

เอกสาร Detection Limit ของรายการทดสอบ

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

(ประเภทตัวอย่าง : อากาศในบรรยากาศโดยทั่วไป - Ambient Air Quality)

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
แผนปฏิบัติการภาคสนาม									
1	Sulfur Dioxide (SO ₂)	UV Fluorescence Method	U.S. EPA EQSA-0292-084 / Sulfur Dioxide Analyzer	-	24 hrs (1 hr avg.)	0.001 - 10	ppm	3	
2	Nitrogen Dioxide (NO ₂)	Chemiluminescence Method	U.S. EPA RFCA-0995-108 / Nitrogen Dioxide	-	24 hrs (1 hr avg.)	0.001 - 10	ppm	3	
3	Carbon Monoxide (CO)	Non-Dispersive Infrared Photometric Method	U.S. EPA 40 CFR Part 50 Appendix C / Carbon	-	24 hrs (8 hr avg.)	0.1 - 100	ppm	1	
4	Ozone (O ₃)	UV Fluorescence Method	U.S. EPA 40 CFR Part 50 Appendix D / Ozone	-	24 hrs (1 hr avg.)	0.001 - 10	ppm	3	
5	Sound (Leq, Lmin, Lmax, Ldn, Lp)	Integrated Sound Level Method	ISO 1996-1 / Sound Level meter	-	24 hrs (1 hr avg.)	40 - 140	dB (A)	1	
6	Wind Speed & Wind Direction	Wind Speed & Wind Direction Sensor	ASTM D 4480-93 / WS/WD Equipment	-	-	-	-	-	Wind speed & Wind direction
ส่วนงานทดสอบพื้นฐาน									
1	Total Particulate Matter (TSP)	Gravimetric Method	U.S. EPA Method Part 50 / Gravimetric Method	-	-	-	mg / m ³ ppm	2	
2	PM10	Gravimetric Method	U.S. EPA Method Part 50 / Gravimetric Method	-	-	-	mg / m ³ ppm	2	
3	PM2.5	Gravimetric Method	U.S. EPA Method Part 50 / Gravimetric Method	-	-	200	mg / m ³	-	
ส่วนงานเครื่องมือทดสอบ									
1	Ammonia (NH ₃)	Impingement Absorption, Colorimetric Method	APHA 401 / Spectrophotometer	288 L	0.2 L/min (24 hrs)	0.01	mg / m ³	2	
2	Sulfur Dioxide (SO ₂)	Pararosaniline Method	U.S. EPA 40 CFR Part 50 Appendix A / Spectrophotometer	288 L	0.2 L/min (24 hrs)	0.01	mg / m ³	2	
3	Aluminium (Al)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
4	Antimony (Sb)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.009	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
5	Arsenic (As)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.009	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
6	Barium (Ba)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
7	Cadmium (Cd)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
8	Calcium (Ca)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.090	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
9	Chromium (Cr)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
10	Copper (Cu)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
11	Iron (Fe)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
12	Lead (Pb)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
13	Magnesium (Mg)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.090	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
14	Manganese (Mn)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
15	Mercury (Hg)	Filtration, AAS Method	U.S. EPA Method IO-3.4 / High Volume - AAS	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.0001	ug / m3	4	Advantage MFS Cat. No. GA55 8 x 10 "
16	Nickel (Ni)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
17	Potassium (K)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.090	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
18	Sodium (Na)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.090	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
19	Tin (Sn)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.009	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
20	Titanium (Ti)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
21	Vanadium (V)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
22	Zinc (Zn)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.002	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
23	Selenium (Se)	Filtration, ICP-OES Method	U.S. EPA Method IO-3.4 / High Volume - ICP-OES	1,590 – 2,447 m ³	39-60 ft ³ /min (24 hrs)	0.009	ug / m3	3	Advantage MFS Cat. No. GA55 8 x 10 "
24	Acetone	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.14 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
25	Benzene	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.12 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-02
26	Cyclohexanone	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.16 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-04

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
27	Ethanol (Ethyl alcohol)	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	288 L	0.10 L/min (24 hrs)	0.14 0.07	mg / m ³ ppm	2	SKC Cat. No. ST 226-05
28	Ethylacetate	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.32 0.09	mg / m ³ ppm	2	SKC Cat. No. ST 226-06
29	Ethylbenzene	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.15 0.03	mg / m ³ ppm	2	SKC Cat. No. ST 226-07
30	Hexane	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.32 0.09	mg / m ³ ppm	2	SKC Cat. No. ST 226-08
31	Isopropanol (Isopropyl alcohol) ; IPA	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	288 L	0.10 L/min (24 hrs)	0.14 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
32	Methanol (Methyl alcohol)	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.07 0.05	mg / m ³ ppm	2	SKC Cat. No. ST 226-10
33	Methyl Ethyl Ketone (MEK)	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.14 0.05	mg / m ³ ppm	2	SKC Cat. No. ST 226-11
34	Styrene	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.16 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-12
35	Toluene	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.15 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-13
36	Xylene	Sorbent Adsorption, GC Method	ASTM D 3687-95 / GC-FID	144 L	0.10 L/min (24 hrs)	0.15 0.03	mg / m ³ ppm	2	SKC Cat. No. ST 226-14
37	Methylcyclohexane	Sorbent Adsorption, GC Method	NIOSH 1500 (P.1-8) / PS pump / GC-FID	2-23 L	0.10 L/min (1 hr)	0.32 0.08	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
38	Methyl acetate	Sorbent Adsorption, GC Method	NIOSH 1458 (P.1-8) / PS pump / GC-FID	0.2-10 L	0.10 L/min (1 hr)	0.61 0.20	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
39	Diethyl Ether or Ethyl Ether	Sorbent Adsorption, GC Method	NIOSH 1610 (P.1-4) / PS pump / GC-FID	0.25-3 L	0.01-0.20 L/min (1 hr)	0.12 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
40	Methyl tert-Butyl Ether (MTBE)	Sorbent Adsorption, GC Method	NIOSH 1615 (P.1-4) / PS pump / GC-FID	2-96 L	0.01-0.20 L/min (1 hr)	0.13 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
41	Dichloromethane	Sorbent Adsorption, GC Method	NIOSH 1005 (P.1-4) / PS pump / GC-FID	0.5-2.5 L	0.01-0.20 L/min (1 hr)	0.23 0.07	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
42	1-Butanol /n-butyl alcohol	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	0.17 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
43	2-Butanol /sec-butyl alcohol	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	0.17 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-01

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
44	Isobutyl alcohol (IBA)	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	0.17 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
45	Methyl Isobutyl Ketone (MIBK)	Sorbent Adsorption, GC Method	OSHA 1004(P.1-27) / PS pump / GC-FID	0.25-12L	0.10 L/min (1 hr)	0.14 0.03	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
46	Ketones	Sorbent Adsorption, GC Method	NIOSH 2555 (P.1-5) / PS pump / GC-FID	0.5-10L	0.01-0.20 L/min (1 hr)	0.14 0.06	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
47	n-Butyl acetate	Sorbent Adsorption, GC Method	NIOSH 1450 (P.1-6) / PS pump / GC-FID	1-10L	0.01-0.20 L/min (1 hr)	0.38 0.08	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
48	n-Pentane	Sorbent Adsorption, GC Method	NIOSH 1500 (P.1-8) / PS pump / GC-FID	-	0.01-0.20 L/min (1 hr)	0.11 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
49	Chloroform	Sorbent Adsorption, GC Method	NIOSH 1003 (P.1-7) / PS pump / GC-FID	1-50L	0.01-0.20 L/min (1 hr)	0.21 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
50	Chlorobenzene	Sorbent Adsorption, GC Method	NIOSH 1003 (P.1-7) / PS pump / GC-FID	1.5-40L	0.01-0.20 L/min (1 hr)	0.19 0.04	mg / m ³ ppm	2	SKC Cat. No. ST 226-01
51	Formaldehyde	Sorbent Adsorption, GC Method	NIOSH 2541 (P.1-5) / PS pump / GC-FID	1-36L	0.01-0.10 L/min (1 hr)	0.01 0.01	mg / m ³ ppm	2	SKC Cat. No. 226-118
52	Hydrogen chloric	Sorbent Adsorption, IC Method	OSHA ID-174SG / PS pump / IC	1-7.5 L	0.20 L/min (24 hr)	0.015 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03
53	Hydrogen Bromide	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	1-96 L	0.20 L/min (24 hr)	0.033 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03
54	Sulfuric Acid	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC NIOSH 7908 / PS pump / IC	1-96 L	0.20 L/min (24 hr)	0.040 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03 Fiter (PTFE)
55	Phosphoric Acid	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC NIOSH 7908 / PS pump / IC	1-96 L	0.20 L/min (24 hr)	0.040 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03 Fiter (PTFE)
56	Nitric	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	1-96 L	0.20 L/min (24 hr)	0.026 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03
57	Chlorine	Sorbent Adsorption, IC Method	OSHA ID-202 / PS pump / IC	14 L	0.20 L/min (24 hr)	0.029 0.010	mg / m ³ ppm	3	0.02% KI in Buffer solution
58	Ammonia (NH ₃)	Sorbent Adsorption, IC Method	NIOSH 6016 / PS pump / IC	12 L	200 L/min (120min)	0.200 0.280	mg / m ³ ppm	3	SKC Cat. No. 226-10-06
59	Hydrogen fluoride	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	60 L	200 L/min (60min)	0.008 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03

เอกสารอ้างอิง

1. Method of Air Sampling and Analysis, APHA Intersociety Committee, 2017
2. NIOSH Manual of Analytical Methods (NMAM)
3. Code of Federal Regulation, U.S. EPA. , 40 CFR Part 50, Part 60, 2000
4. Occupational Health and Safety Management System(OSHA) Analytical Methods Manuel
5. International Standard Organization, ISO 11204:1995
6. Compendium of Methods for Determination of Inorganic Compound in Ambient Air, U.S. EPA. , 1999
7. Annual Book of ASTM Standard, Section 11, 2001

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

(ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality)

ตารางที่ 1 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality)

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
	แผนปฏิบัติการภาคสนาม								
1	Smoke density (Opacity)	Ringelmann' s method	U.S. EPA Method 9 / Ringelmann' s Chart	-	-	-	%	2	
2	Oxide of Nitrogen	Chemilluminescence Method	U.S. EPA Method 7E / Nitrogen dioxide Analyzer	-	-	0.1 - 100	ppm	1	ใช้ Dilution Probe ร่วมในการตรวจวัด
3	Sulfur Dioxide	UV Fluorescence Method	U.S. EPA Method 6C / Sulfur dioxide Analyzer	-	-	0.4 - 100	ppm	1	ใช้ Dilution Probe ร่วมในการตรวจวัด
4	Carbon Monoxide	Bag,Non-Dispersive Infrared Method	U.S. EPA method 10 / Carbon monoxide analyzer	-	-	0.1 - 100	ppm	1	ใช้ Dilution Probe ร่วมในการตรวจวัด
	ส่วนงานทดสอบพื้นฐาน								
1	Hydrogen Sulfide (H ₂ S)	Absorption, Iodometric Method	U.S. EPA Method 11 / Iodometric			8.0 6.0	mg / m ³ ppm	1	
2	Sulfur Dioxide (SO ₂)	Absorption Barium Thorin Titrimetric Method	U.S. EPA Method 6 / Titration	0.03 m ³	Isokinetic (30 min)	3.4 1.3	mg / m ³ ppm	1	
3	Sulfuric acid (H ₂ SO ₄)	Isokinetic, Barium Thorin Titrimetric Method	U.S. EPA Method 8 / Titration	0.9 m ³	Isokinetic (30 min)	0.05 0.01	mg / m ³ ppm	2	
4	Total Particulate Matter (TSP)	Isokinetic, Sampling / Gravimetric Method	U.S. EPA Method 5 / Gravimetric Method	-	-	0.1	mg / m ³	1	
	ส่วนงานเครื่องมือทดสอบ								
1	Oxide of Nitrogen (Nitrogen Dioxide ;	Chemical Absorption, Colorimetric Method	U.S. EPA Method 7 / Spectrophotometer	2.0 L	Non-Isokinetic (30 min)	2.0 1.0	mg / m ³ ppm	1	
2	Xylene	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	2.05 0.47	mg / m3 ppm	2	SKC Cat. No. 226-09
3	Vanadium (V)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-OES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
4	Tin (Sn)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-OES	0.9 m ³	Isokinetic (30 min)	0.010	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
5	Selenium (Se)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-OES	0.9 m ³	Isokinetic (30 min)	0.010	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
6	Antimony (Sb)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.010	mg / m ³	3	Advantage MFS Cat No. GC5090 MM

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
7	Arsenic (As)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.010	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
8	Cadmium (Cd)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
9	Chromium (Cr)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
10	Copper (Cu)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
11	Cobalt (Co)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
12	Lead and Inorganic Lead (Pb)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
13	Manganese (Mn)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
14	Nickel (Ni)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
15	Mercury (Hg)	Isokinetic, Sampling,Cold Vapor Technique-AAS Method	U.S. EPA Method 101 / AAS	0.053 m3	Isokinetic (1.5 L/min)	0.0001	mg / m ³	4	Advantage MFS Cat No. GC5090 MM

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

(ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality)

ตารางที่ 2 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ที่ไม่ได้ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality)

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
	แผนปฏิบัติการภาคสนาม								
1	Sampling and Traverse point	U.S. EPA Recommend (Method 1)	U.S. EPA Method 1 / Calculation	-	-	-	-	-	
2	Velocity and Volumetric Flow rate		U.S. EPA Method 2 / Calculation	-	-	-	-	-	
3	Oxygen	Electrochemical Sensor	Modified U.S. EPA 3 / Electrochemical Sensor	-	-	0-20.9	%	1	
4	Moisture Content		U.S. EPA Method 4 / Calculation	-	-	-	-	2	
5	Carbon dioxide (CO ₂)	Electrochemical Sensor	Modified U.S. EPA 3 / Electrochemical Sensor	-	-	0-20.9	%	2	
	ส่วนงานทดสอบพื้นฐาน								
1	PM10,PM2.5	Isokinetic, Sampling / Gravimetric Method	U.S. EPA Method 201A / Gravimetric Method	-	-	0.1	mg / m ³	1	
	ส่วนงานเครื่องมือทดสอบ								
1	Aluminium (Al)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
2	Barium (Ba)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
3	Calcium (Ca)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.100	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
4	Iron (Fe)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
5	Magnesium (Mg)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.100	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
6	Beryllium (Be)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
7	Silver (Ag)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
8	Sodium (Na)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.100	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
9	Zinc (Zn)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
10	Acetone	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	1.88 0.79	mg / m ³ ppm	2	SKC Cat. No. 226-09
11	Benzene	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	1.68 0.52	mg / m ² ppm	2	SKC Cat. No. 226-09
12	Cyclohexanone	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	2.26 0.56	mg / m ² ppm	2	SKC Cat. No. 226-09
13	Ethanol (Ethyl alcohol)	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	1.88 1.00	mg / m ² ppm	2	SKC Cat. No. 226-09
14	Ethylbenzene	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	2.07 0.48	mg / m ² ppm	2	SKC Cat. No. 226-09
15	Ethylacetate	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	4.32 1.20	mg / m ² ppm	2	SKC Cat. No. 226-09
16	Hexane	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	4.23 1.20	mg / m ² ppm	2	SKC Cat. No. 226-09
17	Isopropanol (Isopropyl alcohol); IPA	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	1.87 0.76	mg / m ² ppm	2	SKC Cat. No. 226-09
18	Methanol (Methyl alcohol)	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	0.94 0.72	mg / m ² ppm	2	SKC Cat. No. 226-09
19	Methyl Ethyl Ketone (MEK)	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	1.92 0.65	mg / m ² ppm	2	SKC Cat. No. 226-09
20	Styrene	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	2.16 0.51	mg / m ² ppm	2	SKC Cat. No. 226-09
21	Toluene	Sorbent Adsorption, Gas Chromatography Method	US. EPA Method 18 / GC-FID	0.21 m ³	0.7 L/min (30 min)	2.07 0.55	mg / m ² ppm	2	SKC Cat. No. 226-09

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
22	Methylcyclohexane	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	2-23 L	0.10 L/min (1 hr)	4.02 1.00	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
23	Diethyl Ether or Ethyl Ether	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	0.25-3 L	0.01-0.20 L/min (1 hr)	11.88 3.92	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
24	Methyl tert-Butyl Ether (MTBE)	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	2-96 L	0.01-0.20 L/min (1 hr)	3.08 0.86	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
25	Dichloromethane	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	0.5-2.5 L	0.01-0.20 L/min (1 hr)	3.16 0.91	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
26	1-Butanol /n-butyl alcohol	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	2.31 0.76	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
27	2-Butanol /sec-butyl alcohol	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	2.31 0.76	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
28	Isobutyl alcohol (IBA)	Sorbent Adsorption, Gas Chromatography Method	U.S.EPA Method18/SKC.Guide/ GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	2.29 0.76	mg / m ³ ppm	2	SKC Cat. No. ST 226-09
29	Thallium (Tl)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.010	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
30	Ketones	Sorbent Adsorption, Gas Chromatography Method	NIOSH2555 (P.1-5) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	1.88 0.79	mg / m ³ ppm	2	SKC Cat. No. 226-09
31	n-Heptane	Sorbent Adsorption, Gas Chromatography Method	NIOSH1500 (P.1-8) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	3.89 0.95	mg / m ³ ppm	2	SKC Cat. No. 226-09
32	n-Butyl acetate	Sorbent Adsorption, Gas Chromatography Method	NIOSH 1450(P.1-6) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	4.75 1.00	mg / m ³ ppm	2	SKC Cat. No. 226-09
33	n-Pentane	Sorbent Adsorption, Gas Chromatography Method	NIOSH 1500(P.1-8) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	1.50 0.51	mg / m ³ ppm	2	SKC Cat. No. 226-09
34	Chloroform	Sorbent Adsorption, Gas Chromatography Method	NIOSH1003 (P.1-7) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	2.82 0.58	mg / m ³ ppm	2	SKC Cat. No. 226-09
35	Chlorobenzene	Sorbent Adsorption, Gas Chromatography Method	NIOSH1003 (P.1-7) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	2.64 0.57	mg / m ³ ppm	2	SKC Cat. No. 226-09

Items	Parameter	Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark
36	Formaldehyde	Sorbent Adsorption, Gas Chromatography Method	NIOSH2541 (P.1-5) / PS pump / GC-FID	21 L	0.70 L/min (1 hr)	0.31 0.25	mg / m ³ ppm	2	SKC Cat. No. 226-118
37	Hydrogen chloride	Sorbent Adsorption, IC Method	EPA Method 26A /IC	0.12 m ³	1 L/min (30 min)	0.015 0.010	mg / m ³ ppm	3	0.1 N H ₂ SO ₄ / 0.1 N NaOH
38	Hydrogen fluoride	Sorbent Adsorption, IC Method	EPA Method 26A /IC	0.12 m ³	1 L/min (30 min)	0.012 0.015	mg / m ³ ppm	3	0.1 N H ₂ SO ₄ / 0.1 N NaOH
39	Nitric	Sorbent Adsorption, IC Method	EPA Method 26A /IC	0.029 m ³	1 L/min (30 min)	0.026 0.010	mg / m ³ ppm	3	0.1 N H ₂ SO ₄ / 0.1 N NaOH
40	Chlorine	Sorbent Adsorption, IC Method	EPA Method 26A /IC	0.12 m ³	1 L/min (30 min)	0.029 0.010	mg / m ³ ppm	3	Milli-Q Water
41	Molybdenum (Mo)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
42	Titanium (Ti)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
43	Boron (B)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
44	Silicon (Si)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.005	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
45	Potassium (K)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.100	mg / m ³	3	Advantage MFS Cat No. GC5090 MM
46	Phosphorus (P)	Isokinetic, Sampling,Digestion,ICP-OES Method	U.S. EPA Method 29 / ICP-AES	0.9 m ³	Isokinetic (30 min)	0.100	mg / m ³	3	Advantage MFS Cat No. GC5090 MM

เอกสารอ้างอิง

1. Method of Air Sampling and Analysis, APHA Intersociety Committee, 2017
2. NIOSH Manual of Analytical Methods (NMAM)
3. Code of Federal Regulation, U.S. EPA. , 40 CFR Part 50, Part 60, 2000
4. Occupational Health and Safety Management System(OSHA) Analytical Methods Manuel
5. International Standard Organization, ISO 11204:1995
6. Compendium of Methods for Determination of Inorganic Compound in Ambient Air, U.S. EPA. , 1999
7. Annual Book of ASTM Standard, Section 11, 2001

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

(ประเภทตัวอย่าง : อากาศในบริเวณการทำงาน - Workplace Air Quality)										
Items	Parameter	Sampling/Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark	Heavy Metal (TWA)
	แผนปฏิบัติการภาคสนาม									
1	Illumination	Lux Meter	JIS C 1906 / Lux meter		-	0-5000	lux	-		
2	Sound (Leq, Lmin, Lmax, Ldn, Lp)	Integrated Sound Level Method	ISO 11202 / Sound Level Meter		-	40 - 140	dB (A)	1		
3	Noise Octave band	Integrated Sound Level Method	AS/NZS 4476 1997 / Sound Level Meter		-	40 – 140	dB (A)	1	1/3 Octave band หรือ 1/1 Octave band	
4	Noise dose	Integrated Sound Level Method	BS6402 / Noise Dosemeter		-	0 - 9999	% Dose	2		
5	Carbon Monoxide (CO)	Non-Dispersive Infrared Photometric Method	U.S. EPA 10 (P.1-5)/ Carbon Monoxide Analyzer		-	0.1 - 100	ppm	1		
6	Ozone (O ₃)	UV Fluorescence Method	U.S. EPA method / Ozone Analyzer		-	0.1 - 100	ppm	2		
7	Heat Stress	WBGT Method	ACGIH / Grove + DI + Thermometer / calculation	-	-	0 - 100	oC	2		
	ส่วนงานทดสอบพื้นฐาน									
1	Total Dust (TD)	Filtration, Gravimetric Method	NIOSH 0500 (P.1-3) / PS pump / Gravimetric	7-133 L	2 L/min (1 hr)	0.8	mg / m ³	1	SKC Cat No. 225-8-01	
2	Respirable Dust (RD)	Cyclone - Filtration, Gravimetric Method	NIOSH 0600 (P.1-3) / PS pump cyclone / Gravimetric	20-400 L	1.70 L/min (1 hr)	0.5	mg / m ³	1	SKC Cat No. 225-8-01	
3	NaOH	Acid-Base Titrimetric Method	NIOSH 7401(P.1-4) / PS pump / Titration	70-1000 L	1-4 L/min	0.4	mg / m ³	1	SKC Cat No. 225-17-01	
4	KOH	Acid-Base Titrimetric Method	NIOSH 7401(P.1-4) / PS pump / Titration	70-1000 L	1-4 L/min	0.6	mg / m ³	1	SKC Cat No. 225-17-01	
5	LiOH	Acid-Base Titrimetric Method	NIOSH 7401(P.1-4) / PS pump / Titration	70-1000 L	1-4 L/min	0.2	mg / m ³	1	SKC Cat No. 225-17-01	
	ส่วนงานเครื่องมือทดสอบ									
1	Ammonia	Impingement Absorption - Colorimetric Method	Modified NIOSH 6015(P.1-7) / Spectrophotometer	0.1-96 L	1 L/min (1 hr)	0.01	mg / m ³	2		
2	Nitrogen Dioxide	Impingement Absorption, Spectrophotometer Method	APHA 817(P.1-3) / Spectrophotometer	7.5 – 10 L	0.5 L/min (15-20 min)	0.01	ppm	2		
3	Sulfur Dioxide	Impingement Absorption, Titrimetric Method	APHA 823(P.1-3) / Titration	26 L	0.21 L/min (2 hrs)	0.30 0.11	mg / m ³ ppm	2		
4	P,P'-diphenylmethane diisocyanate(MDI) (MDI)	Impingement Absorption, Spectrophotometer Method	APHA 831(P.1-3) / Spectrophotometer	20 L	1 L/min (20 min)	0.002	ppm	2		
5	Aluminum (Al)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-100 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
6	Antimony (Sb)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	50-2000 L	2 L/min (1 hr)	0.021	mg / m ³	3	SKC Cat No. 225-5	0.003

Items	Parameter	Sampling/Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark	Heavy Metal (TWA)
7	Arsenic & Compound (as As)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-2000 L	2 L/min (1 hr)	0.021	mg / m ³	3	SKC Cat No. 225-5	0.003
8	Barium (Ba)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	50-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
9	Cadmium & Compounds (as Cd)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	25-1500 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
10	Calcium & Compounds (as Ca)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	20-400 L	2 L/min (1 hr)	0.208	mg / m ³	3	SKC Cat No. 225-5	0.026
11	Chromium & Compounds (as Cr)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
12	Copper (Cu) (Dust & Fume)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	50-1500 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
13	Iron & Compounds (as Fe)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
14	Lead (Pb)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	50-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
15	Magnesium (Mg)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	6-67 L	2 L/min (1 hr)	0.208	mg / m ³	3	SKC Cat No. 225-5	0.026
16	Manganese (Mn)	Filtration, ICP-OES Method	NIOSH 6009(P.1-8) / PS pump / ICP-OES	5-200 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
17	Mercury (Hg)	Filtration - AAS Method	NIOSH 6009(P.1-5) / PS pump / AAS	2 – 100 L	0.2 L/min (1 hr)	0.021	ug / m ³	3	SKC Cat No. 225-5	0.003
18	Nickel & Compounds (as Ni)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
19	Selenium (Se)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	13-2000 L	2 L/min (1 hr)	0.021	mg / m ³	3	SKC Cat No. 225-5	0.003
20	Silver (Ag)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	250-2000 L	2 L/min (2-17 hr)	0.010	mg / m ³	3	SKC Cat No. 225-5	0.001
21	Sodium (Na)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	13-2000 L	2 L/min (1 hr)	0.208	mg / m ³	3	SKC Cat No. 225-5	0.026
22	Tin (Sn)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.021	mg / m ³	3	SKC Cat No. 225-5	0.003
23	Titanium (Ti)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001

Items	Parameter	Sampling/Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark	Heavy Metal (TWA)
24	Vanadium (V)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
25	Zinc & Compounds (Zn)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
26	Acetone	Sorbent Adsorption, GC Method	NIOSH 1300 (P.1-5)/ PS pump / GC-FID	0.5-3 L	0.10 L/min (30 min)	13.17 5.54	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
27	Benzene	Sorbent Adsorption, GC Method	NIOSH 1501(P.1-7) / PS pump / GC-FID	5-30 L	0.10 L/min (1 hr)	2.93 0.92	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
28	Cyclohexanone	Sorbent Adsorption, GC Method	NIOSH 1300(P.1-5) / PS pump / GC-FID	1-10 L	0.10 L/min (1 hr)	3.96 0.99	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
29	Ethanol (Ethyl alcohol)	Sorbent Adsorption, GC Method	NIOSH 1400(P.1-4) / PS pump / GC-FID	12 L	0.10 L/min (1 hr)	3.29 1.75	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
30	Ethylacetate	Sorbent Adsorption, GC Method	NIOSH 1457 (P.1-4)/ PS pump / GC-FID	0.1-10 L	0.10 L/min (1 hr)	7.21 2.00	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
31	Ethylbenzene	Sorbent Adsorption, GC Method	NIOSH 1501 (P.1-7) / PS pump / GC-FID	1-24 L	0.10 L/min (1 hr)	3.63 0.83	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
32	Hexane	Sorbent Adsorption, GC Method	NIOSH 1500(P.1-8) / PS pump / GC-FID	4 L	0.10 L/min (1 hr)	7.05 2.00	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
33	Isopropanol (Isopropyl alcohol) ; IPA	Sorbent Adsorption, GC Method	NIOSH 1400(P.1-4) / PS pump / GC-FID	12 L	0.10 L/min (1 hr)	3.28 1.33	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
34	Methanol (Methyl alcohol)	Sorbent Adsorption, GC Method	OSHA 91(P.1-10) / PS pump / GC-FID	1-5 L	0.10 L/min (30 min)	3.96 3.02	mg / m ³ ppm	2	SKC Cat. No. ST 226-82	
35	Methyl Ethyl Ketone (MEK)	Sorbent Adsorption, GC Method	OSHA 1004(P.1-27) / PS pump / GC-FID	0.25-12L	0.10 L/min (1 hr)	3.35 1.14	mg / m ³ ppm	2	SKC Cat. No. ST 226-	
36	Methyl Isobutyl Ketone (MIBK)	Sorbent Adsorption, GC Method	OSHA 1004(P.1-27) / PS pump / GC-FID	0.25-12L	0.10 L/min (1 hr)	3.34 0.81	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
37	Styrene	Sorbent Adsorption, GC Method	NIOSH 1501 (P.1-7) / PS pump / GC-FID	1-24 L	0.10 L/min (1 hr)	3.78 0.89	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
38	Toluene	Sorbent Adsorption, GC Method	NIOSH 1501 (P.1-7) / PS pump / GC-FID	1-8 L	0.10 L/min (1 hr)	3.63 0.96	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
39	Xylene	Sorbent Adsorption, GC Method	NIOSH 1501 (P.1-7) / PS pump / GC-FID	2-23 L	0.10 L/min (1 hr)	3.58 0.83	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
40	Cumene	Sorbent Adsorption, GC Method	NIOSH 1501 (P.1-7) / PS pump / GC-FID	2-23 L	0.10 L/min (1 hr)	3.60 0.73	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	

Items	Parameter	Sampling/Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark	Heavy Metal (TWA)
41	Methylcyclohexane	Sorbent Adsorption, GC Method	NIOSH 1500 (P.1-8) / PS pump / GC-FID	2-23 L	0.10 L/min (1 hr)	7.23 1.80	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
42	Methyl acetate	Sorbent Adsorption, GC Method	NIOSH 1458 (P.1-8) / PS pump / GC-FID	0.2-10 L	0.10 L/min (1 hr)	9.09 3.00	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
43	Diethyl Ether or Ethyl Ether	Sorbent Adsorption, GC Method	NIOSH 1610 (P.1-4) / PS pump / GC-FID	0.25-3 L	0.01-0.20 L/min (1 hr)	11.88 3.92	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
44	Methyl tert-Butyl Ether (MTBE)	Sorbent Adsorption, GC Method	NIOSH 1615 (P.1-4) / PS pump / GC-FID	2-96 L	0.01-0.20 L/min (1 hr)	3.08 0.86	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
45	Dichloromethane or Methylene chloride	Sorbent Adsorption, GC Method	NIOSH 1005 (P.1-4) / PS pump / GC-FID	0.5-2.5 L	0.01-0.20 L/min (1 hr)	22.1 6.36	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
46	1-Butanol /n-butyl alcohol	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	4.86 1.60	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
47	2-Butanol /sec-butyl alcohol	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	4.86 1.60	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
48	Isobutyl alcohol (IBA)	Sorbent Adsorption, GC Method	NIOSH 1401 (P.1-4) / PS pump / GC-FID	2-10 L	0.01-0.20 L/min (1 hr)	4.81 1.59	mg / m ³ ppm	2	SKC Cat. No. ST 226-01	
49	Beryllium (Be)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	1250-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
50	Cobalt (Co)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	25-2000 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
51	Molybdenum (Mo)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-67 L	2 L/min (1 hr)	0.004	mg / m ³	3	SKC Cat No. 225-5	0.001
52	Thallium (Tl)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	25-2000 L	2 L/min (1 hr)	0.021	mg / m ³	3	SKC Cat No. 225-5	0.003
53	Silicon (Si)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.010	mg / m ³	3	SKC Cat No. 225-5	0.001
54	Potassium (K)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.208	mg / m ³	3	SKC Cat No. 225-5	0.026
55	Ketones	Sorbent Adsorption, GC Method	NIOSH 2555 (P.1-5) / PS pump / GC-FID	0.5-3.0 L	0.01-0.20 L/min (1 hr)	13.17 5.54	mg / m ³ ppm	2	SKC Cat. No. 226-01	
56	n-Heptane	Sorbent Adsorption, GC Method	NIOSH 1500 (P.1-8) / PS pump / GC-FID	-	0.01-0.20 L/min (1 hr)	6.97 1.70	mg / m ³ ppm	2	SKC Cat. No. 226-01	
57	n-Butyl acetate	Sorbent Adsorption, GC Method	NIOSH 1450(P.1-6) / PS pump / GC-FID	1-10 L	0.01-0.20 L/min (1 hr)	8.55 1.80	mg / m ³ ppm	2	SKC Cat. No. 226-01	

Items	Parameter	Sampling/Method	Reference Method / Analytical Technique	Air Volume	Sampling Rate / Period	LOQ / Range	Unit	Decimal point	Remark	Heavy Metal (TWA)
58	n-Pentane	Sorbent Adsorption, GC Method	NIOSH 1500(P.1-8) / PS pump / GC-FID	-	0.01-0.20 L/min (1 hr)	2.63 0.89	mg / m ³ ppm	2	SKC Cat. No. 226-01	
59	Chloroform	Sorbent Adsorption, GC Method	NIOSH 1003 (P.1-7) / PS pump / GC-FID	1-50 L	0.01-0.20 L/min (1 hr)	4.93 1.01	mg / m ³ ppm	2	SKC Cat. No. 226-01	
60	Chlorobenzene	Sorbent Adsorption, GC Method	NIOSH 1003 (P.1-7) / PS pump / GC-FID	1.5-40L	0.01-0.20 L/min (1 hr)	4.63 1.00	mg / m ³ ppm	2	SKC Cat. No. 226-01	
61	Formaldehyde	Sorbent Adsorption, GC Method	NIOSH 2541 (P.1-5) / PS pump / GC-FID	1-36L	0.01-0.10 L/min (1 hr)	0.12 0.10	mg / m ³ ppm	2	SKC Cat. No. 226-118 เปลี่ยน DL:1/2/24	
62	Hydrogen chloride	Sorbent Adsorption, IC Method	OSHA ID-174SG / PS pump / IC	100 L	500 L/min (15 min)	0.015 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03	
63	Hydrogen Bromide	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	100 L	200 L/min (60min)	0.033 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03	
64	Sulfuric Acid	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC NIOSH 7908 / PS pump / IC	100 L	200 L/min (60min)	0.040 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03 Fiter (PTFE)	
65	Phosphoric Acid	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC NIOSH 7908 / PS pump / IC	100 L	200 L/min (60min)	0.040 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03 Fiter (PTFE)	
66	Ammonia (NH ₃)	Sorbent Adsorption, IC Method	NIOSH 6016 / PS pump / IC	12 L	200 L/min (120min)	0.200 0.280	mg / m ³ ppm	3	SKC Cat. No. 226-10-06	
67	Nitric	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	100 L	200 L/min (60min)	0.026 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03	
68	Chlorine	Sorbent Adsorption, IC Method	OSHA ID-202 / PS pump / IC	60 L	200 L/min (60min)	0.029 0.010	mg / m ³ ppm	3	0.02% KI in Buffer	
69	Hydrogen fluoride	Sorbent Adsorption, IC Method	OSHA ID165SG / PS pump / IC	60 L	200 L/min (60min)	0.008 0.010	mg / m ³ ppm	3	SKC Cat. No. 226-10-03	
70	Phosphorus (P)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.208	mg / m ³	3	SKC Cat No. 225-5	0.026
71	Boron (B)	Filtration, ICP-OES Method	NIOSH 7300(P.1-8) / PS pump / ICP-OES	5-1000 L	2 L/min (1 hr)	0.010	mg / m ³	3	SKC Cat No. 225-5	0.001

เอกสารอ้างอิง

1. Method of Air Sampling and Analysis, APHA Intersociety Committee, 1997
2. NIOSH Manual of Analytical Method, 4th Edition, 1994
3. Code of Federal Regulation, U.S. EPA. , 40 CFR Part 50, Part 60, 2000
4. OSHA Analytical Methods Manual, 2nd Edition, U.S. Department of Labor, 1992
5. International Standard Organization, ISO 11204:1995
6. Compendium of Methods for Determination of Inorganic Compound in Ambient Air, U.S. EPA. , 1999
7. Annual Book of ASTM Standard, Section 11, 2001

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 1 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : น้ำเสีย(ขึ้นทะเบียนกรมโรงงานฯ), น้ำ,น้ำเพื่ออุปโภค, น้ำประปา, น้ำผิวดิน, น้ำบาดาล และน้ำทะเล)

ส่วนงาน : ส่วนงานทดสอบพื้นฐาน

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
1.1	Biochemical Oxygen Demand (BOD ₅)	5-Day BOD Test, Membrane Electrode Method	Standard Method part 5210 B, 4500-O G / DO meter	Plastic	1000	-	2.0	mg/l	1	
1.2	Biochemical Oxygen Demand (BOD ₅)	5-Day BOD Test, Azide Modification Method	Standard Method part 5210 B, 4500-O C / Titration	Plastic	1000	-	2.0	mg/l	1	
2.1	Chemical Oxygen Demand (COD)	In-house Method	Standard Method part 5220 C / Titration	Plastic	100	-	40	mg/l as O ₂	0	
2.2	Chemical Oxygen Demand (COD)	Titrimetric, Closed Reflux Method	Standard Method part 5220 C / Titration	Plastic	100	-	40	mg/l as O ₂	0	
3	Free Chlorine	Iodometric Method	Standard Method part 4500-B / Titration	Plastic	100	-	0.50	mg/l	2	
4	Total Dissolved Solids (TDS)	Dried at 180 °C	Standard Method part 2540 C / Gravimetric	Plastic	200	-	25	mg/l	0	
5.1	Grease&Oil	In-house Method	Standard Method part 5520 B / Gravimetric	Glass	1000	-	3.0	mg/l	1	
5.2	Grease&Oil	Partition Gravimetric Method	Standard Method part 5520 B / Gravimetric	Glass	1001	-	3.0	mg/l	1	
6	Sulfide (S ₂ ⁻)	ZnS Precipitation ,Iodometric Method	Standard Method part 4500-S ₂ ⁻ F / Titration	BOD bottle	300	-	0.50	mg/l as H ₂ S	2	
7	pH	Electrometric Method	Standard Method part 4500 H ⁺ / pH meter	Plastic	50	-	3.0-12.0	-	1	

8	Total Suspended Solids (TSS)	Dried at 103-105 °C	Standard Method part 2540 D / Grvimetric	Plastic	1000	-	5	mg/l	0	
9	Temperature	Laboratory and Field Method	Standard Method part 2550 B / Thermometer	at field		-	1	°C	0	
10	Total Kjeldahl Nitrogen (TKN)	Macro-Kjeldahl Method	Standard Method part 4500-N _{org} / Titration	Plastic	500	-	5	mg/l as NH ₃ -N	0	
11	Hydrogen Sulfide (H ₂ S)	ZnS Precipitation ,Iodometric Method	Standard Method part 4500-S ²⁻ F / Titration	BOD bottle	300	-	0.53	mg/l as H ₂ S	2	

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 3 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ที่ไม่ได้ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : น้ำ, น้ำเสีย, น้ำเพื่ออุปโภค, น้ำประปา, น้ำผิวดิน, น้ำบาดาล และน้ำทะเล)

ส่วนงาน : ส่วนงานทดสอบพื้นฐาน

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
1	Acidity	Titration Method	Standard Method part 2310 B / Titration	Plastic	50	-	20.00	mg/l as CaCO ₃	1	
2	M-Alkalinty	Titration Method	Standard Method part 2320 B / Titration	Plastic	50	-	20.00	mg/l as CaCO ₃	1	
3	P-Alkalinty	Titration Method	Standard Method part 2320 B / Titration	Plastic	50	-	20.00	mg/l as CaCO ₃	1	
4	Ammonia Nitrogen (NH ₃ -N)	Distillation and Titrimetric Method	Standard Method part 4500-NH ₃ ⁺ / Titration	Plastic	500		2	mg/l as NH ₃ -N	1	
5	Calcium Hardness	EDTA Titrimetric Method	Standard method part 3500-Ca B/ Titration	Plastic	100	-	3.0	mg/l as CaCO ₃	1	
6	Chloride (Cl ⁻)	Argentometric Method	Standard Method part 4500-Cl ⁻ B / Titration	Plastic	50	-	5.0	mg/l as Cl ⁻	1	
7	Chlorine (Residual)	DPD Colorimetric Method	Standard Method part 4500-Cl G / Test kit	Plastic	500	-	0.1	mg/l as Cl ₂	1	
8	Chlorine (Total)	DPD Colorimetric Method	Modified Standard Method part 4500-Cl G / Test kit	Plastic	500	-	0.1	mg/l as Cl ₂	1	
9	Fixed Solids (FS)	Dried at 550 °C	Standard Method part 2540 E / Gravimetric	Plastic	200	-	30.0	mg/l	1	
10	Hardness	EDTA Titrimetric Method	Standard Method part 2340 C / Titration	Plastic	100	-	6.0	mg/l as CaCO ₃	1	
11	Magnesium (Mg)	Calculation Method	Standard Method part 3500-Mg / Calculation	Plastic	100	-	0.70	mg/l as Mg	1	
12	Magnesium Hardness	Calculation Method	Standard Method part 3500-Mg / Calculation	Plastic	100	-	3.0	mg/l as CaCO ₃	1	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
13	Mix Liquor Suspended Solids (MLSS)	Dried at 103-105 °C	Standard Method part 2540 C / Gravimetric	Plastic	200	-	5	mg/l	1	
14	Mix Liquor Volatile Suspended Solids (MLVSS)	Dried at 550 °C	Standard Method part 2540 E / Gravimetric	Plastic	200	-	5	mg/l	1	
15	Organic Nitrogen	Macro-Kjeldahl Method	Standard Method part 4500-N _{org} / Titration	Plastic	500	-	5	mg/l as NH ₃ -N	1	Org-N = TKN-(Ammonia-N)
17	Conductivity	Laboratory Method	Standard Method part 2510 B	Plastic	200	-	0.1	us/cm	หลักหน่วย 2 ตำแหน่ง/หลักสิบ 1ตำแหน่ง	อ่านจากเครื่อง
18	Salinity	Electrical Conductivity Method	Standard Method part 2520 B / Conductivity meter	Plastic	100	-	0.01	ppt	หลักหน่วย 2 ตำแหน่ง/หลักสิบ 1ตำแหน่ง	อ่านจากเครื่อง
19	Sludge Volume Index (SV ₃₀)	Volumetric Method	Standard Method part 2540 F / Volumetric	Plastic	1000	-	0.1	ml/l	1	
20	Sulfite	Titrimetric Method	Standard Method part 4500-SO ₃ ²⁻ B / Titration	Plastic	200	-	2.00	mg/l as SO ₃ ²⁻	2	
21	Total Dissolved Solids (TDS)	Dried at 103-105 °C	Modified Standard Method part 2540 B / Gravimetric	Plastic	200	-	25	mg/l	0	
22	Turbidity	Nephelometric Method	Standard Method part 2130 B / Turbidity meter	Plastic	50	0.01	0.01	NTU	หลักหน่วย 2 ตำแหน่ง/หลักสิบ 1ตำแหน่ง	NTU=FTU=ซีลีกาสเกล
23	Volatile Fatty Acid	Titrimetric Method	คู่มือวิเคราะห์น้ำเสีย สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย / Titration	Plastic	200	-	1.00	mg/l	1	
24	Volatile Solids (VS)	Dried at 550 °C	Standard Method part 2540 E / Gravimetric	Plastic	200		3.0	mg/l	1	
25	Volatile Suspended Solids (VSS)	Dried at 550 °C	Standard Method part 2540 E / Gravimetric	Plastic	200		3.0	mg/l	1	
26	Dissolved Oxygen(DO)	Azide Modification	Standard Method part 4500-O C/Titration	Plastic	300	-	0.3	mg/l	1	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
	ส่วนงานจุลชีววิทยา									
1	Benthos	Counting Chamber Method	Standard Method part 10500 B / Counting	ถุงดำ	-	-	-	ind/m ²	0	รายงานค่าสุด =Not found
2	Escherichia Coli Bacteria (E.coli)	MPN Test	Standard Method part 9221 F / Fluorogenic Substrate , MPN	Glass	250	-	-	MPN:100 ml	ตามตาราง MPN-	รายงานค่าสุด 1.1 (น้ำดื่ม) / 1.8 (น้ำ)
3	Total Coliform	MPN Test	Standard Method part 9221 B / Fermentation Technique , MPN	Glass	250	-	-	MPN:100 ml	ตามตาราง MPN-	รายงานค่าสุด 1.1 (น้ำดื่ม) / 1.8 (น้ำ)
4	Thermotolerant coliforms (Fecal Coliform)	MPN Test	Standard Method part 9221 E /Thermolerant Coliform , MPN	Glass	250	-	-	MPN:100 ml	ตามตาราง MPN-	รายงานค่าสุด 1.1 (น้ำดื่ม) / 1.8 (น้ำ)
5	Heterotrophic Bacteria (Total Bacteria)	Heterotrophic plate count (Standard Plate Count Method)	Standard Method part 9215 B / Pour plate	Glass	250	1	1	Colonies/cm ³	0	*Heterotrophic plate count = Standard plate Count
6	Phytoplankton	Counting Chamber Method	Standard Method part 10200 F / Counting	Plstic	-	-	-	Cell / l	0	รายงานค่าสุด =Not found
7	Zooplankton	Counting Chamber Method	Standard Method part 10200 G / Counting	Plastic	-	-	-	ind./l	0	รายงานค่าสุด =Not found
8	S.Aureus	Enrichment	Standard Method part 9213 B	Glass	1000	-	-	-	รายงาน พบ/ไม่พบ	รายงานค่าสุด =Not found
9	Salmonella sp.	Membrane Filter	Standard Method part 9260 B	Glass	1000	-	-	-	รายงาน พบ/ไม่พบ	รายงานค่าสุด =Not found
10	Clostridium perfringens	Comperndium 2003,Chapter 34	Comperndium 2003,Chapter 34	Glass	1000	-	-	-	รายงาน พบ/ไม่พบ	รายงานค่าสุด =Not found

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 8 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : ดิน)

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
1	Arsenic (As)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	2.50	5.00	mg/kg as As	2	
2	Antimony (Sb)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	2.50	5.00	mg/kg as Sb	2	
3	Barium (Ba)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Ba	2	
4	Beryllium (Be)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Be	2	
5	Cadmium (Cd)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.10	0.15	mg/kg as Cd	2	
6	Chromium (Cr)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Cr	2	
7	Hexavalent Chromium (Cr ⁶⁺)	Digestion,Colorimetric Method	US EPA SW 846 Method 3060A,7196A / Spectrophotometer	Plastic	500	0.40	2.00	mg/kg as Cr	3	
8	Lead (Pb)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Pb	2	
9	Manganese (Mn)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Mn	2	
10	Mercury (Hg)	Digestion,Cold Vapor Technique-AAS Method	US EPA SW 846 Method 7471B / AAS	Plastic	500	0.10	0.20	mg/kg as Hg	4	
11	Nickel (Ni)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Ni	2	
12	Selenium (Se)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	2.50	5.00	mg/kg as Se	2	
13	Silver (Ag)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	1.00	2.50	mg/kg as Ag	2	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
14	Trivalent Chromium (Cr ³⁺)	Digestion,ICP-OES; Filtration,Colorimetric Method;Calculation/	US EPA SW 846 Method 3060A,7196A / Spectrophotometer	Plastic	500	0.40	2.00	mg/k as Cr	3	
15	Vanadium (V)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as V	2	
16	Zinc (Zn)	Digestion,ICP-OES Method	US EPA SW 846 Method 3050B / ICP-OES	Plastic	500	0.50	1.00	mg/kg as Zn	2	
17	Volatile organic compounds;VOC			Glass	50					
1	- Acetone	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
2	- Benzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
3	- Bromodichloromethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
4	- Bromoform	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
5	- Butanol	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
6	- Carbon disulfide	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
7	- Carbon tetrachloride	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
8	- Chlorobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
9	- Chlorodibromomethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
10	- Chloroform	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
11	- 1,2-Dichlorobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
12	- 1,3-Dichlorobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
13	- 1,4-Dichlorobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
14	- 1,1-Dichloroethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
15	- 1,2-Dichloroethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
16	- 1,1-Dichloroethylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
17	- cis-1,2-Dichloroethylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
18	- trans-1,2-Dichloroethylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
19	- 1,2-Dichloropropane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
20	- 1,3-Dichloropropane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
21	- Ethylbenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
22	- n-Hexane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.010	0.010	mg/kg	3	
23	- Methylene Chloride or Dichloromethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
24	- Methyl tert-butyl ether	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
25	- Naphthalene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
26	- Nitrobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
27	- Styrene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
28	- 1,1,2,2-Tetrachloroethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
29	- Tetrachloroethylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
30	- Toluene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
31	- 1,2,4-Trichlorobenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
32	- 1,1,1-Trichloroethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
33	- 1,1,2-Trichloroethane	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
34	- Trichloroethylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
35	- 1,3,5-Trimethylbenzene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
36	- Vinyl acetate	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
37	- Vinyl Chloride	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
38	- m-Xylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
39	- o-Xylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
40	- p-Xylene	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	
41	- Xylene Total	Purge-and-Trap / GC-MS	US EPA SW 846 Method 5035A and 8260D	Glass	50	0.005	0.010	mg/kg	3	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
18	Semivolatile organic compounds #1			Glass	2500					
1	Acenaphthene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
2	Anthracene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
3	Benz[a]anthracene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
4	Benzo[b]fluoranthene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
5	Benzo[k]fluoranthene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
6	Benzo[a]pyrene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
7	Benzo[ghi]perylene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
8	Bis(2-chloroethyl) ether	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
9	Bis(2-ethylhexyl) phthalate	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
10	Butyl benzyl phthalate	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
11	Carbazole	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
12	p-Chloroaniline	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.500	1.250	mg/kg	3	
13	2-Chlorophenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
14	Chrysene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
15	Dibenz[a,h]anthracene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
16	Di-n-butyl phthalate	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
17	2,4-Dichlorophenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
18	Diethyl Phthalate	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
19	2,4-Dimethylphenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
20	2,4-Dinitrotoluene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
21	2,6-Dinitrotoluene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
22	Di-n-octyl phthalate	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
23	Fluoranthene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
24	Fluorene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
25	Hexachlorobenzene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
26	Hexachloro-1,3-butadiene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
27	Hexachlorocyclopentadiene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
28	Hexachloroethane	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
29	Indeno[1,2,3-cd]pyrene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
30	Isophorone	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
31	2-Methylphenol (o-Cresol)	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
32	2-Methylnaphthalene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
33	N-Nitrosodi-n-propylamine	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
34	Phenanthrene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
35	Phenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
36	Pyrene	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.250	mg/kg	3	
37	2,4,5-Trichlorophenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	
38	2,4,6-Trichlorophenol	Ultrasonic Extraction / GC-MS	US EPA SW 846 Method 3550C and 8270E	Glass	2500	0.125	0.500	mg/kg	3	

การตรวจวิเคราะห์คุณภาพน้ำ – กากตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 7 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : กากตะกอน ตามประกาศเรื่องสิ่งปฏิกูลที่ไม่ใช่แล้ว และ ดิน)

ส่วนงาน : ส่วนงานเครื่องมือทดสอบ

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
1	Antimony (Sb)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Sb	2	
		Digestion, ICP-OES Method				2.50	5.00	mg/kg as Sb		
2	Arsenic (As)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.05	0.10	mg/l as As	2	
		Digestion, ICP-OES Method				2.50	5.00	mg/kg as As		
3	Barium (Ba)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Ba	2	
		Digestion, ICP-OES Method				0.50	1.00	mg/kg as Ba		
4	Beryllium (Be)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Be	2	
		Digestion, ICP-OES Method				0.50	1.00	mg/kg as Be		
5	Cadmium (Cd)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Cd	2	
		Digestion, ICP-OES Method				0.10	0.15	mg/kg as Cd		
6	Chromium (Cr)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Cr	2	
		Digestion, ICP-OES Method				0.50	1.00	mg/kg as Cr		
7	Cobalt (Co)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Co	2	
		Digestion, ICP-OES Method				0.50	1.00	mg/kg as Co		
8	Copper (Cu)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Cu	2	
		Digestion, ICP-OES Method				0.50	1.00	mg/kg as Cu		

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (g)	MDL	LOQ	Unit	Decimal point	Remark
9	Hexavalent Chromium (Cr ⁶⁺)	Colorimetric Method/ Spectrophotometer	SW 846 Method 3060A,7196A / Spectrophotometer	Plastic	500	0.003	0.050	mg/l as Cr	3	
		Alkaline Digestion,Colorimetric Method/ Spectrophotometer				0.40	2.00	mg/kg as Cr	2	
10	Lead (Pb)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Pb	2	
		Digestion,ICP-OES Method				0.50	1.00	mg/kg as Pb		
11	Mercury (Hg)	Waste Extraction , ICP-OES Method	SW 846 Method 7471B / AAS	Plastic	500	0.0005	0.0010	mg/l as Hg	4	
		Digestion,Cold Vapor Technique-AAS Method				0.10	0.20	mg/kg as Hg	2	
12	Molybdenum (Mo)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Mo	2	
		Digestion,ICP-OES Method				0.50	1.00	mg/kg as Mo		
13	Nickel (Ni)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Ni	2	
		Digestion,ICP-OES Method				0.50	1.00	mg/kg as Ni		
14	Selenium (Se)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Se	2	
		Digestion,ICP-OES Method				2.50	5.00	mg/kg as Se		
15	Silver (Ag)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.02	0.05	mg/l as Ag	2	
		Digestion,ICP-OES Method				1.00	2.50	mg/kg as Ag		
16	Thallium (Tl)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.05	0.10	mg/l as V	2	
		Digestion,ICP-OES Method				2.50	5.00	mg/kg as V		
17	Vanadium (V)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as V	2	
		Digestion,ICP-OES Method				0.50	1.00	mg/kg as V		
18	Zinc (Zn)	Waste Extraction , ICP-OES Method	SW 846 Method 3050B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Zn	2	
		Digestion,ICP-OES Method				0.50	1.00	mg/kg as Zn		

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 5 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : น้ำใต้ดิน)

ส่วนงาน : ส่วนงานเครื่องมือทดสอบ

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
1	Antimony (Sb)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Sb	2
2	Arsenic (As)	Continuous Hydride Generation-ICP-OES Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.0010	0.0020	mg/l as As	4
3	Arsenic (As)	Continuous Hydride Generation /Atomic Absorption Spectrometric Method	Standard Method Part 3114 B and 3114 C / AAS	Plastic	500	0.0005	0.0020	mg/l as As	4
4	Barium (Ba)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Ba	2
5	Beryllium (Be)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.005	0.01	mg/l as Be	2
6	Cadmium (Cd)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.002	0.003	mg/l as Cd	3
7	Chromium (Cr)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Cr	2
8	Cyanide (CN ⁻)	Distillation, Colorimetric Method	Standard Method part 4500 CN ⁻ C,E/ Spectrophotometer	Plastic	500	0.008	0.020	mg/l	3
9	Chromium Hexavalence (Cr ⁶⁺)	Filtration,Colorimetric Method	Standard Method part 3500-Cr B/ Spectrophotometer	Plastic	500	0.003	0.050	mg/l as Cr ⁶⁺	3
10	Lead (Pb)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.005	0.010	mg/l as Pb	3
11	Manganese (Mn)	Digestion, Inductively Coupled Plasma Method	Standard Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Mn	2
12	Mercury (Hg)	Digestion, Cold Vapor Atomic Absorption Spectrometric Method	Standard Method part 3112 B / AAS	Plastic	500	0.0005	0.0010	mg/l as Hg	4

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
13	Nickel (Ni)	Digestion, Inductively Coupled Plasma Method	Standard Method part 3030F and 3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Ni	2
14	Phenols	Distillation, Direct Photometric Method	Standard Method part 5530 D / Spectrophotometer	Plastic	500	0.002	0.005	mg/l	3
15	Silver (Ag)	Digestion, Inductively Coupled Plasma Method	Standard Method part 3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.05	mg/l as Ag	2
16	Trivalent Chromium (Cr ³⁺)	Digestion, Direct Aspiration-AAS Method; Filtration, Colorimetric Method; Calculation	Standard Method part 3500-Cr B & part 3111B / AAS	Plastic	500	0.05	0.10	mg/l	2
17	Trivalent Chromium (Cr ³⁺)	Digestion, ICP-OES Method; Filtration, Colorimetric Method; Calculation	Standard Method part 3500-Cr B & part 3120B / ICP-OES	Plastic	500	0.02	0.03	mg/l	2
18	Vanadium (V)	Digestion, Inductively Coupled Plasma Method	Standard Method part 3030F and 3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as V	2
19	Zinc (Zn)	Digestion, Inductively Coupled Plasma Method	Standard Method part 3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Zn	2
20	Selenium (Se)	Digestion, Hydride Generation / Atomic Absorption Spectrometric Method	Standard Method part 3030F, 3114 B and 3114C	Plastic	500	0.0005	0.0020	mg/l	4
21	Volatile organic compounds; VOC#1	Purge-and-Trap / GC-MS	Standard Method part 6200B	Glass	40 *4				
1	- Benzene					0.00025	0.00050	mg/l	5
2	- Bromodichloromethane					0.00050	0.00050	mg/l	5
3	- Bromoform					0.00050	0.00050	mg/l	5
4	- Carbon tetrachloride					0.00025	0.00025	mg/l	5
5	- Chlorobenzene					0.00025	0.00050	mg/l	5
6	- Chlorodibromomethane					0.00050	0.00100	mg/l	5
7	- 1,2-Dichlorobenzene					0.00025	0.00050	mg/l	5
8	- 1,3-Dichlorobenzene					0.00025	0.00025	mg/l	5

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
9	- 1,4-Dichlorobenzene					0.00025	0.00025	mg/l	5
10	- 1,1-Dichloroethane					0.00025	0.00025	mg/l	5
11	- 1,2-Dichloroethane					0.00025	0.00050	mg/l	5
12	- 1,1-Dichloroethylene					0.00025	0.00050	mg/l	5
13	- cis-1,2-Dichloroethylene					0.00050	0.00050	mg/l	5
14	- trans-1,2-Dichloroethylene					0.00025	0.00050	mg/l	5
15	- 1,2-Dichloropropane					0.00025	0.00050	mg/l	5
16	- 1,3-Dichloropropane					0.00025	0.00050	mg/l	5
17	- Ethylbenzene					0.00025	0.00050	mg/l	5
18	- Methyl tert-butyl ether					0.00025	0.00050	mg/l	5
19	- Naphthalene					0.00025	0.00100	mg/l	5
20	- Nitrobenzene					0.00025	0.00025	mg/l	5
21	- Styrene					0.00050	0.00100	mg/l	5
22	- 1,1,2,2-Tetrachloroethane					0.00050	0.00050	mg/l	5
23	- Tetrachloroethylene					0.00025	0.00050	mg/l	5
24	- Toluene					0.00025	0.00050	mg/l	5
25	- 1,2,4-Trichlorobenzene					0.00025	0.00050	mg/l	5
26	- 1,1,1-Trichloroethane					0.00025	0.00025	mg/l	5
27	- 1,1,2-Trichloroethane					0.00025	0.00050	mg/l	5
28	- Trichloroethylene					0.00025	0.00050	mg/l	5

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
29	- 1,3,5-Trimethylbenzene					0.00025	0.00100	mg/l	5
30	- Vinyl acetate					0.00050	0.00100	mg/l	5
31	- Vinyl Chloride					0.00025	0.00025	mg/l	5
32	- m-Xylene					0.00025	0.00100	mg/l	5
33	- o-Xylene					0.00025	0.00100	mg/l	5
34	- p-Xylene					0.00025	0.00100	mg/l	5
35	- Xylene Total					0.00025	0.00100	mg/l	5
22	Volatile organic compounds;VOC#2	Purge-and-Trap / GC-MS Method	Standard Method part 6200B	Glass	40 *4				
1	- Acetone					0.00100	0.00100	mg/l	5
2	- Butanol					0.00100	0.00100	mg/l	5
3	- Carbon disulfide					0.00200	0.00500	mg/l	5
4	- Chloroform					0.00100	0.00200	mg/l	5
5	- n-Hexane					0.00100	0.00200	mg/l	5
6	- Dichloromethane					0.00200	0.00200	mg/l	5
23	Semivolatile organic compounds #1	Liquid-Liquid Extraction / GC-MS	Standard Method part 6410B	Glass	2500				
1	Acenaphthene					0.0005	0.0010	mg/l	4
2	Anthracene					0.0005	0.0010	mg/l	4
3	Benz[a]anthracene					0.0005	0.0010	mg/l	4
4	Benzo[b]fluoranthene					0.0005	0.0010	mg/l	4
5	Benzo[k]fluoranthene					0.0005	0.0010	mg/l	4

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
6	Benzo[a]pyrene					0.0005	0.0001	mg/l	4
7	Benzo[ghi]perylene					0.0005	0.0010	mg/l	4
8	Bis(2-chloroethyl) ether					0.0005	0.0100	mg/l	4
9	Bis(2-ethylhexyl) phthalate					0.0005	0.0010	mg/l	4
10	Butyl benzyl phthalate					0.0005	0.0010	mg/l	4
11	Carbazole					0.0005	0.0010	mg/l	4
12	p-Chloroaniline					0.0005	0.0100	mg/l	4
13	2-Chlorophenol					0.0005	0.0010	mg/l	4
14	Chrysene					0.0005	0.0010	mg/l	4
15	Dibenz[a,h]anthracene					0.0005	0.0010	mg/l	4
16	Di-n-butyl phthalate					0.0005	0.0100	mg/l	4
17	2,4-Dichlorophenol					0.0005	0.0010	mg/l	4
18	Diethyl Phthalate					0.0005	0.0010	mg/l	4
19	2,4-Dimethylphenol					0.0005	0.0010	mg/l	4
20	2,4-Dinitrotoluene					0.0005	0.0010	mg/l	4
21	2,6-Dinitrotoluene					0.0005	0.0010	mg/l	4
22	Di-n-octyl phthalate					0.0005	0.0010	mg/l	4
23	Fluoranthene					0.0005	0.0010	mg/l	4
24	Fluorene					0.0005	0.0010	mg/l	4
25	Hexachlorobenzene					0.0005	0.0010	mg/l	4

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
26	Hexachloro-1,3-butadiene					0.0005	0.0010	mg/l	4
27	Hexachlorocyclopentadiene					0.0005	0.0100	mg/l	4
28	Hexachloroethane					0.0005	0.0010	mg/l	4
29	Indeno[1,2,3-cd]pyrene					0.0005	0.0010	mg/l	4
30	Isophorone					0.0005	0.0010	mg/l	4
31	2-Methylphenol (o-Cresol)					0.0005	0.0010	mg/l	4
32	2-Methylnaphthalene					0.0005	0.0010	mg/l	4
33	N-Nitrosodi-n-propylamine					0.0005	0.0010	mg/l	4
34	Phenanthrene					0.0005	0.0010	mg/l	4
35	Phenol					0.0005	0.0010	mg/l	4
36	Pyrene					0.0005	0.0010	mg/l	4
37	2,4,5-Trichlorophenol					0.0005	0.0010	mg/l	4
38	2,4,6-Trichlorophenol					0.0005	0.0010	mg/l	4
24	Semivolatile organic compounds #2	Liquid-Liquid Extraction / GC-MS	Standard Method part 6410B	Glass	2500	0.030	0.050	µg/l	3
1	Aldrin					0.030	0.050	µg/l	3
2	Chlordane					0.030	0.050	µg/l	3
3	DDD					0.030	0.050	µg/l	3
4	DDE					0.030	0.050	µg/l	3
5	DDT					0.030	0.050	µg/l	3

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point
6	Dieldrin					0.030	0.050	µg/l	3
7	Endosulfan					0.030	0.050	µg/l	3
8	Endrin					0.050	0.100	µg/l	3
9	Heptachlor					0.030	0.050	µg/l	3
10	Heptachlor epoxide					0.030	0.050	µg/l	3
11	alpha - BHC					0.020	0.050	µg/l	3
12	beta - BHC					0.030	0.050	µg/l	3
13	gamma - BHC					0.030	0.050	µg/l	3
14	Methoxychlor					0.030	0.050	µg/l	3

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 4 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : น้ำเสีย(ขึ้นทะเบียนกรมโรงงานฯ), น้ำ,น้ำเพื่ออุปโภค, น้ำประปา, น้ำผิวดิน, น้ำบาดาล และน้ำทะเล)

ส่วนงาน : ส่วนงานเครื่องมือทดสอบ

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
1	Arsenic (As)	Continuous Hydride Generation-AAS Method	APHA Method Part 3114 B / AAS	Plastic	500	0.0005	0.0020	mg/l as As	4	น้ำทะเล MDL/LOQ = 1.00/2.00 ug/l
2	Barium (Ba)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Ba	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
3	Cadmium (Cd)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Cd	2	น้ำทะเล MDL/LOQ = 20/30 ug/l น้ำดื่ม MDL/LOQ = 0.002/0.003 mg/l
4	Chromium (Cr)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Cr	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
5	Color	ADMI Weighted-Ordinate Spectrophotometer Method	APHA Method part 2120 F / Spectrophotometer	Plastic	500	10	20	ADMI	0	
6	Chromium Hexavalence (Cr ⁶⁺)	Filtration,Colorimetric Method	APHA Method part 3500-Cr B / Spectrophotometer	Plastic	500	0.003	0.050	mg/l as Cr ⁶⁺	3	น้ำทะเล MDL/LOQ = 3.00/50.0 ug/l
7	Copper (Cu)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Cu	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
8	Cyanide (CN ⁻)	Distillation, Colorimetric Method	APHA Method part 4500 CN ⁻ C,E/ Spectrophotometer	Plastic	500	0.008	0.020	mg/l	3	น้ำทะเล MDL/LOQ = 8/20 ug/l
9	Formaldehyde	Distillation, Colorimetric Method	คู่มือวิเคราะห์น้ำเสีย,สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย	Plastic	100	0.20	0.50	mg/l	2	
10	Lead (Pb)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Pb	2	น้ำทะเล MDL/LOQ = 20/30 ug/l น้ำดื่ม MDL/LOQ = 0.005/0.010 mg/l

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
11	Manganese (Mn)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Mn	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
12	Mercury (Hg)	Cold Vapor Atomic Absorption Spectrometric Method(SM:3112B)	APHA Method part 3112 B / AAS	Plastic	500	0.0005	0.0010	mg/l as Hg	4	
13	Nickel (Ni)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Ni	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
14	Phenols	Distillation, Direct Photometric Method	APHA Method part 5530 D / Spectrophotometer	Plastic	500	0.002	0.005	mg/l	3	
15	Trivalent Chromium (Cr ³⁺)	Digestion,Direct Aspiration-AAS Method; Filtration,Colorimetric Method;Calculation	APHA Method part 3500-Cr B & part 3111B /AAS	Plastic	500	0.05	0.10	mg/l	2	
16	Trivalent Chromium (Cr ³⁺)	Digestion,ICP-OES Method; Filtration,Colorimetric Method;Calculation	APHA Method part 3500-Cr B & part 3120B / ICP-OES	Plastic	500	0.02	0.03	mg/l	2	
17	Zinc (Zn)	Digestion,ICP-OES Method	APHA Method part3030F and 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Zn	2	น้ำทะเล MDL/LOQ = 20/30 ug/l
18	Free Chlorine	DPD Colorimetric Method	APHA Method part 4500 Cl ₂ G./ Spectrophotometer	Plastic	500	0.03	0.05	mg/l	2	
19	Selenium (Se)	Continuos,Hydride Generation/AAS	APHA Method part3030F , 3114 B and 3114C	Plastic	500	0.0005	0.0020	mg/l	4	
20	สารฆ่าศัตรูพืชและสัตว์ (Pesticide) :	Liquid-Liquid Extraction Gas Chromatography	APHA Method part 6630B/GC and APHA Method part 6410B/GC-MS	Glass	2500	0.03	0.05	ug/l	2	
	- alpha - BHC					0.03	0.05	ug/l	2	
	- beta - BHC					0.03	0.05	ug/l	2	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
	- gamma - BHC	Liquid-Liquid Extraction Gas Chromatography	APHA Method part 6630B/GC and APHA Method part 6410B/GC-MS	Glass	2500	0.03	0.05	ug/l	2	
	- delta - BHC					0.03	0.05	ug/l	2	
	- Heptachlor					0.03	0.05	ug/l	2	
	- Aldrin					0.03	0.05	ug/l	2	
	- Heptachlor epoxide					0.03	0.05	ug/l	2	
	- Endosulfan I					0.03	0.05	ug/l	2	
	- p,p - DDE					0.03	0.05	ug/l	2	
	- Dieldrin					0.03	0.05	ug/l	2	
	- Endrin ketone					0.03	0.05	ug/l	2	
	- Endosulfan II					0.03	0.05	ug/l	2	
	- p,p - DDD					0.03	0.05	ug/l	2	
	- Endrin Aldehyde					0.03	0.05	ug/l	2	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
	- Endosulfan Sulfate	Liquid-Liquid Extraction Gas Chromatography	APHA Method part 6630B/GC and APHA Method part 6410B/GC-MS	Glass	2500	0.03	0.05	ug/l	2	
	- trans Chlordane					0.03	0.05	ug/l	2	
	- cis Chlordane					0.03	0.05	ug/l	2	
	- DDT	Liquid-Liquid Extraction Gas Chromatography	APHA Method part 6410B/GC-MS	Glass	2500	0.03	0.05	ug/l	2	
	- Endrin					0.05	0.10	ug/l	2	
	- Methoxychlor					0.03	0.05	ug/l	2	

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ 6 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ที่ไม่ได้ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : น้ำ, น้ำเสีย, น้ำใต้ดิน, น้ำเพื่ออุปโภค, น้ำประปา, น้ำผิวดิน, น้ำบาดาล และน้ำทะเล)

ส่วนงาน : ส่วนงานเครื่องมือทดสอบ

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
1	Antimony (Sb)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Sb	2	
2	Aluminium (Al)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Al	2	
3	Boron (B)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as B	2	
4	Calcium (Ca)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.50	1.00	mg/l as Ca	2	
5	Cadmium (Cd)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.002	0.003	mg/l as Cd	3	น้ำดื่ม
6	Cobalt (Co)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Co	2	
7	Color	Spectrophotometric Method	Standard Method part 2120 C / Spectrophotometer	Plastic	500	0.50	1.00	Pt-Co	2	
8	Iron (Fe)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.02	0.03	mg/l as Fe	2	
9	Lead (Pb)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.005	0.010	mg/l as Pb	3	น้ำดื่ม
10	Magnesium (Mg)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.50	1.00	mg/l as Mg	2	
11	Molybdenum (Mo)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Mo	2	
12	Nitrite (NO ₂ ⁻)	Colorimetric Method	Standard Method part 4500-NO ₂ ⁻ B / Spectrophotometer	Plastic	500	0.003	0.030	mg/l as NO ₂ ⁻	3	
13	Nitrite-Nitrogen (NO ₂ ⁻ -N)	Colorimetric Method	Standard Method part 4500-NO ₂ ⁻ B / Spectrophotometer	Plastic	500	0.001	0.010	mg/l as NO ₂ ⁻ -N	3	
14	Nitrate (NO ₃ ⁻)	Colorimetric Method	Standard Method part 4500-NO ₃ ⁻ B / Spectrophotometer	Plastic	500	0.09	0.44	mg/l as NO ₃ ⁻	2	

Items	Parameter	Method	Reference Method / Analytical Technique	Container	sample size (ml)	MDL	LOQ	Unit	Decimal point	Remark
15	Nitrate-Nitrogen (NO_3^-)	Colorimetric Method	Standard Method part 4500- NO_3^- B / Spectrophotometer	Plastic	500	0.02	0.10	mg/l as NO_3^- -N	2	
16	Potassium (K)	Direct Aspiration-AAS Method	Standard Method part 3111 B / AAS	Plastic	500	0.008	0.025	mg/l as K	3	
17	Potassium (K)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.50	1.00	mg/l as K	2	
18	Selenium (Se)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Se	2	
19	Silica (SiO_2)	Molybdosilicate Method	Standard Method part 4500- SiO_2 C / Spectrophotometer	Plastic	500	1.00	2.00	mg/l as SiO_2	2	
20	Silicon (Si)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.02	0.05	mg/l as Si	2	
21	Silver (Ag)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.02	0.05	mg/l as Ag	2	
22	Sodium (Na)	Direct Aspiration-AAS Method	Standard Method part 3111 B / AAS	Plastic	500	0.005	0.050	mg/l as Na	3	
23	Sodium (Na)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.50	1.00	mg/l as Na	2	
24	Sodium Absorption Ratio (SAR)	Calculation,Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.50	1.00	-	2	
25	Strontium (Sr)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Sr	2	
26	Tin (Sn)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Sn	2	
27	Titanium (Ti)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as Ti	2	
28	Thallium (Tl)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.05	0.10	mg/l as Tl	2	
29	Vanadium (V)	Digestion,ICP-OES Method	Standard Method part 3030F,3120 B / ICP-OES	Plastic	500	0.01	0.02	mg/l as V	2	
30	Phosphate (PO_4^{3-})	Ascorbic Acid Method	Standard Method part 4500- PO_4^{3-} B/ Spectrophotometer	Plastic	500	0.03	0.46	mg/l as P	2	

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31	Phosphorus (P)	Ascorbic Acid Method	Standard Method part 4500-P B/ Spectrophotometer	Plastic	500	0.05	0.15	mg/l as PO_4^{3-}	2	
32	Sulfate (SO_4^{2-})	Turbidimetric Method	Standard Method part 4500- SO_4^{2-} E/ Spectrophotometer	Plastic	500	1.50	5.00	mg/l as SO_4^{2-}	2	
33	Surfactant	Anionic Surfactants as MBAS	Standard Method Part 5540 C / Spectrophotometer	Plastic	500	0.35	0.40	mg/l as MBAS	2	
34	Surfactant (LAS)	Anionic Surfactants as MBAS	Standard Method Part 5540 C / Spectrophotometer	Plastic	1000	0.08	0.10	mg/l as MBAS	2	น้ำดื่ม
35	Fluoride (F^-)	Ion-Selective Electrode Method	Standard Method part 4500- F^- C/ Spectrophotometer	Plastic	100	0.20	0.50	mg/l as F^-	2	
36	Gold (Au)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.02	0.05	mg/l as Au	2	
37	Phosphorus (P)	Digestion, ICP-OES Method	Standard Method part 3030F, 3120 B / ICP-OES	Plastic	500	0.50	1.00	mg/l as P	2	
38	Chlorine (Residual)	Spectrophotometric Method	Standard Method part 4500-Cl G / Spectrophotometer	Plastic	500	0.03	0.05	mg/l as Cl_2	2	