

ภาคผนวก ง

ผลการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม



Request No. LA67-R0814

Report No. R6708-3807

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakom Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : Waste Heat Boiler
SAMPLING DATE : 05/08/2024
RECEIVED DATE : 05/08/2024

SAMPLE NO. : 29187
SAMPLING TIME : 10:10-11:40
REPORTED DATE : 07/08/2028

STACK DESCRIPTION⁶

Height : 23.00 m Type of Process : Combustion
Diameter : 0.80 m Type of Fuel : Natural Gas
Temperature : 131.00 °C Oxygen Content : 4.27 %
Air Velocity : 5.03 m/s Barometric Pressure : 754.75 mm.Hg
Flow rate³ : 1.62 m³/s Atmospheric Temperature : 30.00 °C
Moisture Content : 12.53 %

PARAMETER*	TEST METHOD	TIME	RESULT ³		STD	UNIT
			4.27 % O ₂	7 % O ₂		
Oxides of Nitrogen (No _x)	US.EPA Method 7E	10:10-11:40	41.0	34.3	376 ¹ , 85.0 ²	mg/m ³
			21.8	18.2	200 ¹ , 45.2 ²	ppm
			0.0664	-	0.068 ²	g/s

REMARK:

- ¹ Notification of The Ministry of Industry B.E. 2549 (2006)
- ² ค่าที่กำหนดไว้ในรายงานการเปลี่ยนแปลงรายละเอียดโครงการในรายงานการประเมินผลกระทบสิ่งแวดล้อม (EIA) ของโครงการ โรงงานผลิตเอทิลีนออกไซด์และเอทิลีนโกลคอล (ครั้งที่ 8) ของบริษัท พีทีที โกลบอล เคมิคอล จำกัด (มหาชน) สาขา 16 พ.ศ. 2566
- ³ Standard Condition (Temperature 25°C, Pressure 760 mmHg) and Dry Basis
- Sampling By Mr. Teerapong Nualin (J-003-ค-0014)
- ⁶ These Data Outside The Scope of The Registration of The Department of Industrial Works.



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COPY



Request No. LA67-R0843

Report No. R6708-4351 - R6708-4357

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakom Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บ้านหนองเพ็ง
PARAMETER* : Nitrogen Dioxide
DETERMINATION METHOD : Chemiluminescence
INSTRUMENT : API Model T200 S/N 7875

SAMPLE NO. : 29735-29741
SAMPLING DATE : 02-09/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME / DATE	02-03/08/2024	03-04/08/2024	04-05/08/2024	05-06/08/2024	06-07/08/2024	07-08/08/2024	08-09/08/2024	UNIT
11:00 - 12:00 ²	0.001	0.002	0.002	0.003	0.002	0.001	0.001	ppm
12:00 - 13:00	0.001	0.002	0.002	0.003	0.002	0.001	0.002	ppm
13:00 - 14:00	0.001	0.002	0.007	0.002	0.003	0.001	0.002	ppm
14:00 - 15:00	0.001	0.002	0.008	0.001	0.002	0.002	0.001	ppm
15:00 - 16:00	0.001	0.002	0.003	0.001	0.001	0.002	0.001	ppm
16:00 - 17:00	0.002	0.001	0.003	0.001	0.002	0.001	0.001	ppm
17:00 - 18:00	0.002	0.001	0.001	0.001	0.001	0.001	0.001	ppm
18:00 - 19:00	0.002	0.001	0.001	0.001	0.001	0.001	0.001	ppm
19:00 - 20:00	0.001	0.001	0.001	0.001	0.001	0.001	0.002	ppm
20:00 - 21:00	0.001	0.001	0.001	0.001	0.001	0.001	0.001	ppm
21:00 - 22:00	0.002	0.002	0.001	0.001	0.001	0.001	0.001	ppm
22:00 - 23:00	0.001	0.002	0.002	0.002	0.002	0.001	0.001	ppm
23:00 - 00:00	0.002	0.002	0.002	0.002	0.002	0.002	0.002	ppm
00:00 - 01:00	0.002	0.002	0.002	0.002	0.002	0.002	0.002	ppm
01:00 - 02:00	0.002	0.003	0.002	0.002	0.002	0.002	0.002	ppm
02:00 - 03:00	0.002	0.003	0.002	0.002	0.002	0.002	0.002	ppm
03:00 - 04:00	0.002	0.002	0.002	0.002	0.001	0.002	0.002	ppm
04:00 - 05:00	0.002	0.002	0.001	0.002	0.002	0.002	0.002	ppm
05:00 - 06:00	0.002	0.002	0.003	0.002	0.002	0.002	0.002	ppm
06:00 - 07:00	0.002	0.002	0.003	0.002	0.002	0.002	0.002	ppm
07:00 - 08:00	0.002	0.002	0.003	0.002	0.002	0.002	0.002	ppm
08:00 - 09:00	0.002	0.001	0.003	0.002	0.001	0.002	0.002	ppm
09:00 - 10:00	0.002	0.001	0.003	0.002	0.003	0.002	0.002	ppm
10:00 - 11:00	0.002	0.002	0.003	0.002	0.002	0.002	0.002	ppm
Maximum 1 hr.	0.002	0.003	0.008	0.003	0.003	0.002	0.002	ppm
Average 24 hr.	0.002	0.002	0.003	0.002	0.002	0.002	0.002	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. Tummarut Photankhum)



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โทร. 0-3848-1197, 0-3876-3031-2 แฟกซ์ : 0-3848-2095
เว็บไซต์ : http://www.etc1992.com อี-เมล : info@etc1992.com



ACCREDITED LABORATORY
ISO/IEC 17025

EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11 Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230
Tel. 0-3848-1197, 0-3876-3031-2 Fax : 0-3848-2095
Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. LA67-R0843

Report No. R6708-4344 - R6708-4350

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch I6
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : วัดมบขลุ่ย
PARAMETER* : Nitrogen Dioxide
DETERMINATION METHOD : Chemiluminescence
INSTRUMENT : API Model T200 S/N 7874

SAMPLE NO. : 29728-29734
SAMPLING DATE : 02-09/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME / DATE	02-03/08/2024	03-04/08/2024	04-05/08/2024	05-06/08/2024	06-07/08/2024	07-08/08/2024	08-09/08/2024	UNIT
10:00 - 11:00 ²	0.002	0.003	0.006	0.006	0.003	0.003	0.003	ppm
11:00 - 12:00	0.002	0.005	0.011	0.007	0.002	0.003	0.003	ppm
12:00 - 13:00	0.002	0.003	0.012	0.005	0.002	0.005	0.003	ppm
13:00 - 14:00	0.003	0.002	0.003	0.005	0.002	0.003	0.002	ppm
14:00 - 15:00	0.003	0.002	0.002	0.005	0.003	0.003	0.002	ppm
15:00 - 16:00	0.002	0.003	0.004	0.004	0.003	0.003	0.004	ppm
16:00 - 17:00	0.002	0.002	0.003	0.003	0.005	0.003	0.004	ppm
17:00 - 18:00	0.002	0.003	0.004	0.003	0.006	0.005	0.005	ppm
18:00 - 19:00	0.002	0.005	0.004	0.004	0.007	0.004	0.007	ppm
19:00 - 20:00	0.002	0.007	0.003	0.005	0.004	0.004	0.006	ppm
20:00 - 21:00	0.002	0.006	0.002	0.005	0.004	0.004	0.004	ppm
21:00 - 22:00	0.001	0.005	0.002	0.004	0.003	0.005	0.004	ppm
22:00 - 23:00	0.002	0.003	0.002	0.004	0.003	0.003	0.003	ppm
23:00 - 00:00	0.002	0.002	0.003	0.003	0.003	0.003	0.004	ppm
00:00 - 01:00	0.001	0.001	0.003	0.003	0.002	0.002	0.002	ppm
01:00 - 02:00	0.001	0.002	0.003	0.002	0.003	0.003	0.002	ppm
02:00 - 03:00	0.002	0.002	0.002	0.003	0.003	0.003	0.002	ppm
03:00 - 04:00	0.001	0.002	0.002	0.003	0.003	0.003	0.002	ppm
04:00 - 05:00	0.001	0.004	0.004	0.003	0.004	0.004	0.002	ppm
05:00 - 06:00	0.001	0.005	0.006	0.004	0.006	0.003	0.003	ppm
06:00 - 07:00	0.001	0.004	0.005	0.003	0.007	0.004	0.003	ppm
07:00 - 08:00	0.001	0.004	0.006	0.006	0.007	0.005	0.006	ppm
08:00 - 09:00	0.001	0.004	0.005	0.004	0.006	0.004	0.006	ppm
09:00 - 10:00	0.002	0.004	0.005	0.003	0.003	0.003	0.008	ppm
Maximum 1 hr.	0.003	0.007	0.012	0.007	0.007	0.005	0.008	ppm
Average 24 hr.	0.002	0.003	0.004	0.004	0.004	0.003	0.004	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. Tummarut Photankhum)



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Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. LA67-R0843

Report No. R6708-4358 - R6708-4364

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch I6
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : สำนักงานนิคมอุตสาหกรรมระดับชีวเอชเอ ตะวันออก (มบตาพุด)
PARAMETER* : Nitrogen Dioxide
DETERMINATION METHOD : Chemiluminescence
INSTRUMENT : API Model T200 S/N 6758

SAMPLE NO. : 29742-29748
SAMPLING DATE : 02-09/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME / DATE	02-03/08/2024	03-04/08/2024	04-05/08/2024	05-06/08/2024	06-07/08/2024	07-08/08/2024	08-09/08/2024	UNIT
11:00 - 12:00 ²	0.019	0.028	0.036	0.037	0.036	0.038	0.038	ppm
12:00 - 13:00	0.020	0.033	0.045	0.041	0.041	0.043	0.043	ppm
13:00 - 14:00	0.014	0.022	0.030	0.033	0.030	0.034	0.035	ppm
14:00 - 15:00	0.018	0.023	0.031	0.036	0.032	0.037	0.036	ppm
15:00 - 16:00	0.012	0.025	0.032	0.035	0.034	0.037	0.036	ppm
16:00 - 17:00	0.017	0.027	0.032	0.037	0.035	0.037	0.037	ppm
17:00 - 18:00	0.021	0.026	0.032	0.044	0.037	0.039	0.039	ppm
18:00 - 19:00	0.014	0.029	0.031	0.037	0.036	0.038	0.039	ppm
19:00 - 20:00	0.018	0.029	0.030	0.036	0.038	0.038	0.039	ppm
20:00 - 21:00	0.022	0.036	0.033	0.039	0.039	0.040	0.040	ppm
21:00 - 22:00	0.019	0.026	0.027	0.031	0.033	0.033	0.034	ppm
22:00 - 23:00	0.019	0.027	0.028	0.031	0.034	0.034	0.035	ppm
23:00 - 00:00	0.020	0.027	0.028	0.031	0.034	0.034	0.035	ppm
00:00 - 01:00	0.022	0.028	0.028	0.031	0.034	0.034	0.036	ppm
01:00 - 02:00	0.022	0.033	0.029	0.031	0.034	0.035	0.036	ppm
02:00 - 03:00	0.024	0.027	0.030	0.032	0.035	0.037	0.036	ppm
03:00 - 04:00	0.025	0.027	0.031	0.033	0.035	0.036	0.036	ppm
04:00 - 05:00	0.030	0.029	0.036	0.037	0.041	0.038	0.038	ppm
05:00 - 06:00	0.021	0.028	0.030	0.030	0.034	0.031	0.033	ppm
06:00 - 07:00	0.022	0.029	0.033	0.033	0.036	0.035	0.036	ppm
07:00 - 08:00	0.023	0.028	0.034	0.034	0.038	0.036	0.036	ppm
08:00 - 09:00	0.024	0.031	0.036	0.035	0.037	0.038	0.039	ppm
09:00 - 10:00	0.026	0.033	0.036	0.034	0.036	0.038	0.042	ppm
10:00 - 11:00	0.027	0.035	0.035	0.034	0.036	0.038	0.031	ppm
Maximum 1 hr.	0.030	0.036	0.045	0.044	0.041	0.043	0.043	ppm
Average 24 hr.	0.021	0.028	0.032	0.035	0.036	0.037	0.037	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. Tummarut Photankhum)



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Wind Speed & Wind Direction

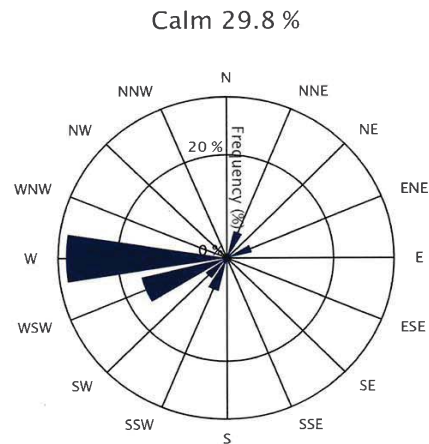
Request No. LA67-R0843

PTT Global Chemical Public Company Limited Branch 16 (EOEG Plant)

Sample No. 29763

Sampling Source : สำนักงานนิคมอุตสาหกรรมดับบลิวเอชเอ ตะวันออก (มาบตาพุด)

Sampling Date : August 2-9, 2024



■ 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	5.4	0.0	0.0	0.0	0.0	0.0	5.4
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	4.8	0.0	0.0	0.0	0.0	0.0	4.8
E	0.6	0.0	0.0	0.0	0.0	0.0	0.6
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.6	0.0	0.0	0.0	0.0	0.0	0.6
SSE	0.6	0.0	0.0	0.0	0.0	0.0	0.6
S	1.2	0.0	0.0	0.0	0.0	0.0	1.2
SSW	6.6	0.0	0.0	0.0	0.0	0.0	6.6
SW	4.8	0.0	0.0	0.0	0.0	0.0	4.8
WSW	16.1	0.0	0.0	0.0	0.0	0.0	16.1
W	29.8	0.0	0.0	0.0	0.0	0.0	29.8
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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
Calm	29.8						29.8

Wind Speed & Wind Direction

Request No. LA67-R0843

PTT Global Chemical Public Company Limited Branch 16 (EOEG Plant)

Sample No. 29763

Sampling Source : สำนักงานนิคมอุตสาหกรรมดับบลิวเอชเอ ตะวันออก (มาบตาพุด)

Sampling Date : August 2-9, 2024

Time	August 2-3, 2024		August 3-4, 2024		August 4-5, 2024		August 5-6, 2024		August 6-7, 2024		August 7-8, 2024		August 8-9, 2024	
	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
11:00-12:00	0.4	W	0.4	WSW	0.4	SE	0.4	W	0.4	NNE	0.9	W	0.9	WSW
12:00-13:00	0.9	W	0.4	SW	0.4	E	0.9	W	0.9	NNE	0.9	W	1.3	WSW
13:00-14:00	0.9	W	0.4	W	0.4	W	0.9	W	1.3	WSW	0.9	W	1.3	WSW
14:00-15:00	1.3	WSW	0.4	W	0.4	WSW	0.9	S	1.3	WSW	1.3	WSW	0.9	W
15:00-16:00	0.9	W	1.3	W	0.9	WSW	1.3	SW	1.8	W	1.3	WSW	0.9	W
16:00-17:00	0.4	W	0.9	W	0.9	WSW	0.9	WSW	1.8	WSW	0.9	W	0.9	W
17:00-18:00	0.4	W	0.4	W	0.4	W	0.9	WSW	0.9	WSW	0.4	W	0.4	WSW
18:00-19:00	0.4	W	0.9	SSW	0.9	SSW	0.4	WSW	0.4	W	0.4	W	0.4	W
19:00-20:00	0.4	W	0.4	SSW	0.9	SSW	0.0	-	0.4	W	0.4	W	0.0	-
20:00-21:00	0.0	-	0.4	SSE	0.4	WSW	0.0	-	0.0	-	0.4	W	0.0	-
21:00-22:00	0.4	SSW	0.0	-	0.4	SSW	0.0	-	0.4	W	0.0	-	0.0	-
22:00-23:00	0.4	SW	0.4	SW	0.4	WSW	0.4	WSW	0.4	W	0.4	W	0.0	-
23:00-00:00	0.4	WSW	0.4	SSW	0.0	-	0.4	W	0.9	SSW	0.0	-	0.0	-
00:00-01:00	0.0	-	0.9	NNE	0.0	-	0.4	W	0.4	W	0.0	-	0.4	SW
01:00-02:00	0.4	W	0.0	-	0.0	-	0.4	W	0.4	W	0.0	-	0.0	-
02:00-03:00	0.0	-	0.0	-	0.4	NNE	0.0	-	0.4	NNE	0.4	S	0.0	-
03:00-04:00	0.4	W	0.0	-	0.4	NNE	0.0	-	0.4	NNE	1.3	SSW	0.0	-
04:00-05:00	0.0	-	0.0	-	0.4	ENE	0.0	-	0.4	ENE	0.9	SW	0.0	-
05:00-06:00	0.4	WSW	0.0	-	0.4	ENE	0.0	-	0.0	-	0.9	WSW	0.0	-
06:00-07:00	0.0	-	0.9	ENE	0.4	ENE	0.0	-	0.0	-	0.4	WSW	0.4	SSW
07:00-08:00	0.0	-	0.4	ENE	0.0	-	0.0	-	0.0	-	0.4	W	0.4	SW
08:00-09:00	0.0	-	0.4	ENE	0.0	-	0.4	W	0.0	-	0.0	-	0.4	NNE
09:00-10:00	0.4	SW	0.0	-	0.4	NNE	0.4	WSW	0.4	W	0.4	W	0.4	ENE
10:00-11:00	0.4	SSW	0.0	-	0.4	W	0.4	WSW	0.9	W	0.9	W	0.0	-

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ISO/IEC 17025

Request No : W6707325

Report No : 6707-1555-1

TEST REPORT

Customer	: PTT Global Chemical Public Company Limited Branch 16			
Address	: 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150			
Sampling Source	: EOEG Plant	Sample No.	: W 67071015	
Sample Name	: จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA	Sampling Date	: 11/07/2024	
Sampling By	: ALS Laboratory Group (Thailand) Co.,Ltd.	Sampling Time	: --	
Sampling Method	: Grab	Received Date	: 12/07/2024	
Tested Date	: 11/07/2024 – 23/07/2024	Reported Date	: 02/08/2024	
Parameter	Unit	Method	Result	Standard ¹
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	7.2	≤ 500
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrimetric Method (SM:5220C)	48	≤ 750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	155	-
Formaldehyde	mg/L	Distillation, Colorimetric Method	< 0.50	≤ 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:2550B)	32	≤ 45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	756	≤ 3,000
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	5	≤ 200

Physical Apperance : 1. Sample : yellowish, lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N

SUPPLEMENT TO TEST REPORT NO. 6707-1555



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ISO/IEC 17025

Request No : W6708278

Report No : 6708-0933

TEST REPORT

Customer	: PTT Global Chemical Public Company Limited Branch 16			
Address	: 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150			
Sampling Source	: EOEG Plant	Sample No.	: W 67080834	
Sample Name	: จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA	Sampling Date	: 08/08/2024	
Sampling By	: ALS Laboratory Group (Thailand) Co.,Ltd.	Sampling Time	: --	
Sampling Method	: Grab	Received Date	: 09/08/2024	
Tested Date	: 09/08/2024 – 16/08/2024	Reported Date	: 19/08/2024	
Parameter	Unit	Method	Result	Standard ¹
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	4.7	≤ 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)	149	-
Formaldehyde	mg/L	Distillation, Colorimetric Method	< 0.50	≤ 1
Oil and Grease	mg/L	Liquid – Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤ 10
pH (on site)		Electrometric Method	7.2	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550B)	32	≤ 45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	772	≤ 3,000
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	< 5	≤ 200

Physical Apperance : 1. Sample : yellowish, lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6709309

Report No : 6709-1737

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67091162
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA Sampling Date : 11/09/2024
Sampling By : ALS Laboratory Group (Thailand) Co.,Ltd. Sampling Time : 3:00 PM
Sampling Method : Grab Received Date : 12/09/2024
Tested Date : 12/09/2024 – 25/09/2024 Reported Date : 26/09/2024

Parameter	Unit	Method	Result	Standard ¹
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	5.0	≤ 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)	132	-
Formaldehyde	mg/L	Distillation,Colorimetric Method	< 0.50	≤ 1
Oil and Grease	mg/L	Liquid – Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤ 10
pH (on site)		Electrometric Method	7.6	5.5-9.0
Temperature	°C	Laboratory and Field Method (SM:2550B)	27	≤ 45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	630	≤ 3,000
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	< 5	≤ 200

Physical Apperance : 1. Sample : yellowish, lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6710302

Report No : 6710-1258

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67100957
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA Sampling Date : 09/10/2024
Sampling By : ALS Laboratory Group (Thailand) Co.,Ltd. Sampling Time : --
Sampling Method : Grab Received Date : 10/10/2024
Tested Date : 10/10/2024 – 18/10/2024 Reported Date : 21/10/2024

Parameter	Unit	Method	Result	Standard ¹
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	7.3	≤ 500
Chemical Oxygen Demand	mg/L	Closed Reflux,Titrimetric Method (SM:5220C)	65	≤ 750
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	134	-
Formaldehyde	mg/L	Distillation,Colorimetric Method	< 0.50	≤ 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:2550B)	30	≤ 45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	708	≤ 3,000
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	17	≤ 200

Physical Apperance : 1. Sample : yellow, lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L , PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711226

Report No : 6711-1058

TEST REPORT

Customer	:	PTT Global Chemical Public Company Limited Branch 16	Sample No.	:	W 67110681
Address	:	9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150	Sampling Date	:	07/11/2024
Sampling Source	:	EOEG Plant	Sampling Time	:	--
Sample Name	:	จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA	Received Date	:	08/11/2024
Sampling By	:	ALS Laboratory Group (Thailand) Co.,Ltd.	Reported Date	:	18/11/2024
Sampling Method	:	Grab			
Tested Date	:	08/11/2024 - 15/11/2024			
Parameter	Unit	Method	Result	Standard ¹	
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)	< 40	≤ 750	
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	137	-	
Formaldehyde	mg/L	Distillation, Colorimetric Method	< 0.50	≤ 1	
Oil and Grease	mg/L	Liquid - Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤ 10	
pH (on site)		Electrometric Method	7.1	5.5-9.0	
Temperature	°C	Laboratory and Field Method (SM:2550B)	28	≤ 45	
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	640	≤ 3,000	
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	< 5	≤ 200	

Physical Apperance : 1. Sample : yellowish, lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6712055

Report No : 6712-0756

TEST REPORT

Customer	:	PTT Global Chemical Public Company Limited Branch 16	Sample No.	:	W 67120210
Address	:	9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150	Sampling Date	:	03/12/2024
Sampling Source	:	EOEG Plant	Sampling Time	:	--
Sample Name	:	จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคม WHA	Received Date	:	04/12/2024
Sampling By	:	ALS Laboratory Group (Thailand) Co.,Ltd.	Reported Date	:	13/12/2024
Sampling Method	:	Grab			
Tested Date	:	04/12/2024 - 11/12/2024			
Parameter	Unit	Method	Result	Standard ¹	
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)	61	≤ 750	
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	156	-	
Formaldehyde	mg/L	Distillation, Colorimetric Method	< 0.50	≤ 1	
Oil and Grease	mg/L	Liquid - Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤ 10	
pH (on site)		Electrometric Method	7.5	5.5-9.0	
Temperature	°C	Laboratory and Field Method (SM:2550B)	30	≤ 45	
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	764	≤ 3,000	
Total Suspended Solids	mg/L	Dried at 103-105 degree celsius (SM:2540 D)	< 5	≤ 200	

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L, PE 1.0 L, PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023
3. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711186

Report No : 6711-1063

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสีย ##
Sampling By : ETC
Sampling Method : Grab
Tested Date : 07/11/2024 – 16/11/2024
Sample No. : W 67110577
Sampling Date : 06/11/2024
Sampling Time : 9:55 AM
Received Date : 07/11/2024
Reported Date : 18/11/2024

Parameter	Unit	Method	Result	Standard ¹
Arsenic	mg/L	Continuous Hydride Generation/AAS Method (SM:3114B)	0.0065	≤ 0.25
Barium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.14	≤ 1
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode Method (SM:5210B)	3.8	≤ 500
Cadmium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 0.03
Chemical Oxygen Demand	mg/L	Closed Reflux,Titrimetric Method (SM:5220C)	63	≤ 750
Color (Original)	ADMI	ADMI Weighted Ordinate Spectrophotometric Method (SM:2120F)	25	≤ 600
Color (pH 7.0)	ADMI	ADMI Weighted Ordinate Spectrophotometric Method (SM:2120F)	24	≤ 600

Physical Apperance : 1. Sample : yellowish, lightly SS, nonsmelling
2. Container : Normal [PE 0.5 L [3 Bottle], PE 1.0 L, PE 1.8 L, G 0.25 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharek Phatklang (3-003-ท-0031)
4. ## จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคมอุตสาหกรรม ดับลิวเอชเอ ตะวันออก (มาบตาพุด)
5. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711186

Report No : 6711-1063

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสีย ##
Sampling By : ETC
Sampling Method : Grab
Tested Date : 07/11/2024 – 16/11/2024
Sample No. : W 67110577
Sampling Date : 06/11/2024
Sampling Time : 9:55 AM
Received Date : 07/11/2024
Reported Date : 18/11/2024

Parameter	Unit	Method	Result	Standard ¹
Copper	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	≤ 2
Cyanide	mg/L as HCN	Distillation,Colorimetric Method (SM:4500 CN- C, E)	< 0.020	≤ 0.2
Formaldehyde	mg/L	Distillation,Colorimetric Method	< 0.50	≤ 1
Free Chlorine	mg/L	DPD Colorimetric Method (SM:4500-Cl G)	< 0.05	≤ 1
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500-Cr B)	< 0.050	≤ 0.25
Lead	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 0.2
Manganese	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.14	≤ 5
Mercury	mg/L	Cold-Vapor Atomic Absorption Spectrometric Method (SM:3112B)	< 0.0010	≤ 0.005
Nickel	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 1

Physical Apperance : 1. Sample : yellowish, lightly SS, nonsmelling
2. Container : Normal [PE 0.5 L [3 Bottle], PE 1.0 L, PE 1.8 L, G 0.25 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharek Phatklang (3-003-ท-0031)
4. ## จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคมอุตสาหกรรม ดับลิวเอชเอ ตะวันออก (มาบตาพุด)
5. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711186

Report No : 6711-1063

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67110577
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสีย ## Sampling Date : 06/11/2024
Sampling By : ETC Sampling Time : 9:55 AM
Sampling Method : Grab Received Date : 07/11/2024
Tested Date : 07/11/2024 - 16/11/2024 Reported Date : 18/11/2024

Parameter	Unit	Method	Result	Standard ⁿ
Oil and Grease	mg/L	Liquid-Liquid, Partition-Gravimetric Method (SM:5520B)	< 3.0	≤ 10
pH (on site)		Electrometric Method	7.2	5.5-9.0
Phenol	mg/L	Distillation, Direct Photometric Method (SM:5530B,D)	< 0.005	≤ 1
Selenium	mg/L	Digestion, Hydride Generation/AAS Method (SM:3030F, 3114B&C)	< 0.0020	≤ 0.02
Sulfide	mg/L as H ₂ S	ZnS Precipitation, Iodometric Method (SM:4500 -S2- F)	< 0.50	≤ 1
Temperature	°C	Laboratory and Field Method (SM:2550 B)	33	≤ 45
Total Dissolved Solids	mg/L	Dried at 180 degree celsius (SM:2540C)	716	≤ 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
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)	0.63	≤ 5

Physical Appearance : 1. Sample : yellowish, lightly SS, nonsmelling
2. Container : Normal [PE 0.5 L [3 Bottle], PE 1.0 L, PE 1.8 L, G 0.25 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (2-003-ท-0031)
4. ## จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคมอุตสาหกรรม ดับบลิวเอชเอ ตะวันออก (มาบตาพุด)
5. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711186

Report No : 6711-1063

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67110577
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสีย ## Sampling Date : 06/11/2024
Sampling By : ETC Sampling Time : 9:55 AM
Sampling Method : Grab Received Date : 07/11/2024
Tested Date : 07/11/2024 - 16/11/2024 Reported Date : 18/11/2024

Parameter	Unit	Method	Result	Standard ⁿ
Chloride	mg/L as Cl ₂	Argentometric Method (SM:4500-Cl- B)	152	-
Fluoride	mg/L	Ion-Selective Electrode Method (SM:4500 -F- C)	0.85	≤ 5
Iron	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.44	≤ 10
Silver	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.05	≤ 1
Surfactants (LAS)	mg/L as MBAS	Anionic Surfactants as MBAS Method (SM:5540C)	< 0.40	≤ 30

Physical Appearance : 1. Sample : yellowish, lightly SS, nonsmelling
2. Container : Normal [PE 0.5 L [3 Bottle], PE 1.0 L, PE 1.8 L, G 0.25 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. Parameter Outside The Scope of The Registration of Department of Industrial Works
3. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
4. Sampling By Mr. Supharerk Phatklang
5. ## จุดปล่อยน้ำทิ้งลงท่อรวบรวมน้ำเสียของนิคมอุตสาหกรรม ดับบลิวเอชเอ ตะวันออก (มาบตาพุด)
6. Sampling at UTM 47 P 0730729 E 1404613 N



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Request No : W6711186

Report No : 6711-1063

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9-9/1 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : จุดปล่อยน้ำทิ้งลงท่อรวมน้ำเสีย ##
Sampling By : ETC
Sampling Method : Grab
Tested Date : 07/11/2024 – 16/11/2024
Sample No. : W 67110577
Sampling Date : 06/11/2024
Sampling Time : 9:55 AM
Received Date : 07/11/2024
Reported Date : 18/11/2024

Parameter	Unit	Method	Method Detection Limit	Result	Standard ¹⁾
Organochlorine Pesticides					
alpha-BHC	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.020	Not Detected	****
beta-BHC	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
gamma-BHC (Lindane)	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
delta-BHC	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Heptachlor	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Aldrin	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Heptachlor epoxide (isomer B)	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
trans-Chlordane	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Endosulfan I	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
cis-Chlordane	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Dieldrin	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
4,4'-DDE	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Endrin	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.050	Not Detected	****
Endosulfan II	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
4,4'-DDD	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Endrin aldehyde	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Endosulfan sulfate	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
4,4'-DDT	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Endrin Ketone	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****
Methoxychlor	µg/L	Liquid-Liquid Extraction / GC-MS (SM:6410B)	0.030	Not Detected	****

Physical Apperance : 1. Sample : yellowish, lightly SS, nonsmelling
2. Container : Normal [PE 0.5 L [6 Bottle], PE 1.0 L [2 Bottl], PE 1.8 L, G 1.0 L]

Remark : 1. /1 Notification of Industrial Estate Authority of Thailand 029 / 2567 (2024)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3.**** ต้องตรวจไม่พบตามวิธีการตรวจสอบที่กำหนด



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Request No. W6711562

Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : ริมรั้วด้านทิศเหนือโครงการ (บ่อเหนือหน้า (Up-gradient)) (MW01)
Sampling By : ETC
Sampling Method : Grab
Tested Date : 22/11/2024 – 09/12/2024
Sample No. : W 67111670
Sampling Date : 21/11/2024
Sampling Time : 9:35 AM
Received Date : 22/11/2024
Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Arsenic	mg/L	Continuous Hydride Generation/AAS Method (SM:3114B)	< 0.0020	≤ 0.1
Beryllium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.01	≤ 0.01
Cadmium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.003	≤ 2.0
Chromium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 6.0
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤ 6.0
Lead	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.010	≤ 4.0
Manganese	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.20	≤ 33
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method (SM:3112B)	< 0.0010	≤ 0.7

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-ก-0031)
4. Sampling At UTM 47 P 731078 E 1405208 N



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ACCREDITED LABORATORY
ISO/IEC 17025Request No. W6711562
Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

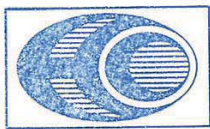
Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : ริมรั้วด้านทิศเหนือโครงการ (บ่อเหนือหน้า (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Nickel	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5.0
Selenium	mg/L	Digestion, Hydride Generation/AAS Method (SM:3030F, 3114B&C)	< 0.0020	≤ 12
Vanadium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	≤ 17

Physical Appearance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
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-ก-0031)
4. Sampling At UTM 47 P 731078 E 1405208 N



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ACCREDITED LABORATORY
ISO/IEC 17025Request No. W6711562
Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : ริมรั้วด้านทิศเหนือโครงการ (บ่อเหนือหน้า (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	3.64	≤ 10

Physical Appearance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
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-ก-0031)
4. Sampling At UTM 47 P 731078 E 1405208 N



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Request No. W6711562
Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : ริมรั้วด้านทิศเหนือโครงการ (บ่อเหนือหน้า (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
pH (on site)		Electrometric Method	7.1	6.5-9.2 ***

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. *** ค่า pH จากจุดเก็บตัวอย่างบ่อกับจุดเก็บตัวอย่างบ่อเหนือหน้าที่แตกต่างกันเล็กน้อยจะต้องไม่เกินหนึ่งระดับ และ
ไม่อยู่นอกช่วงค่าเกณฑ์ของมาตรฐาน คุณภาพน้ำบาดาลที่ใช้บริโภค
3. Sampling By Mr. Supharerk Phatklang (J-003-ศ-0031)
4. Sampling At UTM 47 P 731078 E 1405208 N



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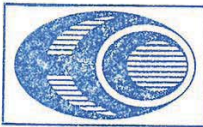
Request No. W6711562
Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : ริมรั้วด้านทิศเหนือโครงการ (บ่อเหนือหน้า (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Boron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	-
Cobalt	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-
Copper	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	-
Iron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	6.50	-
Titanium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. Parameter Outside The Scope of The Registration of Department of Industrial Works
3. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
4. Sampling By Mr. Supharerk Phatklang
5. Sampling At UTM 47 P 731078 E 1405208 N



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Request No. W6711562

Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : รีมวี่ด้านทิศเหนือโครงการ (บ่อเหนือน้ำ (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Results	Standard ¹⁾
Volatile Organic Compounds				
- Benzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.2
- Carbon tetrachloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.4
- 1,2-Dichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.5
- 1,1-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.1
- cis-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- trans-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- Ethylbenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- Styrene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Tetrachloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.9
- Toluene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- 1,2,4 - Trichlorobenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 24
- 1,1,1-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.2
- 1,1,2-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.8
- Trichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 4.4
- Vinyl Chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.03
- p,m-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- o-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Total Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Methylene chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00200	≤ 6.0

Physical Appearance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater. APHA. AWWA. WEF. 24th Edition. 2023.
3. Sampling By Mr. Supharker Phatklang (7-003-n-0031)



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Request No. W6711562

Report No. 6712-0388

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111670
Sample Name : รีมวี่ด้านทิศเหนือโครงการ (บ่อเหนือน้ำ (Up-gradient)) (MW01) Sampling Date : 21/11/2024
Sampling By : SECOT Co.,Ltd. *** Sampling Time : 9:35 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Total Petroleum Hydrocarbons ***				
- TPH (C ₈ -C ₁₆)	mg/L	3510 C /8015 D	ND	≤ 1.7
- n-Nonane				
- n-Decane				
- n-Dodecane				
- n-Tetradecane				
- n-Hexadecane				

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. *** Sampling and Tested by SECOT Co.,Ltd. (7-239)
3. ND = non-detectable [TPH (C₈-C₁₆) = < 0.025 mg/L]
4. Sampling At UTM 47 P 731078 E 1405208 N



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Request No. W6711562

Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมรั้วด้านทิศใต้โครงการ (บ่อพักน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Arsenic	mg/L	Continuous Hydride Generation/AAS Method (SM:3114B)	< 0.0020	≤ 0.1
Beryllium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.01	≤ 0.01
Cadmium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.003	≤ 2.0
Chromium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 6.0
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500-Cr B)	< 0.050	≤ 6.0
Lead	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.010	≤ 4.0
Manganese	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.23	≤ 33
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method (SM:3112B)	< 0.0010	≤ 0.7

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], PE 2.0 L, G 2.5 L]

Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-ท-0031)
4. Sampling At UTM 47 P 730370 E 1404509 N



REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY

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Request No. W6711562

Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมรั้วด้านทิศใต้โครงการ (บ่อพักน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Nickel	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	≤ 5.0
Selenium	mg/L	Digestion, Hydride Generation/AAS Method (SM:3030F, 3114B&C)	< 0.0020	≤ 12
Vanadium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	≤ 17

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-ท-0031)
4. Sampling At UTM 47 P 730370 E 1404509 N



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ISO/IEC 17025

Request No. W6711562

Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมร้วด้านทิศใต้โครงการ (บ่อท้ายน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Zinc	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	8.15	≤ 10

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-P-0031)
4. Sampling At UTM 47 P 730370 E 1404509 N

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TEST REPORT

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Sample Name : ริมร้วด้านทิศใต้โครงการ (บ่อท้ายน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
pH (on site)		Electrometric Method	7.0	6.5-9.2 ***

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. *** ค่า pH จากจุดเก็บตัวอย่างบ่อท้ายน้ำกับจุดเก็บตัวอย่างบ่อน้ำที่เปลี่ยนแปลงจะต้องไม่เกินหนึ่งระดับ และ
ไม่อยู่นอกช่วงค่าเกณฑ์อนุโลมสูงสุดของมาตรฐาน คุณภาพน้ำบาดาลที่ใช่วิ โภค
3. Sampling By Mr. Supharerk Phatklang (7-003-P-0031)
4. Sampling At UTM 47 P 730370 E 1404509 N



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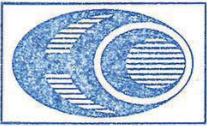
Request No. W6711562
Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมรั้วด้านทิศใต้โครงการ (บ่อพักน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Boron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.12	-
Cobalt	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-
Copper	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	-
Iron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	17.3	-
Titanium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. Parameter Outside The Scope of The Registration of Department of Industrial Works
3. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
4. Sampling By Mr. Supharek Phatklang
5. Sampling At UTM 47 P 730370 E 1404509 N



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Request No. W6711562
Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมรั้วด้านทิศใต้โครงการ (บ่อพักน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Results	Standard ¹⁾
Volatile Organic Compounds				
- Benzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.2
- Carbon tetrachloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.4
- 1,2-Dichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.5
- 1,1-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.1
- cis-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- trans-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- Ethylbenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- Styrene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Tetrachloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.9
- Toluene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- 1,2,4 - Trichlorobenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 24
- 1,1,1-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.2
- 1,1,2-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.8
- Trichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 4.4
- Vinyl Chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.03
- p,m-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- o-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Total Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Methylene chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00200	≤ 6.0

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Waste



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Request No. W6711562

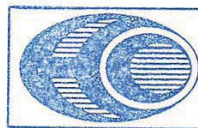
Report No. 6712-0389

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111671
Sample Name : ริมวัดด้านทิศใต้โครงการ (บ่อพักน้ำ (Down-gradient)) (MW05) Sampling Date : 21/11/2024
Sampling By : SECOT Co.,Ltd. *** Sampling Time : 10:40 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹
Total Petroleum Hydrocarbons ***				
- TPH (C ₈ -C ₁₆)	mg/L	3510 C /8015 D	ND	≤ 1.7
- n-Nonane				
- n-Decane				
- n-Dodecane				
- n-Tetradecane				
- n-Hexadecane				

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2.*** Sampling and Tested by SECOT Co.,Ltd. (7-239)
3. ND = non-detectable [TPH (C₈-C₁₆) = < 0.025 mg/L]
4. Sampling At UTM 47 P 730370 E 1404509 N



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Request No. W6711562

Report No. 6712-0390

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมวัดด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method ¹	Result	Standard ¹
Arsenic	mg/L	Continuous Hydride Generation/AAS Method (SM:3114B)	< 0.0020	≤ 0.1
Beryllium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.01	≤ 0.01
Cadmium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.003	≤ 2.0
Chromium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 6.0
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500-Cr B)	< 0.050	≤ 6.0
Lead	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.010	≤ 4.0
Manganese	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.25	≤ 33
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method (SM:3112B)	< 0.0010	≤ 0.7

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-ก-0031)
4. Sampling At UTM 47 P 730789 E 1404730 N



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Request No. W6711562
Report No. 6712-0390

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Nickel	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5.0
Selenium	mg/L	Digestion, Hydride Generation/AAS Method (SM:3030F, 3114B&C)	< 0.0020	≤ 12
Vanadium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	≤ 17

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
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)
4. Sampling At UTM 47 P 730789 E 1404730 N



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TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
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Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	14.9	≤ 10

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
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)
4. Sampling At UTM 47 P 730789 E 1404730 N



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TEST REPORT

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Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
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Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
pH (on site)		Electrometric Method	7.0	6.5-9.2 ***

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. *** ค่า pH จากจุดเก็บตัวอย่างบ่อที่ขนำกับจุดเก็บตัวอย่างบ่อน้ำที่เปลี่ยนแปลงจะต้องไม่เกินหนึ่งระดับ และ
ไม่อยู่นอกช่วงค่าเกณฑ์อนุโลมสูงสุดของมาตรฐาน คุณภาพน้ำบาดาลที่ใช้น้ำวิ โภค
3. Sampling By Mr. Supharerk Phatklang (ว-003-ค-0031)
4. Sampling At UTM 47 P 730789 E 1404730 N



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TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 – 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Boron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.30	-
Cobalt	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-
Copper	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	-
Iron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.34	-
Titanium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-

Physical Apperance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1./1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. Parameter Outside The Scope of The Registration of Department of Industrial Works
3. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
4. Sampling By Mr. Supharerk Phatklang
5. Sampling At UTM 47 P 730789 E 1404730 N



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Report No. 6712-0390

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Results	Standard ¹⁾
Volatile Organic Compounds				
- Benzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.2
- Carbon tetrachloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.4
- 1,2-Dichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.5
- 1,1-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.1
- cis-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- trans-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- Ethylbenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- Styrene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Tetrachloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.9
- Toluene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- 1,2,4-Trichlorobenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 24
- 1,1,1-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.2
- 1,1,2-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.8
- Trichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 4.4
- Vinyl Chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.03
- p,m-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- o-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Total Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Methylene chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00200	≤ 6.0

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2002

Perk Phatklang (T-003-R-0031)

730789 E 1404730 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. W6711562

Report No. 6712-0390

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150

Sampling Source : EOEG Plant Sample No. : W 67111672
Sample Name : ริมรั้วด้านทิศตะวันตกโครงการ (บ่อกลางน้ำ (Middle-gradient)) (MW06) Sampling Date : 21/11/2024
Sampling By : SECOT Co.,Ltd. *** Sampling Time : 10:20 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
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Total Petroleum Hydrocarbons ***

- TPH (C ₉ -C ₁₆)	mg/L	3510 C /8015 D	ND	≤ 1.7
- n-Nonane				
- n-Decane				
- n-Dodecane				
- n-Tetradecane				
- n-Hexadecane				

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2.*** Sampling and Tested by SECOT Co.,Ltd. (T-239)
3. ND = non-detectable [TPH (C₉-C₁₆) = < 0.025 mg/L]
4. Sampling At UTM 47 P 730789 E 1404730 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY
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Request No. W6711562

Report No. 6712-0391

TEST REPORT

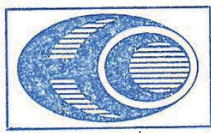
Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : บริเวณแนวท่อใต้ดิน (MW07)
Sampling By : ETC
Sampling Method : Grab
Tested Date : 22/11/2024 - 09/12/2024
Sample No. : W 67111673
Sampling Date : 21/11/2024
Sampling Time : 10:10 AM
Received Date : 22/11/2024
Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Arsenic	mg/L	Continuous Hydride Generation/AAS Method (SM:3114B)	< 0.0020	≤ 0.1
Beryllium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.01	≤ 0.01
Cadmium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.003	≤ 2.0
Chromium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 6.0
Hexavalent Chromium	mg/L as Cr ⁶⁺	Filtration, Colorimetric Method (SM:3500 -Cr B)	< 0.050	≤ 6.0
Lead	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.010	≤ 4.0
Manganese	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.05	≤ 33
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method (SM:3112B)	< 0.0010	≤ 0.7

Physical Appearance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharek Phatklang (1-003-ก-0031)
4. Sampling At UTM 47 P 730841 E 1404704 N



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Request No. W6711562

Report No. 6712-0391

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant
Sample Name : บริเวณแนวท่อใต้ดิน (MW07)
Sampling By : ETC
Sampling Method : Grab
Tested Date : 22/11/2024 - 09/12/2024
Sample No. : W 67111673
Sampling Date : 21/11/2024
Sampling Time : 10:10 AM
Received Date : 22/11/2024
Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Nickel	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	≤ 5.0
Selenium	mg/L	Digestion, Hydride Generation/AAS Method (SM:3030F, 3114B&C)	< 0.0020	≤ 12
Vanadium	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	≤ 17

Physical Appearance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharek Phatklang (1-003-ก-0031)
4. Sampling At UTM 47 P 730841 E 1404704 N



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683 หมู่ 11 ต.สุขาภิบาล 8 ต.หนองขาม อ.ศรีราชา จ.ชลบุรี 20230
โทร. 0-3848-1197, 0-3876-3031-2 แฟกซ์ : 0-3848-2095
เว็บไซต์ : http://www.etc1992.com อีเมล : info@etc1992.com



EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11 Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230
Tel. 0-3848-1197, 0-3876-3031-2 Fax : 0-3848-2095
Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. W6711562

Report No. 6712-0391

TEST REPORT

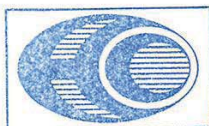
Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111673
Sample Name : บริเวณแนวท่อใต้ดิน (MW07) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:10 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹
Zinc	mg/L	Digestion, Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.14	≤ 10

Physical Apperance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
3. Sampling By Mr. Supharerk Phatklang (7-003-ท-0031)
4. Sampling At UTM 47 P 730841 E 1404704 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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โทร. 0-3848-1197, 0-3876-3031-2 แฟกซ์ : 0-3848-2095
เว็บไซต์ : http://www.etc1992.com อีเมล : info@etc1992.com



EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11 Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230
Tel. 0-3848-1197, 0-3876-3031-2 Fax : 0-3848-2095
Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. W6711562

Report No. 6712-0391

TEST REPORT

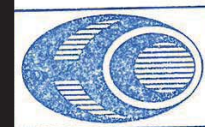
Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111673
Sample Name : บริเวณแนวท่อใต้ดิน (MW07) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:10 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹
pH (on site)		Electrometric Method	7.0	6.5-9.2 ***

Physical Apperance : 1. Sample : lightly SS

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

Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2. *** ค่า pH จากจุดเก็บตัวอย่างบ่อน้ำกับจุดเก็บตัวอย่างบ่อน้ำที่เปลี่ยนแปลงจะต้องไม่เกินหนึ่งระดับ และ
ไม่อยู่นอกช่วงค่าเกณฑ์อนุ โคมสูงสุดของมาตรฐาน คุณภาพน้ำบาดาลที่ใช้นิโรค
3. Sampling By Mr. Supharerk Phatklang (7-003-ท-0031)
4. Sampling At UTM 47 P 730841 E 1404704 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. W6711562
Report No. 6712-0391

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111673
Sample Name : บริเวณแนวท่อใต้ดิน (MW07) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:10 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Boron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.03	-
Cobalt	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-
Copper	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.03	-
Iron	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	0.34	-
Titanium	mg/L	Digestion,Inductively Coupled Plasma Method (SM:3030F, 3120B)	< 0.02	-

Physical Apperance : 1. Sample : lightly SS

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

- Remark :
1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
 2. Parameter Outside The Scope of The Registration of Department of Industrial Works
 3. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.
 4. Sampling By Mr. Supharerk Phatklang
 5. Sampling At UTM 47 P 730841 E 1404704 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. W6711562
Report No. 6712-0391

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111673
Sample Name : บริเวณแนวท่อใต้ดิน (MW07) Sampling Date : 21/11/2024
Sampling By : ETC Sampling Time : 10:10 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Results	Standard ¹⁾
Volatile Organic Compounds				
- Benzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.2
- Carbon tetrachloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.4
- 1,2-Dichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.5
- 1,1-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.1
- cis-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- trans-1,2-Dichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- Ethylbenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 2.0
- Styrene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Tetrachloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.9
- Toluene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 5.0
- 1,2,4 - Trichlorobenzene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 24
- 1,1,1-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.2
- 1,1,2-Trichloroethane	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 0.8
- Trichloroethylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00050	≤ 4.4
- Vinyl Chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00025	≤ 0.03
- p,m-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- o-Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Total Xylene	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00100	≤ 24
- Methylene chloride	mg/L	Purge-and-Trap Capillary-Column/GC-MS (SM:6200B)	< 0.00200	≤ 6.0

Physical Apperance : 1. Sample : lightly SS

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

- Remark :
1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
 2. SM = Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th Edition, 2023.

Supharerk Phatklang (2-003-ท-0031)

7 P 730841 E 1404704 N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. W6711562

Report No. 6712-0391

TEST REPORT

Customer : PTT Global Chemical Public Company Limited Branch 16
Address : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
Sampling Source : EOEG Plant Sample No. : W 67111673
Sample Name : บริเวณแนวท่อไคติน (MW07) Sampling Date : 21/11/2024
Sampling By : SECOT Co.,Ltd. *** Sampling Time : 10:10 AM
Sampling Method : Grab Received Date : 22/11/2024
Tested Date : 22/11/2024 - 09/12/2024 Reported Date : 12/12/2024

Parameter	Unit	Method	Result	Standard ¹⁾
Total Petroleum Hydrocarbons ***				
- TPH (C ₈ -C ₁₆)	mg/L	3510 C /8015 D	ND	≤ 1.7
- n-Nonane				
- n-Decane				
- n-Dodecane				
- n-Tetradecane				
- n-Hexadecane				

Physical Appearance : 1. Sample : lightly SS
2. Container : Normal [PE 0.5 L [3 Bottle], G 1.0 L]
Remark : 1. /1 Soil and Groundwater Contamination Standard, Notification of the Ministry of Industry , B.E. 2559 (2016)
2.*** Sampling and Tested by SECOT Co.,Ltd. (ว-239)
3. ND = non-detectable [TPH (C₈-C₁₆) = < 0.025 mg/L]
4. Sampling At UTM 47 P 730841 E 1404704 N



REPORTED TEST REFER TO SUBMITTED SAMPLES ONLY

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Request No. LA67-R0843

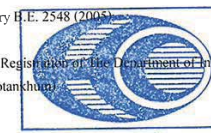
Report No. R6708-4365

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max}, L₉₀ & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29749
MEASURING DATE : 02-03/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	02-03/08/2024 (L _{eq})	02-03/08/2024 (L _{max})	02-03/08/2024 (L ₉₀)	UNIT
11:00 - 12:00 ³⁾	58.1	76.4	54.5	dB(A)
12:00 - 13:00	56.3	66.7	54.0	dB(A)
13:00 - 14:00	57.4	72.9	54.6	dB(A)
14:00 - 15:00	57.0	65.0	54.9	dB(A)
15:00 - 16:00	57.0	66.0	54.5	dB(A)
16:00 - 17:00	58.5	74.4	54.8	dB(A)
17:00 - 18:00	58.5	75.5	55.0	dB(A)
18:00 - 19:00	58.8	77.0	54.9	dB(A)
19:00 - 20:00	58.9	81.6	54.6	dB(A)
20:00 - 21:00	55.8	67.2	54.0	dB(A)
21:00 - 22:00	55.5	69.8	54.2	dB(A)
22:00 - 23:00	55.4	62.7	54.4	dB(A)
23:00 - 00:00	54.7	64.9	53.8	dB(A)
00:00 - 01:00	54.8	64.7	54.0	dB(A)
01:00 - 02:00	54.7	61.7	54.1	dB(A)
02:00 - 03:00	56.0	65.6	55.1	dB(A)
03:00 - 04:00	55.1	65.5	54.4	dB(A)
04:00 - 05:00	58.3	69.1	56.1	dB(A)
05:00 - 06:00	56.5	67.5	55.4	dB(A)
06:00 - 07:00	60.0	76.6	55.9	dB(A)
07:00 - 08:00	59.9	74.5	56.1	dB(A)
08:00 - 09:00	58.1	71.5	55.1	dB(A)
09:00 - 10:00	57.3	71.9	54.7	dB(A)
10:00 - 11:00	56.4	70.5	54.3	dB(A)
L _{eq} 24 hr.	57.3	-	-	dB(A)
L _{dn}	63.2	-	-	dB(A)
Maximum	-	81.6	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Water Pollution Control
(Measurement By Mr. Tummarut Photanashum)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Appr

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Request No. LA67-R0843

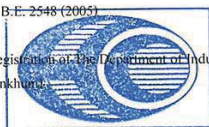
Report No. R6708-4366

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29750
MEASURING DATE : 03-04/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	03-04/08/2024 (L_{eq})	03-04/08/2024 (L_{max})	03-04/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	57.3	73.5	54.2	dB(A)
12:00 - 13:00	57.2	78.2	54.1	dB(A)
13:00 - 14:00	56.8	75.4	54.2	dB(A)
14:00 - 15:00	56.8	70.1	54.7	dB(A)
15:00 - 16:00	57.2	75.2	54.7	dB(A)
16:00 - 17:00	58.4	71.9	55.1	dB(A)
17:00 - 18:00	57.3	74.1	54.6	dB(A)
18:00 - 19:00	57.9	68.4	54.7	dB(A)
19:00 - 20:00	57.2	75.6	54.6	dB(A)
20:00 - 21:00	55.8	64.3	54.6	dB(A)
21:00 - 22:00	55.2	67.3	54.4	dB(A)
22:00 - 23:00	55.0	69.2	54.2	dB(A)
23:00 - 00:00	56.3	65.2	55.0	dB(A)
00:00 - 01:00	58.4	69.2	56.6	dB(A)
01:00 - 02:00	54.4	62.2	53.7	dB(A)
02:00 - 03:00	53.6	59.6	53.1	dB(A)
03:00 - 04:00	53.6	63.9	53.1	dB(A)
04:00 - 05:00	54.0	63.5	53.0	dB(A)
05:00 - 06:00	54.1	64.7	53.1	dB(A)
06:00 - 07:00	58.1	73.4	54.1	dB(A)
07:00 - 08:00	58.0	71.1	54.0	dB(A)
08:00 - 09:00	57.3	78.5	53.6	dB(A)
09:00 - 10:00	56.8	74.2	54.2	dB(A)
10:00 - 11:00	56.0	67.1	54.2	dB(A)
L_{eq} 24 hr.	56.6	-	-	dB(A)
L_{dn}	62.3	-	-	dB(A)
Maximum	-	78.5	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photakham)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0843

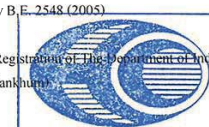
Report No. R6708-4367

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29751
MEASURING DATE : 04-05/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	04-05/08/2024 (L_{eq})	04-05/08/2024 (L_{max})	04-05/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	56.3	72.3	53.5	dB(A)
12:00 - 13:00	55.5	70.2	53.7	dB(A)
13:00 - 14:00	56.0	65.9	54.2	dB(A)
14:00 - 15:00	56.6	74.0	54.4	dB(A)
15:00 - 16:00	56.8	74.8	54.4	dB(A)
16:00 - 17:00	57.5	73.5	54.5	dB(A)
17:00 - 18:00	58.4	84.2	54.7	dB(A)
18:00 - 19:00	57.3	71.8	54.8	dB(A)
19:00 - 20:00	57.2	74.7	54.9	dB(A)
20:00 - 21:00	55.6	71.2	54.5	dB(A)
21:00 - 22:00	55.5	66.3	54.7	dB(A)
22:00 - 23:00	55.2	69.3	54.4	dB(A)
23:00 - 00:00	54.7	66.9	53.8	dB(A)
00:00 - 01:00	54.5	61.6	53.8	dB(A)
01:00 - 02:00	52.8	62.2	51.9	dB(A)
02:00 - 03:00	53.5	63.9	52.5	dB(A)
03:00 - 04:00	53.0	61.9	52.3	dB(A)
04:00 - 05:00	53.5	64.4	52.5	dB(A)
05:00 - 06:00	53.9	60.9	52.7	dB(A)
06:00 - 07:00	59.4	77.4	55.0	dB(A)
07:00 - 08:00	60.7	79.9	55.3	dB(A)
08:00 - 09:00	58.0	68.8	53.9	dB(A)
09:00 - 10:00	57.0	69.4	53.7	dB(A)
10:00 - 11:00	57.4	70.4	53.8	dB(A)
L_{eq} 24 hr.	56.6	-	-	dB(A)
L_{dn}	61.8	-	-	dB(A)
Maximum	-	84.2	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photakham)

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Request No. LA67-R0843

Report No. R6708-4368

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29752
MEASURING DATE : 05-06/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	05-06/08/2024 (L_{eq})	05-06/08/2024 (L_{max})	05-06/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	57.9	70.2	54.6	dB(A)
12:00 - 13:00	56.9	69.0	54.4	dB(A)
13:00 - 14:00	58.3	71.0	55.2	dB(A)
14:00 - 15:00	57.3	71.3	54.6	dB(A)
15:00 - 16:00	57.0	75.1	54.3	dB(A)
16:00 - 17:00	58.8	75.8	54.8	dB(A)
17:00 - 18:00	58.9	72.1	55.3	dB(A)
18:00 - 19:00	58.7	73.2	55.2	dB(A)
19:00 - 20:00	58.0	76.1	55.0	dB(A)
20:00 - 21:00	57.2	76.2	54.8	dB(A)
21:00 - 22:00	56.0	65.3	54.7	dB(A)
22:00 - 23:00	55.9	66.8	54.8	dB(A)
23:00 - 00:00	56.1	73.5	54.8	dB(A)
00:00 - 01:00	54.8	62.1	54.3	dB(A)
01:00 - 02:00	54.1	61.3	53.6	dB(A)
02:00 - 03:00	53.8	60.1	53.2	dB(A)
03:00 - 04:00	53.5	62.3	53.0	dB(A)
04:00 - 05:00	54.3	65.5	53.5	dB(A)
05:00 - 06:00	54.3	64.6	53.1	dB(A)
06:00 - 07:00	59.3	74.6	54.8	dB(A)
07:00 - 08:00	60.7	72.1	56.0	dB(A)
08:00 - 09:00	58.7	71.3	54.6	dB(A)
09:00 - 10:00	57.6	70.7	54.4	dB(A)
10:00 - 11:00	56.7	69.8	53.6	dB(A)
L_{eq} 24 hr.	57.3	-	-	dB(A)
L_{dn}	62.4	-	-	dB(A)
Maximum	-	76.2	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankhun)

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Request No. LA67-R0843

Report No. R6708-4369

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29753
MEASURING DATE : 06-07/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	06-07/08/2024 (L_{eq})	06-07/08/2024 (L_{max})	06-07/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	57.5	75.9	53.1	dB(A)
12:00 - 13:00	56.1	68.1	54.0	dB(A)
13:00 - 14:00	57.4	73.9	54.8	dB(A)
14:00 - 15:00	57.3	71.7	55.0	dB(A)
15:00 - 16:00	57.2	75.5	54.9	dB(A)
16:00 - 17:00	59.2	76.7	55.2	dB(A)
17:00 - 18:00	59.2	82.3	55.1	dB(A)
18:00 - 19:00	59.2	76.3	55.0	dB(A)
19:00 - 20:00	57.8	74.4	54.8	dB(A)
20:00 - 21:00	56.4	68.4	54.6	dB(A)
21:00 - 22:00	55.8	67.9	54.5	dB(A)
22:00 - 23:00	55.1	64.8	54.2	dB(A)
23:00 - 00:00	55.4	70.1	54.2	dB(A)
00:00 - 01:00	54.4	63.0	53.8	dB(A)
01:00 - 02:00	53.4	63.7	52.8	dB(A)
02:00 - 03:00	52.1	60.2	51.5	dB(A)
03:00 - 04:00	52.7	62.9	52.1	dB(A)
04:00 - 05:00	53.3	64.4	52.6	dB(A)
05:00 - 06:00	54.0	64.2	52.8	dB(A)
06:00 - 07:00	59.1	75.8	54.7	dB(A)
07:00 - 08:00	60.7	75.4	56.2	dB(A)
08:00 - 09:00	57.9	70.7	54.4	dB(A)
09:00 - 10:00	57.4	69.7	54.2	dB(A)
10:00 - 11:00	56.6	66.3	54.0	dB(A)
L_{eq} 24 hr.	57.0	-	-	dB(A)
L_{dn}	61.9	-	-	dB(A)
Maximum	-	82.3	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankhun)

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Request No. LA67-R0843

Report No. R6708-4370

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29754
MEASURING DATE : 07-08/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	07-08/08/2024 (L_{eq})	07-08/08/2024 (L_{max})	07-08/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	58.2	73.1	54.4	dB(A)
12:00 - 13:00	56.6	67.8	54.3	dB(A)
13:00 - 14:00	58.0	75.7	55.1	dB(A)
14:00 - 15:00	56.6	68.4	54.2	dB(A)
15:00 - 16:00	56.2	67.2	53.8	dB(A)
16:00 - 17:00	58.6	75.7	54.4	dB(A)
17:00 - 18:00	58.6	76.6	54.6	dB(A)
18:00 - 19:00	57.7	72.7	54.4	dB(A)
19:00 - 20:00	56.9	71.5	53.9	dB(A)
20:00 - 21:00	56.6	76.5	53.8	dB(A)
21:00 - 22:00	55.0	63.6	53.8	dB(A)
22:00 - 23:00	56.2	76.7	53.9	dB(A)
23:00 - 00:00	54.6	66.3	53.9	dB(A)
00:00 - 01:00	54.7	64.6	54.0	dB(A)
01:00 - 02:00	54.5	65.5	53.9	dB(A)
02:00 - 03:00	54.6	60.4	54.0	dB(A)
03:00 - 04:00	54.7	64.0	54.2	dB(A)
04:00 - 05:00	54.9	62.5	54.3	dB(A)
05:00 - 06:00	54.9	67.4	53.8	dB(A)
06:00 - 07:00	58.8	78.9	54.9	dB(A)
07:00 - 08:00	60.5	74.7	55.4	dB(A)
08:00 - 09:00	58.4	75.7	54.1	dB(A)
09:00 - 10:00	56.9	70.3	53.9	dB(A)
10:00 - 11:00	56.9	70.0	53.8	dB(A)
L_{eq} 24 hr.	57.0	-	-	dB(A)
L_{dn}	62.3	-	-	dB(A)
Maximum	-	78.9	-	dB(A)
Standard	70 ^{1/,2}	115 ^{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 Hygiene (Measurement By Mr. Tummarut Photakham)



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Report No. R6708-4371

TEST REPORT

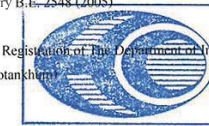
CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศเหนือ
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322751 : Class 2

SAMPLE NO. : 29755
MEASURING DATE : 08-09/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	08-09/08/2024 (L_{eq})	08-09/08/2024 (L_{max})	08-09/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	57.5	76.8	54.0	dB(A)
12:00 - 13:00	55.9	69.0	53.7	dB(A)
13:00 - 14:00	56.9	68.2	54.0	dB(A)
14:00 - 15:00	56.4	70.4	54.0	dB(A)
15:00 - 16:00	56.8	73.8	53.6	dB(A)
16:00 - 17:00	58.2	74.8	54.3	dB(A)
17:00 - 18:00	58.6	77.0	54.8	dB(A)
18:00 - 19:00	58.2	70.9	54.9	dB(A)
19:00 - 20:00	57.3	76.4	54.4	dB(A)
20:00 - 21:00	56.5	77.4	54.2	dB(A)
21:00 - 22:00	55.4	67.8	54.1	dB(A)
22:00 - 23:00	55.0	68.0	53.7	dB(A)
23:00 - 00:00	55.0	68.6	53.8	dB(A)
00:00 - 01:00	54.9	66.0	54.0	dB(A)
01:00 - 02:00	54.2	65.8	53.7	dB(A)
02:00 - 03:00	54.0	61.5	53.5	dB(A)
03:00 - 04:00	54.6	66.0	54.0	dB(A)
04:00 - 05:00	54.7	62.3	54.0	dB(A)
05:00 - 06:00	55.2	64.2	54.1	dB(A)
06:00 - 07:00	58.7	72.6	55.6	dB(A)
07:00 - 08:00	60.7	77.9	55.3	dB(A)
08:00 - 09:00	58.4	74.7	53.7	dB(A)
09:00 - 10:00	57.2	71.2	53.5	dB(A)
10:00 - 11:00	57.2	69.1	53.3	dB(A)
L_{eq} 24 hr.	56.9	-	-	dB(A)
L_{dn}	62.2	-	-	dB(A)
Maximum	-	77.9	-	dB(A)
Standard	70 ^{1/,2}	115 ^{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 Hygiene (Measurement By Mr. Tummarut Photakham)



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21/08/2024

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Request No. LA67-R0843

Report No. R6708-4372

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29756
MEASURING DATE : 02-03/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	02-03/08/2024 (L_{eq})	02-03/08/2024 (L_{max})	02-03/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	64.4	84.4	59.8	dB(A)
12:00 - 13:00	63.1	83.0	58.8	dB(A)
13:00 - 14:00	63.6	81.5	60.0	dB(A)
14:00 - 15:00	63.2	81.9	60.0	dB(A)
15:00 - 16:00	64.9	84.0	60.5	dB(A)
16:00 - 17:00	64.3	84.0	60.4	dB(A)
17:00 - 18:00	64.5	80.6	60.3	dB(A)
18:00 - 19:00	63.9	84.8	59.9	dB(A)
19:00 - 20:00	63.3	80.7	59.1	dB(A)
20:00 - 21:00	62.3	84.2	58.1	dB(A)
21:00 - 22:00	61.9	85.5	58.5	dB(A)
22:00 - 23:00	61.1	79.7	58.7	dB(A)
23:00 - 00:00	60.5	72.9	59.1	dB(A)
00:00 - 01:00	61.2	80.4	59.2	dB(A)
01:00 - 02:00	60.2	76.2	58.7	dB(A)
02:00 - 03:00	60.6	69.9	59.2	dB(A)
03:00 - 04:00	63.9	82.5	59.1	dB(A)
04:00 - 05:00	62.6	79.0	60.8	dB(A)
05:00 - 06:00	61.9	77.1	60.2	dB(A)
06:00 - 07:00	62.8	77.8	59.2	dB(A)
07:00 - 08:00	64.7	86.5	59.7	dB(A)
08:00 - 09:00	64.2	78.8	60.0	dB(A)
09:00 - 10:00	65.4	85.5	59.6	dB(A)
10:00 - 11:00	64.6	84.8	59.9	dB(A)
L_{eq} 24 hr.	63.3	-	-	dB(A)
L_{dn}	68.6	-	-	dB(A)
Maximum	-	86.5	-	dB(A)
Standard	70 ^{1,2}	115 ^{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
(Measurement By Mr. Tummarut Photankhuan)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0843

Report No. R6708-4373

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29757
MEASURING DATE : 03-04/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	03-04/08/2024 (L_{eq})	03-04/08/2024 (L_{max})	03-04/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	65.3	84.4	60.3	dB(A)
12:00 - 13:00	65.0	80.0	60.1	dB(A)
13:00 - 14:00	65.1	81.9	60.5	dB(A)
14:00 - 15:00	63.7	81.9	60.7	dB(A)
15:00 - 16:00	64.6	83.4	61.2	dB(A)
16:00 - 17:00	64.4	83.1	60.3	dB(A)
17:00 - 18:00	62.3	85.3	59.2	dB(A)
18:00 - 19:00	62.3	84.3	58.8	dB(A)
19:00 - 20:00	60.9	77.5	58.6	dB(A)
20:00 - 21:00	60.6	72.6	59.1	dB(A)
21:00 - 22:00	60.4	72.9	59.0	dB(A)
22:00 - 23:00	61.3	86.6	58.9	dB(A)
23:00 - 00:00	62.9	73.1	60.5	dB(A)
00:00 - 01:00	63.6	72.7	62.1	dB(A)
01:00 - 02:00	61.4	69.9	60.6	dB(A)
02:00 - 03:00	61.9	77.6	59.2	dB(A)
03:00 - 04:00	59.6	71.8	58.5	dB(A)
04:00 - 05:00	58.9	67.0	58.0	dB(A)
05:00 - 06:00	60.0	78.0	58.1	dB(A)
06:00 - 07:00	61.3	76.5	58.5	dB(A)
07:00 - 08:00	61.4	72.9	58.3	dB(A)
08:00 - 09:00	60.5	72.5	58.1	dB(A)
09:00 - 10:00	61.7	80.1	58.5	dB(A)
10:00 - 11:00	61.4	77.1	58.6	dB(A)
L_{eq} 24 hr.	62.5	-	-	dB(A)
L_{dn}	68.1	-	-	dB(A)
Maximum	-	86.6	-	dB(A)
Standard	70 ^{1,2}	115 ^{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
(Measurement By Mr. Tummarut Photankhuan)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0843

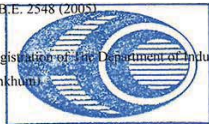
Report No. R6708-4374

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29758
MEASURING DATE : 04-05/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	04-05/08/2024 (L_{eq})	04-05/08/2024 (L_{max})	04-05/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	62.1	80.5	59.6	dB(A)
12:00 - 13:00	61.0	74.0	58.7	dB(A)
13:00 - 14:00	61.6	80.7	59.0	dB(A)
14:00 - 15:00	62.7	78.7	59.1	dB(A)
15:00 - 16:00	61.3	78.5	59.1	dB(A)
16:00 - 17:00	63.1	87.2	59.0	dB(A)
17:00 - 18:00	60.6	71.6	59.0	dB(A)
18:00 - 19:00	61.1	80.0	59.2	dB(A)
19:00 - 20:00	62.4	88.3	59.2	dB(A)
20:00 - 21:00	60.5	74.5	59.0	dB(A)
21:00 - 22:00	61.0	77.4	59.2	dB(A)
22:00 - 23:00	60.4	74.7	59.1	dB(A)
23:00 - 00:00	59.8	66.5	59.0	dB(A)
00:00 - 01:00	60.5	67.4	59.5	dB(A)
01:00 - 02:00	60.3	77.4	58.8	dB(A)
02:00 - 03:00	59.9	65.3	59.1	dB(A)
03:00 - 04:00	59.9	78.3	58.1	dB(A)
04:00 - 05:00	60.7	79.3	58.2	dB(A)
05:00 - 06:00	62.5	82.5	58.6	dB(A)
06:00 - 07:00	62.5	86.9	59.1	dB(A)
07:00 - 08:00	63.9	84.0	60.0	dB(A)
08:00 - 09:00	64.2	80.9	59.4	dB(A)
09:00 - 10:00	63.9	78.6	60.2	dB(A)
10:00 - 11:00	63.5	83.3	60.5	dB(A)
L_{eq} 24 hr.	61.9	-	-	dB(A)
L_{dn}	67.5	-	-	dB(A)
Maximum	-	88.3	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankham)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0843

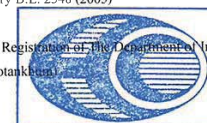
Report No. R6708-4375

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29759
MEASURING DATE : 05-06/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	05-06/08/2024 (L_{eq})	05-06/08/2024 (L_{max})	05-06/08/2024 (L_{90})	UNIT
11:00 - 12:00 ¹⁾	64.4	81.9	59.8	dB(A)
12:00 - 13:00	63.0	73.4	60.2	dB(A)
13:00 - 14:00	64.3	81.7	60.8	dB(A)
14:00 - 15:00	63.7	79.3	60.6	dB(A)
15:00 - 16:00	63.9	79.3	60.5	dB(A)
16:00 - 17:00	64.0	82.5	60.7	dB(A)
17:00 - 18:00	63.7	81.1	60.5	dB(A)
18:00 - 19:00	64.4	82.1	61.2	dB(A)
19:00 - 20:00	65.4	91.2	60.5	dB(A)
20:00 - 21:00	62.9	82.3	60.1	dB(A)
21:00 - 22:00	63.6	84.3	60.2	dB(A)
22:00 - 23:00	61.9	79.5	60.3	dB(A)
23:00 - 00:00	61.8	76.3	60.5	dB(A)
00:00 - 01:00	61.5	76.6	60.3	dB(A)
01:00 - 02:00	61.4	79.7	59.9	dB(A)
02:00 - 03:00	60.7	72.1	59.7	dB(A)
03:00 - 04:00	61.2	76.2	60.0	dB(A)
04:00 - 05:00	60.7	70.9	59.8	dB(A)
05:00 - 06:00	61.4	75.7	60.1	dB(A)
06:00 - 07:00	62.6	85.1	60.0	dB(A)
07:00 - 08:00	64.6	84.3	60.1	dB(A)
08:00 - 09:00	64.8	80.8	60.5	dB(A)
09:00 - 10:00	64.6	83.9	61.1	dB(A)
10:00 - 11:00	63.7	80.7	61.1	dB(A)
L_{eq} 24 hr.	63.3	-	-	dB(A)
L_{dn}	68.4	-	-	dB(A)
Maximum	-	91.2	-	dB(A)
Standard	70 ^{1),2)}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankham)

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เว็บไซต์ : http://www.etc1992.com อี-เมล : info@etc1992.com



EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11 Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230
Tel. 0-3848-1197, 0-3876-3031-2 Fax : 0-3848-2095
Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. LA67-R0843
Report No. R6708-4376

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29760
MEASURING DATE : 06-07/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	06-07/08/2024 (L_{eq})	06-07/08/2024 (L_{max})	06-07/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	63.6	82.6	59.8	dB(A)
12:00 - 13:00	63.3	76.8	59.9	dB(A)
13:00 - 14:00	63.9	82.5	61.3	dB(A)
14:00 - 15:00	64.8	80.4	61.9	dB(A)
15:00 - 16:00	64.4	84.6	60.9	dB(A)
16:00 - 17:00	64.3	81.7	61.5	dB(A)
17:00 - 18:00	64.5	82.4	60.9	dB(A)
18:00 - 19:00	63.9	83.4	60.0	dB(A)
19:00 - 20:00	63.1	85.0	60.2	dB(A)
20:00 - 21:00	62.1	80.9	60.0	dB(A)
21:00 - 22:00	61.5	71.7	59.6	dB(A)
22:00 - 23:00	61.0	81.3	59.2	dB(A)
23:00 - 00:00	61.2	78.8	59.4	dB(A)
00:00 - 01:00	61.5	79.5	59.1	dB(A)
01:00 - 02:00	60.3	71.6	59.1	dB(A)
02:00 - 03:00	59.6	71.9	58.2	dB(A)
03:00 - 04:00	61.0	74.9	57.7	dB(A)
04:00 - 05:00	60.0	72.5	58.0	dB(A)
05:00 - 06:00	62.5	83.3	58.4	dB(A)
06:00 - 07:00	63.8	83.3	61.5	dB(A)
07:00 - 08:00	64.2	80.4	59.6	dB(A)
08:00 - 09:00	65.1	85.6	59.7	dB(A)
09:00 - 10:00	63.3	78.8	60.3	dB(A)
10:00 - 11:00	63.7	79.5	60.2	dB(A)
L_{eq} 24 hr.	63.1	-	-	dB(A)
L_{dn}	68.2	-	-	dB(A)
Maximum	-	85.6	-	dB(A)
Standard	70 ^{1/,2}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankhum)



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โทร. 0-3848-1197, 0-3876-3031-2 แฟกซ์ : 0-3848-2095
เว็บไซต์ : http://www.etc1992.com อี-เมล : info@etc1992.com



EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11 Sukhapibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230
Tel. 0-3848-1197, 0-3876-3031-2 Fax : 0-3848-2095
Website : http://www.etc1992.com E-mail : info@etc1992.com

Request No. LA67-R0843
Report No. R6708-4377

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29761
MEASURING DATE : 07-08/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	07-08/08/2024 (L_{eq})	07-08/08/2024 (L_{max})	07-08/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	64.6	83.4	59.4	dB(A)
12:00 - 13:00	64.1	87.1	59.2	dB(A)
13:00 - 14:00	64.1	83.1	61.1	dB(A)
14:00 - 15:00	65.0	82.9	60.4	dB(A)
15:00 - 16:00	64.1	82.2	59.7	dB(A)
16:00 - 17:00	64.0	80.1	60.7	dB(A)
17:00 - 18:00	63.4	80.7	60.4	dB(A)
18:00 - 19:00	63.0	84.0	60.0	dB(A)
19:00 - 20:00	62.9	83.7	60.3	dB(A)
20:00 - 21:00	61.6	74.4	59.3	dB(A)
21:00 - 22:00	63.5	88.1	59.9	dB(A)
22:00 - 23:00	61.6	74.1	59.9	dB(A)
23:00 - 00:00	60.7	75.5	59.5	dB(A)
00:00 - 01:00	61.5	79.9	59.3	dB(A)
01:00 - 02:00	60.3	70.6	59.2	dB(A)
02:00 - 03:00	60.5	72.2	59.3	dB(A)
03:00 - 04:00	60.9	68.6	59.8	dB(A)
04:00 - 05:00	61.3	70.7	59.9	dB(A)
05:00 - 06:00	62.3	79.6	59.8	dB(A)
06:00 - 07:00	64.5	85.4	60.3	dB(A)
07:00 - 08:00	64.6	84.2	59.8	dB(A)
08:00 - 09:00	65.7	90.0	60.1	dB(A)
09:00 - 10:00	64.8	83.1	60.6	dB(A)
10:00 - 11:00	64.5	84.0	60.2	dB(A)
L_{eq} 24 hr.	63.3	-	-	dB(A)
L_{dn}	68.5	-	-	dB(A)
Maximum	-	90.0	-	dB(A)
Standard	70 ^{1/,2}	115 ^{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 Industry
(Measurement By Mr. Tummarut Photankhum)



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Request No. LA67-R0843

Report No. R6708-4378

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : บริเวณริมรั้วด้านทิศใต้
PARAMETER* : L_{eq} 1 hr., L_{eq} 24 hr., L_{max} , L_{90} & L_{dn}
DETERMINATION METHOD : ISO 1996-1:2016
INSTRUMENT : Integrated Sound Level Meter
S/N 00322750 : Class 2

SAMPLE NO. : 29762
MEASURING DATE : 08-09/08/2024
RECEIVED DATE : 09/08/2024
REPORTED DATE : 21/08/2024

TIME \ DATE	08-09/08/2024 (L_{eq})	08-09/08/2024 (L_{max})	08-09/08/2024 (L_{90})	UNIT
11:00 - 12:00 ³	63.6	80.4	60.0	dB(A)
12:00 - 13:00	62.7	83.1	59.4	dB(A)
13:00 - 14:00	65.8	83.7	60.9	dB(A)
14:00 - 15:00	66.0	83.1	61.7	dB(A)
15:00 - 16:00	64.3	83.2	60.7	dB(A)
16:00 - 17:00	64.1	82.5	60.1	dB(A)
17:00 - 18:00	65.8	87.7	60.4	dB(A)
18:00 - 19:00	63.1	77.0	60.5	dB(A)
19:00 - 20:00	64.6	85.4	61.5	dB(A)
20:00 - 21:00	62.0	83.7	60.1	dB(A)
21:00 - 22:00	62.0	78.3	60.6	dB(A)
22:00 - 23:00	61.3	78.6	60.1	dB(A)
23:00 - 00:00	61.0	71.3	59.8	dB(A)
00:00 - 01:00	61.3	78.2	59.8	dB(A)
01:00 - 02:00	60.7	71.9	59.6	dB(A)
02:00 - 03:00	62.2	80.5	59.8	dB(A)
03:00 - 04:00	61.6	79.4	59.8	dB(A)
04:00 - 05:00	61.0	74.2	59.9	dB(A)
05:00 - 06:00	62.1	80.5	59.9	dB(A)
06:00 - 07:00	63.5	79.6	61.2	dB(A)
07:00 - 08:00	64.3	81.1	60.8	dB(A)
08:00 - 09:00	65.1	89.3	60.0	dB(A)
09:00 - 10:00	64.8	89.6	60.7	dB(A)
10:00 - 11:00	64.8	82.7	61.3	dB(A)
L_{eq} 24 hr.	63.6	-	-	dB(A)
L_{dn}	68.6	-	-	dB(A)
Maximum	-	89.6	-	dB(A)
Standard	70 ^{1/2}	115 ^{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
(Measurement By Mr. Tummarut Photankham)

บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. ATR6708014

Report No. 6708-0192

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : พนักงานทำงานเกี่ยวข้องกับ EO (กลุ่มสุขภาพจิต ชุมพร)
SAMPLING DATE : 06/08/2024
RECEIVED DATE : 09/08/2024
SAMPLING INSTRUMENT : Passive Sampling

SAMPLE NO : A67080192
SAMPLING TIME : 07:00-19:00
TESTED DATE : 09/08/2024 - 23/08/2024
REPORTED DATE : 26/08/2024

PARAMETER**	TEST METHOD	RESULT ²	STD ¹	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

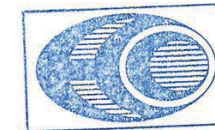
^{1/} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017),
Concentration Limits of Hazardous Chemicals.

^{2/} ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

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

Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)

Analysed By SECOT Co.,Ltd.



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

26/08/2024

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Request No. ATR6708014

Report No. 6708-0193

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : พนักงานทำงานเกี่ยวข้องกับ EO (คุณกมลวิช แก้วมา)
SAMPLING DATE : 06/08/2024 SAMPLE NO : A67080193
RECEIVED DATE : 09/08/2024 SAMPLING TIME : 07:00-19:00
SAMPLING INSTRUMENT : Passive Sampling TESTED DATE : 09/08/2024 – 23/08/2024
REPORTED DATE : 26/08/2024

PARAMETER**	TEST METHOD	RESULT ¹	STD ¹	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

Concentration Limits of Hazardous Chemicals.

² ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

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

Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)

Analysed By SECOT Co.,Ltd.



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Request No. LA67-R0820

Report No. R6708-3931

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : Compressor Area : C-115
PARAMETER* : L_{eq} 1 hr., L_{eq} 8 hr. & L_{max} SAMPLE NO. : 29311
DETERMINATION METHOD : SO 11202:2010 MEASURING DATE : 05/08/2024
INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 05/08/2024
S/N 00322755 : Class 2 REPORTED DATE : 17/08/2024

MEASURING TIME	RESULT		UNIT
	L _{eq} 1 hr.	L _{max}	
08:30 - 09:30	84.1	86.0	dB(A)
09:30 - 10:30	83.7	85.0	dB(A)
10:30 - 11:30	83.9	85.5	dB(A)
11:30 - 12:30	83.9	85.6	dB(A)
12:30 - 13:30	83.9	85.4	dB(A)
13:30 - 14:30	83.9	85.2	dB(A)
14:30 - 15:30	84.1	85.3	dB(A)
15:30 - 16:30	84.1	85.3	dB(A)
L _{eq} 8 hr.	84.0	—	dB(A)
Standard	90 ¹	140 ¹ , 115 ²	dB(A)

REMARK: ¹ Notification of The Ministry of Industry B.E. 2546 (2003)

² Regulation of The Ministry of Labour B.E. 2559 (2016)

* Measurement By Ms. Pornnapa Phongphet



Approved By



17/08/2024

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Request No. LA67-R0820

Report No. R6708-3930

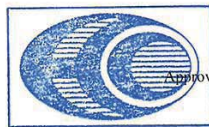
TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
 ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
 Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
 SAMPLE SOURCE : EOE Plant
 SAMPLE POINT : Compressor Area : C-320
 PARAMETER* : L_{eq} 1 hr., L_{eq} 8 hr. & L_{max} SAMPLE NO. : 29310
 DETERMINATION METHOD : ISO 11202:2010 MEASURING DATE : 05/08/2024
 INSTRUMENT : Integrated Sound Level Meter RECEIVED DATE : 05/08/2024
 S/N 00322745 : Class 2 REPORTED DATE : 17/08/2024

MEASURING TIME	RESULT		UNIT
	L_{eq} 1 hr.	L_{max}	
08:30 - 09:30	81.4	86.4	dB(A)
09:30 - 10:30	81.6	83.9	dB(A)
10:30 - 11:30	81.5	82.1	dB(A)
11:30 - 12:30	81.4	81.9	dB(A)
12:30 - 13:30	81.4	82.6	dB(A)
13:30 - 14:30	81.4	81.9	dB(A)
14:30 - 15:30	81.3	82.9	dB(A)
15:30 - 16:30	81.3	82.3	dB(A)
L_{eq} 8 hr.	81.4	—	dB(A)
Standard	90 ^{/1}	140 ^{/1} , 115 ^{/2}	dB(A)

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

* Measurement By Ms. Pornnapa Phongphet



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Request No. LA67-R0820

Report No. R6708-3926

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
 ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
 Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
 SAMPLE SOURCE : EOE Plant
 SAMPLE POINT : Operation 1 (คูขั้วปั๊มปิโตรเลียม ฐาน ID 26009973)
 MEASURING DATE : 05/08/2024 SAMPLE NO. : 29306
 RECEIVED DATE : 05/08/2024 SAMPLING TIME : 07:00-19:00
 SAMPLING INSTRUMENT : Noise dosimeter : S/N CB0955 REPORTED DATE : 17/08/2024

PARAMETER*	RESULT	STANDARD	UNIT
Time weighted average level (12-hr TWA) [#]	78.1	83 ^{/1}	dB(A)
L_{max} 12 hr	92.9	115 ^{/3}	dB(A)
12 Hour dose	30.34	100 ^{/2}	%
Time weighted average level (8-hr TWA) [#]	79.8	85 ^{/1}	dB(A)

REMARK : ^{/1} Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)^{/2} Standard of National Institute for Occupational Safety and Health, Occupational Noise Exposure Revised Criteria 1998^{/3} Regulation of The Ministry of Labour B.E. 2559 (2016)[#] Based on Criteria 85 dB(A) ; 3 dB Exchange Rate

* Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009
 (Measurement By Ms. Pornnapa Phongphet)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0820

Report No. R6708-3927

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEK Plant
SAMPLE POINT : Operation 2 (คุณสุกสิทธิ์ พาท้อน ID 26006122)
MEASURING DATE : 05/08/2024 SAMPLE NO. : 29307
RECEIVED DATE : 05/08/2024 SAMPLING TIME : 07:00-19:00
SAMPLING INSTRUMENT : Noise dosimeter : S/N CB0954 REPORTED DATE : 17/08/2024

PARAMETER*	RESULT	STANDARD	UNIT
Time weighted average level (12-hr TWA) [#]	77.6	83 ^{/1}	dB(A)
L _{max} 12 hr	95.1	115 ^{/3}	dB(A)
12 Hour dose	27.00	100 ^{/2}	%
Time weighted average level (8-hr TWA) [#]	79.3	85 ^{/1}	dB(A)

REMARK : ^{/1} Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)
^{/2} Standard of National Institute for Occupational Safety and Health, Occupational Noise Exposure Revised Criteria 1998
^{/3} Regulation of The Ministry of Labour B.E. 2559 (2016)
[#] Based on Criteria 85 dB(A) ; 3 dB Exchange Rate
* Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009
(Measurement By Ms. Pornnapa Phongphet)



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. LA67-R0917

Report No. R6709-1091

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEK Plant
SAMPLE POINT : Operation 3 (คุณคมสร พรหมวงศ์ ID 26007065)
MEASURING DATE : 06/09/2024 SAMPLE NO. : 32297
RECEIVED DATE : 06/09/2024 SAMPLING TIME : 07:00-19:00
SAMPLING INSTRUMENT : Noise dosimeter : S/N CB0958 REPORTED DATE : 11/09/2024

PARAMETER*	RESULT	STANDARD	UNIT
Time weighted average level (12-hr TWA) [#]	82.7	83 ^{/1}	dB(A)
L _{max} 12 hr	94.7	115 ^{/3}	dB(A)
12 Hour dose	88.00	100 ^{/2}	%
Time weighted average level (8-hr TWA) [#]	84.4	85 ^{/1}	dB(A)

REMARK : ^{/1} Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)
^{/2} Standard of National Institute for Occupational Safety and Health, Occupational Noise Exposure Revised Criteria 1998
^{/3} Regulation of The Ministry of Labour B.E. 2559 (2016)
[#] Based on Criteria 85 dB(A) ; 3 dB Exchange Rate
* Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009
(Measurement By Ms. Onanong Leewongsak)



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Request No. LA67-R0820

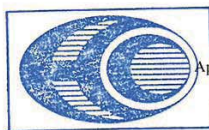
Report No. R6708-3929

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road,
Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE POINT : Operation 4 (คู่มือปฏิบัติงาน ขวนจิตร ID 26003028)
MEASURING DATE : 05/08/2024 SAMPLE NO. : 29309
RECEIVED DATE : 05/08/2024 SAMPLING TIME : 07:00-19:00
SAMPLING INSTRUMENT : Noise dosimeter : S/N CB0957 REPORTED DATE : 17/08/2024

PARAMETER*	RESULT	STANDARD	UNIT
Time weighted average level (12-hr TWA) [#]	81.2	83 ^{/1}	dB(A)
L _{max} 12 hr	97.4	115 ^{/3}	dB(A)
12 Hour dose	62.00	100 ^{/2}	%
Time weighted average level (8-hr TWA) [#]	82.9	85 ^{/1}	dB(A)

REMARK : ^{/1} Notification of The Department of Labour Protection and Welfare B.E. 2561 (2018)
^{/2} Standard of National Institute for Occupational Safety and Health, Occupational Noise Exposure Revised Criteria 1998
^{/3} Regulation of The Ministry of Labour B.E. 2559 (2016)
[#] Based on Criteria 85 dB(A) ; 3 dB Exchange Rate
* Parameter have License Registration of Department of Labour Protection and Welfare No. 0403-03-2564-0009
(Measurement By Ms. Pornnapa Phongphet)



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Request No. ATR6708014

Report No. 6708-0185

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map
Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Scrubbing (T-311)
SAMPLING DATE : 06/08/2024 SAMPLE NO. : A67080185
RECEIVED DATE : 09/08/2024 SAMPLING TIME : 08:49-20:49
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 09/08/2024-19/08/2024
Serial No. 20211103029 REPORTED DATE : 26/08/2024

PARAMETER**	TEST METHOD	RESULT	STD ^{/1}	UNIT
Carbon Dioxide	Non-Dispersive Infrared Method	1,314.0	9,000	mg/m ³
		730.0	5,000	ppm

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 Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)
Analysed By SECOT Co.,Ltd.
GPS = Sampling at UTM 47 P 731050E 1404810N



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Request No. ATR6711030

Report No. 6711-0475

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Scrubbing (T-311)
SAMPLING DATE : 11/11/2024 SAMPLE NO. : A67110475
RECEIVED DATE : 13/11/2024 SAMPLING TIME : 08:11-20:11
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 13/11/2024-21/11/2024
Serial No. 218402 REPORTED DATE : 25/11/2024

PARAMETER**	TEST METHOD	RESULT	STD ¹⁾	UNIT
Carbon Dioxide	Non-Dispersive Infrared Method	1,479.6	9,000	mg/m ³
		822.0	5,000	ppm

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 Eastern Thai Consulting 1992 Co.,Ltd., (Mr. Aocha Khwansirimongkon)

Analysed By SECOT Co.,Ltd.

GPS = Sampling at UTM 47 P 731050E 1404810N



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Examined

25/11/2024

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Request No. ATR6708014

Report No. 6708-0186

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : CO2 Removal Unit (T-220)
SAMPLING DATE : 06/08/2024 SAMPLE NO. : A67080186
RECEIVED DATE : 09/08/2024 SAMPLING TIME : 08:53-20:53
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 09/08/2024-19/08/2024
Serial No. 20180903076 REPORTED DATE : 26/08/2024

PARAMETER**	TEST METHOD	RESULT	STD ¹⁾	UNIT
Carbon Dioxide	Non-Dispersive Infrared Method	1,332.0	9,000	mg/m ³
		740.0	5,000	ppm

REMARK:

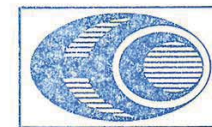
¹⁾ Occupational Safety and Health Administration (OSHA) ; Standard Number 1910.1000 Table Z-1 Limits for Air Contaminants.

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

Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)

Analysed By SECOT Co.,Ltd.

GPS = Sampling at UTM 47 P 731017E 1404785N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

Examined

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Request No. ATR6711030

Report No. 6711-0476

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map
Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : CO2 Removal Unit (T-220)
SAMPLING DATE : 11/11/2024 SAMPLE NO. : A67110476
RECEIVED DATE : 13/11/2024 SAMPLING TIME : 08:18-20:18
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 13/11/2024-21/11/2024
Serial No. 218411 REPORTED DATE : 25/11/2024

PARAMETER**	TEST METHOD	RESULT	STD ¹⁾	UNIT
Carbon Dioxide	Non-Dispersive Infrared Method	1,497.6	9,000	mg/m ³
		832.0	5,000	ppm

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 Eastern Thai Consulting 1992 Co.,Ltd., (Mr. Aocha Khwansirimongkon)

Analysed By SECOT Co.,Ltd.

GPS = Sampling at UTM 47 P 731017E 1404785N



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Request No. ATR6708014

Report No. 6708-0187

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map
Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : Glycol Feed Stripper (T-510)
SAMPLING DATE : 06/08/2024 SAMPLE NO. : A67080187
RECEIVED DATE : 09/08/2024 SAMPLING TIME : 08:49-20:49
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 09/08/2024-13/08/2024
Serial No. 218385 REPORTED DATE : 26/08/2024

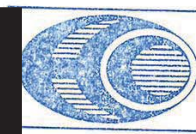
PARAMETER*	TEST METHOD	RESULT	STD ¹⁾	UNIT
Formaldehyde	Sorbent Adsorption, Gas Chromatography/NIOSH 2541	< 0.12	0.92	mg/m ³
		< 0.10	0.75	ppm

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 Miss Pornnapa Pongpet)

GPS = Sampling at UTM 47 P 731046E 1404821N



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Request No. ATR6711030

Report No. 6711-0477

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map
Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : Glycol Feed Stripper (T-510)
SAMPLING DATE : 11/11/2024 SAMPLE NO. : A67110477
RECEIVED DATE : 13/11/2024 SAMPLING TIME : 08:10-20:10
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 13/11/2024-18/11/2024
Serial No. 218445 REPORTED DATE : 25/11/2024

PARAMETER*	TEST METHOD	RESULT	STD ¹⁾	UNIT
Formaldehyde	Sorbent Adsorption, Gas	< 0.12	0.92	mg/m ³
	Chromatography/NIOSH 2541	< 0.10	0.75	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. Aocha Khwansirimongkon)

GPS = Sampling at UTM 47 P 731046E 1404821N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

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Request No. ATR6708014

Report No. 6708-0189

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map
Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Purification Unit (T-410)
SAMPLING DATE : 06/08/2024 SAMPLE NO. : A67080189
RECEIVED DATE : 09/08/2024 SAMPLING TIME : 08:54-20:54
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 09/08/2024-13/08/2024
Serial No. 218411 REPORTED DATE : 26/08/2024

PARAMETER*	TEST METHOD	RESULT	STD ¹⁾	UNIT
Formaldehyde	Sorbent Adsorption, Gas	< 0.12	0.92	mg/m ³
	Chromatography/NIOSH 2541	< 0.10	0.75	ppm

REMARK:

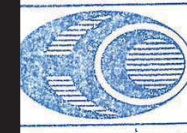
¹⁾ Notification of The Department of Labour Protection and Welfare B.E.2560 (2017), Concentration Limits of Hazardous Chemicals.

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

No.0202-03-2564-0005.

(Sampling By Miss Pornnapa Pongpet)

GPS = Sampling at UTM 47 P 731019E 1404725N



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ACCREDITED LABORATORY
ISO/IEC 17025

Request No. ATR6711030

Report No. 6711-0478

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch 16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Purification Unit (T-410)
SAMPLING DATE : 11/11/2024 SAMPLE NO. : A67110478
RECEIVED DATE : 13/11/2024 SAMPLING TIME : 08:20-20:20
SAMPLING INSTRUMENT : Personal Pump Flow rate 0.05 L/min TESTED DATE : 13/11/2024-18/11/2024
Serial No. 218402 REPORTED DATE : 25/11/2024

PARAMETER*	TEST METHOD	RESULT	STD ^{1/}	UNIT
Formaldehyde	Sorbent Adsorption, Gas	< 0.12	0.92	mg/m ³
	Chromatography/NIOSH 2541	< 0.10	0.75	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. Aocha Khwansirimongkon)

GPS = Sampling at UTM 47 P 731019E 1404725N

ACCREDITED LABORATORY
ISO/IEC 17025

Request No. ATR6708014

Report No. 6708-0188

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut, Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Purification Unit (T-410) SAMPLE NO : A67080188
SAMPLING DATE : 06/08/2024 SAMPLING TIME : 08:57-20:57
RECEIVED DATE : 09/08/2024 TESTED DATE : 09/08/2024 - 23/08/2024
SAMPLING INSTRUMENT : Passive Sampling REPORTED DATE : 26/08/2024

PARAMETER**	TEST METHOD	RESULT ^{2/}	STD ^{1/}	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

^{1/} Notification of The Department of Labour Protection and Welfare B.E.2560 (2017),

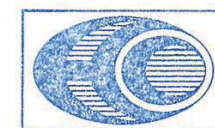
Concentration Limits of Hazardous Chemicals.

^{2/} ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

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

Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)

Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 731019E 1404725N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด

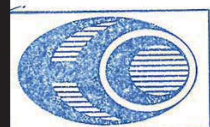
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FM-LAB-040/0/01-08-47



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Request No. ATR6711030

Report No. 6711-0479

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Purification Unit (T-410) SAMPLE NO : A67110479
SAMPLING DATE : 11/11/2024 SAMPLING TIME : 08:23-20:23
RECEIVED DATE : 13/11/2024 TESTED DATE : 13/11/2024-19/11/2024
SAMPLING INSTRUMENT : Passive Sampling REPORTED DATE : 25/11/2024

PARAMETER**	TEST METHOD	RESULT ^{1/2}	STD ^{1/}	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

^{2/} ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

** Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008
Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Mr. Aocha Khwansirimongkon)
Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 731019E 1404725N



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Request No. ATR6708014

Report No. 6708-0190

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : รมรั้วโครงการด้านทิศตะวันตก SAMPLE NO : A67080190
SAMPLING DATE : 06/08/2024 SAMPLING TIME : 09:02-21:02
RECEIVED DATE : 09/08/2024 TESTED DATE : 09/08/2024 – 23/08/2024
SAMPLING INSTRUMENT : Passive Sampling REPORTED DATE : 26/08/2024

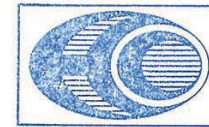
PARAMETER**	TEST METHOD	RESULT ^{1/2}	STD ^{1/}	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

^{2/} ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

** Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008
Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpet)
Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 730858E 1404823N



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Request No. ATR6711030

Report No. 6711-0480

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : รีมรั่วโครงการด้านทิศตะวันตก
SAMPLE NO : A67110480
SAMPLING DATE : 11/11/2024
SAMPLING TIME : 08:28-20:28
RECEIVED DATE : 13/11/2024
TESTED DATE : 13/11/2024-19/11/2024
SAMPLING INSTRUMENT : Passive Sampling
REPORTED DATE : 25/11/2024

PARAMETER**	TEST METHOD	RESULT ²	STD ¹	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

² ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

** Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008
Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Mr. Aocha Khwansirimongkon)
Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 730858E 1404823N



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Request No. ATR6708014

Report No. 6708-0191

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Storage Tank (D-1410A)
SAMPLE NO : A67080191
SAMPLING DATE : 06/08/2024
SAMPLING TIME : 08:58-20:58
RECEIVED DATE : 09/08/2024
TESTED DATE : 09/08/2024 - 23/08/2024
SAMPLING INSTRUMENT : Passive Sampling
REPORTED DATE : 26/08/2024

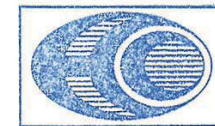
PARAMETER**	TEST METHOD	RESULT ²	STD ¹	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

² ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

** Parameter have License Registration of Department of Labour Protection and Welfare No.0201-03-2564-0008
Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Miss Pornnapa Pongpeti)
Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 731004E 1404676N



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Request No. ATR6711030

Report No. 6711-0481

TEST REPORT

CUSTOMER : PTT Global Chemical Public Company Limited Branch16
ADDRESS : 9 Soi G-12, WHA Eastern Industrial Estate (Map Ta Phut), Pakorn Songkhraorat Road, Tambon Map Ta Phut,
Amphur Muang Rayong, Rayong 21150
SAMPLE SOURCE : EOEG Plant
SAMPLE NAME : EO Storage Tank (D-1410A) SAMPLE NO : A67110481
SAMPLING DATE : 11/11/2024 SAMPLING TIME : 08:25-20:25
RECEIVED DATE : 13/11/2024 TESTED DATE : 13/11/2024-19/11/2024
SAMPLING INSTRUMENT : Passive Sampling REPORTED DATE : 25/11/2024

PARAMETER**	TEST METHOD	RESULT ²	STD ¹	UNIT
Ethylene Oxide	OSHA 1010	ND	1.8	mg/m ³
		ND	1.0	ppm

REMARK:

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

² ND = Non detectable : detection limit of Ethylene Oxide is less than 0.05 mg/m³ or 0.03 ppm.

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

Sampling By Eastern Thai Consulting 1992 Co.,Ltd., (Mr. Aocha Khwansirimongkon)

Analysed By SECOT Co.,Ltd. / GPS = Sampling at UTM 47 P 731004E 1404676N



บริษัท อีสเทิร์นไทยคอนซัลติ้ง 1992 จำกัด



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ภาคผนวก จ

เอกสารชี้แนะเขียนห้องปฏิบัติการวิเคราะห์เอกสาร



ที่ อก ๐๓๒๐/๑๑๓๔๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๗ กรกฎาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติง ๑๙๙๒ จำกัด

อ้างถึง คำขอต่ออายุของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๗ มิถุนายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

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

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติง ๑๙๙๒ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม อำเภอศรีราชา จังหวัดชลบุรี ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท อีสเทิร์น ไทย คอนซัลติง ๑๙๙๒ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
- ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย ตามสิ่งที่ส่งมาด้วย ๒
- ค. ขอบข่ายสมรรถนะที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๗ รายการ อากาศเสีย (ปล่องระบาย) จำนวน ๒๒ รายการ น้ำใต้ดิน จำนวน ๑๑ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๑๘ รายการ และดิน จำนวน ๙๕ รายการ รวมทั้งสิ้นจำนวน ๒๙๒ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๕ กรกฎาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้อื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลติง ๑๙๙๒ จำกัด

เลขทะเบียน ๖-๐๐๓

ที่ อก ๐๓๒๐/๑๑๓๔๒

ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

๑) นางสาวมาลีเกษ เลขะวัจกุล	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๑
๒) นายวัฒนา โคตรหล้า	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๒
๓) นางวรรณเพ็ญ เหลาจินดาวัฒน์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๓
๔) นายเกษวิรี สุธาทิพย์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๔
๕) นางสาวนันทน์ภัส แบนขุนทด	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๕
๖) นางสาวพรนภา หลงคำหงษ์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๖
๗) นางสาวอภิตา ชื่นอารมย์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๗
๘) นางสาวอจรรย์ จิตตะยโสธร	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๘
๙) นางสาวจิรพร ปานคง	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๐๙
๑๐) นายสุทธา สอนธินันท์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๐
๑๑) นางสาวนันทประภา อุยสูงเนิน	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๑
๑๒) นายธงไชย บุญศักดิ์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๒
๑๓) นางสาวธนัชพร กลิ่นโสภณ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๓
๑๔) นายธีระพงษ์ นวลอินทร์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๔
๑๕) นางสาวแพรว พลเสน	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๕
๑๖) นายทรงพล ผิวอ้วน	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๖
๑๗) นายภาคภูมิ บัวสวัสดิ์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๗
๑๘) นางสาวจันทิ สายพันธ์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๘
๑๙) นายภาณุพงศ์ บำรุงรส	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๑๙
๒๐) นางสาวภาณิน จันดีสอน	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๐
๒๑) นายวรกร ไทยะเสวี	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๑
๒๒) นางสาววรรณภา ไชยศิริ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๒
๒๓) นางสาวพรพิมล ภูมิคอนสาร	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๓
๒๔) นางสาวธมลวรรณ ผลอ้อ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๔
๒๕) นางสาวบุญเรือง บุญถม	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๕
๒๖) นางสาวกัสนันท์ ป้อมน้อย	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๖
๒๗) นายชานวัฒน์ โชติวงค์	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๗
๒๘) นางสาวพจณี ยามวิสัย	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๘
๒๙) นายวิษณุวัล สิงห์โต	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๒๙
๓๐) นางสาวนกุล อากศศรี	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๐
๓๑) นายศุภฤกษ์ พาดกลาง	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๑
๓๒) นายณิชาพล ทองหล่อ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๒
๓๓) นายธรรมรัตน์ โพธิ์ตันคำ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๓
๓๔) นายโอชา ขวัญศิริมงคล	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๔
๓๕) นายเมธี สุขประเสริฐ	ทะเบียนเลขที่	๖-๐๐๓-๖-๐๐๓๕

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๓๖) นางสาวพรพินันท์...

๓๖) นางสาวพรพินันท์ วิริยกุลกุล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๖
๓๗) นางสาวอาภาภรณ์ เสริมสนธิ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๗
๓๘) นางสาวณัฏฐ์ธรมณ์ ประดิษฐ์นุช	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๘
๓๙) นางสาวสุนิษา เอ็งเส้ง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๙
๔๐) นางสาวระพีณ อินัน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๔๐

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย

๑) นางสาวดวงกมล เนื้อทอง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๑
๒) นางสาววิษราภรณ์ อินทสุข	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๒
๓) นางสาวกัญจน์กรวิภา จันทร์ขอดแก้ว	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๓
๔) นางสาวฉัตรสุดา มงคลโกชน	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๔
๕) นางสาวณัฐวดี อำนวยทัศน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๕
๖) นางสาวนิอรอุมา 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) นายณารธิป สงวนศิลป์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๐
๑๑) นายวิระชัย พอใจ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๑
๑๒) นายอัญชลี ทะพงษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๒
๑๓) นางสาวสมิตตรา มีแก่น	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๓
๑๔) นางสาวสรวรยา เพชรประไพ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๔
๑๕) นางสาวจุฑามาศ เจริญพรหม	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๕
๑๖) นางสาวนิภาพร คำขมภู	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๖
๑๗) นางสาวอรุษา พันธเมือง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๗
๑๘) นายกิตติ ไพโรจน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๘
๑๙) นายชาญณรงค์ ตั้งธรรมรักษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๙
๒๐) นางสาวปวีตา เอ็นเทียะ	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) นางสาวณัฐนัช นนตานอก	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๔
๒๕) นางสาวดวงสุดา แสนวันดี	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลติง ๑๙๙๒ จำกัด เลขทะเบียน ว-๐๐๓

ที่ ออก 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⁾

Y900

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14 Color...

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]

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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]

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อากาศเสีย...

อากาศเสีย (ปล่อยระบาย) 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 ^[3] 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]

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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 33 Chromium (VI)

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

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]

Y905

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]

COPY

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]

10 Lead...

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]

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]

56 n-Hexane...

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]

COPY 75 Selenium...

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]

94 Xylene (Total)...

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** เรื่องกำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้กลบเป็นเชื้อเพลิง. 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.
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ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กรมโรงงานอุตสาหกรรม โทร. ๐ ๙๓๓๓๓ ๖๐๕๕๔ ต่อ ๕๐๐๑-๒

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ที่ อก ๐๓๒๐/ ๔๖๐๔

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๔ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร
ของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ มีนาคม ๒๕๖๗

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

ตามคำขอ 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. ให้ยกเลิกควบคุมดูแลห้องปฏิบัติการวิเคราะห์ 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

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนในวันที่ ๕ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ airw@diw.mail.go.th

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“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ

บริษัท อีสเทิร์น ไทย คอนซัลติง จำกัด

เลขทะเบียน ๖-๐๐๓

ที่ อก ๐๓๒๐/

ลงวันที่

ขอข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม 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]

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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 trans-Chlordane ...

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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]

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41 Sulfide ...

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

9 Benzene ...

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]

COPY 25 Chlordane ...

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]

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

55 2,4-Dinitrotoluene ...

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

5 Aldrin ...

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]

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COPY

ที่ รง ๐๕๐๔/๑๒๕๓



กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๑๑ กันยายน ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมบุคลากรตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย และเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย

เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ อทค.ตว. ๑๐๐๗/๒๕๖๖ ลงวันที่ ๑๗ สิงหาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย ๑. รายชื่อบุคลากร (เพิ่มเติม) แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ ลงวันที่ ๑๑ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ
๒. รายการเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ (เพิ่มเติม) ลงวันที่ ๑๑ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติมบุคลากรตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๖ ราย และเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๕ เครื่อง สำหรับการเป็นผู้ให้บริการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าบุคลากรตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ และเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ขออนุมัติเพิ่มเติมเป็นไปตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ และกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ประกอบกับประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่อง หลักเกณฑ์ วิธีการตรวจวัด และการวิเคราะห์ผลการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด เพิ่มเติมบุคลากรตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ และเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ดังกล่าว รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพนธ์ กว้างแก้ว)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๙๑๒๘ - ๓๙ ต่อ ๗๐๓

โทรสาร ๐ ๒๔๔๘ ๙๑๔๓

COPY



ที่ รง ๐๕๐๔/๑๐๙๕

กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๒๒ มีนาคม ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมเครื่องมือตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ

เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ อทค.ตว. ๘๗๑/๒๕๖๕ ลงวันที่ ๕ สิงหาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย รายการเครื่องมือตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ (เพิ่มเติม) จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติมเครื่องมือตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ สำหรับการเป็นผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ ตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าบุคลากรผู้ดำเนินการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ขออนุมัติเพิ่มเติมเป็นไปตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัยฯ ประกอบกับกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด เพิ่มเติมเครื่องมือตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ ดังกล่าว รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพนธ์ กว้างแก้ว)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๙๑๒๘ - ๓๙ ต่อ ๗๐๓

โทรสาร ๐ ๒๔๔๘ ๙๑๔๓

COPY

ที่ รง ๐๕๐๔/ร๕๒๐



กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๒๗ กุมภาพันธ์ ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมบุคลากรผู้ดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ
เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ อทค.ดว. ๘๗๑/๒๕๖๕ ลงวันที่ ๕ สิงหาคม ๒๕๖๕
สิ่งที่ส่งมาด้วย ๑. รายชื่อบุคลากร (เพิ่มเติม) แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัด
ระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๑ ฉบับ
๒. รายชื่อบุคลากร (เพิ่มเติม) แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการวิเคราะห์
ระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติม
บุคลากรผู้ดำเนินการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๙ ราย และบุคลากร
ผู้ดำเนินการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๒๑ ราย สำหรับการเป็นผู้ให้บริการ
ตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ตามกฎกระทรวงการขึ้นทะเบียน
และการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔
ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าบุคลากรผู้ดำเนินการตรวจวัด
และวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ที่ขออนุมัติเพิ่มเติมเป็นไปตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัยฯ
ประกอบกับกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย
และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย
คอนซัลติ้ง 1992 จำกัด เพิ่มเติมบุคลากรผู้ดำเนินการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน
๙ ราย และบุคลากรผู้ดำเนินการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ จำนวน ๒๑ ราย ดังกล่าว
รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายการขึ้นทะเบียนและการอนุญาต
ให้บริการเพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๙ ต่อ ๗๐๓

โทรสาร ๐ ๒๔๔๘ ๔๑๔๓

COPY

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศ

ของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๕

๑. นางสาวอภิรดี	ชินอารมย์
๒. นางสาวจิรพร	ปานคง
๓. นายชานูวัฒน์	โชตะวงศ์
๔. นางสาวพจนีย์	งามวิสัย
๕. นางสาวบุญเรือง	บุญถม
๖. นางสาวอาภาภรณ์	เสริมสนธิ
๗. นางสาวสรสร	ตัมวิจิตต์
๘. นางสาวพรรณทิพย์	ยุตะวัน
๙. นางสาวปภาณิน	จันดีสอน
๑๐. นางสาวสุนิษา	เอ็งเส็ง
๑๑. นางสาวรัฐลักษณ์	ขันโต
๑๒. นางสาวณัฐวดี	อำมาตทัศน์
๑๓. นางสาวระพีณ	อินขัน
๑๔. นางสาวสุทธิดา	สร้างแก้ว
๑๕. นางสาวสุมลิตรา	มีแก่น
๑๖. นางสาวอรชา	พันธ์เมือง
๑๗. นายกิตติ	ไพโรจน์
๑๘. นายชาญณรงค์	ตั้งธรรมรักษ์
๑๙. นางสาวดวงกมล	เนื้อทอง
๒๐. นางสาวคณัญญา	โสดาลี
๒๑. นางสาววัชรภรณ์	อินทสุข

ทั้งนี้ ตั้งแต่วันที่ ๒๗ กุมภาพันธ์ พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๗ กุมภาพันธ์ พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๕

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|----|-----------------|------------|
| ๑. | นายกะวีร์ | สุราทรัพย์ |
| ๒. | นางสาวนันท์ณภัส | แบบุนทด |
| ๓. | นางสาวกัสนันท์ | ป้อมน้อย |
| ๔. | นางสาวอัจฉรี | จิตตะยโสธร |
| ๕. | นางสาววรรณภา | ไชยศิริ |
| ๖. | นางสาวพรพิมล | ภูมิคอนสาร |
| ๗. | นางสาวธมลวรรณ | ผลอ้อ |
| ๘. | นายภาณุพงศ์ | บำรุงรส |
| ๙. | นางสาวฉัตรสุดา | มงคลโภชน |

ทั้งนี้ ตั้งแต่วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กบ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๕

อนุญาตให้ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

เลขทะเบียนนิติบุคคล ๐๒๐๕๕๓๕๐๐๔๕๗๘

ตั้งอยู่ เลขที่ ๔๔๙ หมู่ที่ ๓๑ ตำบลหนองแขม อำเภอศรีราชา จังหวัดชลบุรี

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการวิเคราะห์ระดับความเข้มข้น
ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับ
กฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน
พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๙ ราย

ทั้งนี้ ตั้งแต่วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

COPY

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รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศ
ของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๘

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| ๑. นางสาวอรอนงค์ | ถิ่วงศ์ศักดิ์ |
| ๒. นางสาวไพรยาภรณ์ | สังข์ทอง |
| ๓. นางสาวยลดา | พาลี |
| ๔. นางสาวปภาดา | เจริญพร |
| ๕. นายวราวุธ | อารีย์เอื้อ |
| ๖. นายศุภกร | นพพรพิทักษ์ |

ทั้งนี้ ตั้งแต่วันที่ ๑๙ กันยายน พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๙ กันยายน พ.ศ. ๒๕๖๖



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศ
ของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๘

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| ๑. นางสาวนันประภา | อุยสูงเนิน |
| ๒. นางสาวจันทิ | สายพันธ์ |
| ๓. นายทรงพล | ผิวอ้วน |
| ๔. นายศุภฤกษ์ | พาดกลาง |
| ๕. นางสาวอรรณณ | นิยม |
| ๖. นางสาววินิดา | จำปาตัน |
| ๗. นางสาวพรณภา | พงษ์เพชร |
| ๘. นางสาวจุฑารัตน์ | สุชชาเกต |
| ๙. นางสาวศวิตา | กิตติเนาวรัตน์ |

ทั้งนี้ ตั้งแต่วันที่ ๒๓ กุมภาพันธ์ พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๓ กุมภาพันธ์ พ.ศ. ๒๕๖๖



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

COPY

COPY

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๘

- | | |
|------------------|----------------|
| ๑. นางวรรณเพ็ญ | เหลาจินดาวัฒน์ |
| ๒. นางสาวธนัชพร | กลินโสภณ |
| ๓. นายวัฒนา | โคตรหล้า |
| ๔. นายธงไชย | บุญศักดิ์ |
| ๕. นายวิษณุชวลิต | สิงโต |
| ๖. นายโอชา | ขวัญศิริมงคล |
| ๗. นายธีระพงษ์ | นวลอินทร์ |
| ๘. นายวรากร | ไวทยะเสวี |
| ๙. นายณิชาพล | ทองหล่อ |
| ๑๐. นายสุทธธ | สองธนีชัย |
| ๑๑. นายธรรมรัตน์ | โพธิ์ตันคำ |
| ๑๒. นายเมธี | สุขประเสริฐ |
| ๑๓. นายคมกฤษ | ครรรสอน |
| ๑๔. นายนราธิป | สงวนศิลป์ |
| ๑๕. นายวีระชัย | พอใจ |
| ๑๖. นางสาวจริยา | ยาตรี |

ทั้งนี้ ตั้งแต่วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๘

อนุญาตให้.....บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด.....

เลขทะเบียนนิติบุคคล.....๐๒๐๕๕๓๔๐๐๔๕๗๘.....

ตั้งอยู่ เลขที่ ๙๙๙ หมู่ที่ ๑๑ ตำบลหนองขาม อำเภอกีรีราษฎร์ จังหวัดชลบุรี.....

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการตรวจวัดระดับความเข้มข้น
ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับ
กฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน
พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑๖ ราย

ทั้งนี้ ตั้งแต่วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๒๗ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

๒๕๖๕

COPY

๒๕๖๕

COPY

ที่ รง ๐๕๐๔/๑๖๒๐



กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๑๕ พฤศจิกายน ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง

เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด ที่ อทค.ตว. ๑๔๘๐/๒๕๖๖ ลงวันที่ ๑๖ ตุลาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย รายการเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง (เพิ่มเติม) ลงวันที่ ๑๕ พฤศจิกายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง รวมจำนวน ๒ เครื่อง สำหรับการเป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง ตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ เพื่อให้กรมสวัสดิการและคุ้มครองแรงงานพิจารณา ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง ที่ขออนุมัติเพิ่มเติม มีคุณสมบัติตามกฎหมายกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ประกอบกับประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่อง หลักเกณฑ์ วิธีการตรวจวัด และการวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภท กิจการที่ต้องดำเนินการ ลงวันที่ ๘ กุมภาพันธ์ พ.ศ. ๒๕๖๑ และที่แก้ไขเพิ่มเติม จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด เพิ่มเติมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่างดังกล่าว รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้ปฏิบัติตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ เพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๔ ต่อ ๗๐๒

โทรสาร ๐ ๒๔๔๘ ๔๑๔๓

COPY



ที่ รง ๐๕๐๔/๑๖๒๐

กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๑๕ กันยายน ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมบุคลากรและเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง

เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด ที่ อทค.ตว. ๑๔๐๖/๒๕๖๖ ลงวันที่ ๑๗ สิงหาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย ๑. รายชื่อบุคลากร (เพิ่มเติม) แบบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน ลงวันที่ ๑๕ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ
๒. รายชื่อบุคลากร (เพิ่มเติม) แบบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง ลงวันที่ ๑๕ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ
๓. รายชื่อบุคลากร (เพิ่มเติม) แบบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง ลงวันที่ ๑๕ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ
๔. รายการเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง (เพิ่มเติม) ลงวันที่ ๑๕ กันยายน พ.ศ. ๒๕๖๖ จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติมบุคลากรผู้ดำเนินการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง จำนวน ๓ ราย และเครื่องมือตรวจวัด รวมจำนวน ๒ เครื่อง สำหรับการเป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง ตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ เพื่อให้กรมสวัสดิการและคุ้มครองแรงงานพิจารณา ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าบุคลากรและเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง ที่ขออนุมัติเพิ่มเติม มีคุณสมบัติตามกฎหมายกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ประกอบกับประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่อง หลักเกณฑ์ วิธีการตรวจวัด และการวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภทกิจการที่ต้องดำเนินการ ลงวันที่ ๘ กุมภาพันธ์ พ.ศ. ๒๕๖๑ และที่แก้ไขเพิ่มเติม จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด เพิ่มเติมบุคลากรและเครื่องมือตรวจวัดดังกล่าว รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้ปฏิบัติตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ เพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๔ ต่อ ๗๐๒

โทรสาร ๐ ๒๔๔๘ ๔๑๔๓

COPY

ที่ รง ๐๕๐๔/๓๓๕



กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๓๑ มกราคม ๒๕๖๖

เรื่อง การอนุมัติเพิ่มเติมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน และเสียง
เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ อทค.ทว. 872/2565 ลงวันที่ ๕ สิงหาคม ๒๕๖๕
สิ่งที่ส่งมาด้วย รายการเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน และเสียง (เพิ่มเติม)
จำนวน ๒ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติม
เครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน และเสียง จำนวน ๒๘ เครื่อง สำหรับ
การเป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง
ตามกฎหมายกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย
และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าเครื่องมือตรวจวัดและวิเคราะห์
สภาวะการทำงานเกี่ยวกับระดับความร้อน และเสียง ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ที่ขออนุมัติเพิ่มเติม มีคุณสมบัติตามกฎหมายกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการ
ด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙
ประกอบกับประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่อง หลักเกณฑ์ วิธีการตรวจวัด และการวิเคราะห์สภาวะ
การทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภทกิจการที่ต้องดำเนินการ
ลงวันที่ ๘ กุมภาพันธ์ พ.ศ. ๒๕๖๑ และที่แก้ไขเพิ่มเติม จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
เพิ่มเติมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน และเสียง ดังกล่าว รายละเอียด
ปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ
เพื่อส่งเสริมความปลอดภัย อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๔ ต่อ ๗๐๒

โทรสาร ๐ ๒๔๔๘ ๔๑๔๓

COPY



ที่ รง ๐๕๐๔/๔๗๑๒

กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๓๑ มิถุนายน ๒๕๖๕

เรื่อง การอนุมัติเพิ่มเติมบุคลากรและเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
แสงสว่าง และเสียง
เรียน กรรมการผู้จัดการบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
อ้างถึง หนังสือบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ที่ อทค.ทว. ๑๖๕/๒๕๖๕ และ อทค.ทว. ๑๖๖/๒๕๖๕
ลงวันที่ ๒๕ กุมภาพันธ์ ๒๕๖๕

สิ่งที่ส่งมาด้วย ๑. รายชื่อบุคลากร (เพิ่มเติม) แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์
สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง จำนวน ๓ ฉบับ
๒. รายการเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง (เพิ่มเติม)
จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด ได้ขออนุมัติเพิ่มเติม
บุคลากรผู้ดำเนินการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง
จำนวน ๘ ราย พร้อมเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง จำนวน ๑๘ เครื่อง
สำหรับการเป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง
ตามกฎหมายกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงาน พ.ศ. ๒๕๖๔ ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงาน ได้พิจารณาแล้วเห็นว่าบุคลากรและเครื่องมือตรวจวัด
และวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อนและเสียง ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ที่ขออนุมัติเพิ่มเติม มีคุณสมบัติตามกฎหมายกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการ
ด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง
พ.ศ. ๒๕๕๙ ประกอบประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่อง หลักเกณฑ์ วิธีการตรวจวัด และการวิเคราะห์
สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภทกิจการที่ต้องดำเนินการ
ลงวันที่ ๘ กุมภาพันธ์ พ.ศ. ๒๕๖๑ จึงอนุมัติให้ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด เพิ่มเติมบุคลากร
และเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียงดังกล่าว รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย
ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย
อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๔ ต่อ ๗๐๒

โทรสาร ๐ ๒๔๔๘ ๔๑๔๓

COPY

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ของบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๐๙

- | | |
|--------------------|--------------|
| ๑. นางสาวอรอนงค์ | สิวงศ์ศักดิ์ |
| ๒. นางสาวไพรยาภรณ์ | สังข์ทอง |
| ๓. นางสาวยลดา | พาสี |

ทั้งนี้ ตั้งแต่วันที่ ๑๘ กันยายน พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๘ กันยายน พ.ศ. ๒๕๖๖



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ของบริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๐๙

- | | |
|--------------------|----------------|
| ๑. นางสาวปนัดดา | ร่มรุช |
| ๒. นางสาวอภิรดี | ชินอารมย์ |
| ๓. นางสาวจุฬามาศ | เจริญพรหม |
| ๔. นางสาววินิดา | จำปาตัน |
| ๕. นางสาวธัญลักษณ์ | ขันโต |
| ๖. นางสาวจุฑารัตน์ | สุชชาเขต |
| ๗. นางสาวศวิดา | กิตติเนาวรัตน์ |
| ๘. นางสาวพรนภา | พงษ์เพชร |

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

COPY

COPY

COPY

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๐๘

- | | |
|-----------------|----------------|
| ๑. นางวรรณเพ็ญ | เหลาจินดาวัฒน์ |
| ๒. นางสาวธนัชพร | กลิ่นโสภณ |
| ๓. นายวัฒนา | โคตรหล้า |

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพงษ์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บญ
ฉ.ร.บคจ

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๐๘

อนุญาตให้.....บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด.....

เลขทะเบียนนิติบุคคล ๐๒๐๕๕๓๕๐๐๕๕๗๘.....

ตั้งอยู่ เลขที่ ๙๙๙ หมู่ที่ ๑๑ ตำบลหนองขาม อำเภอศรีราชา จังหวัดชลบุรี.....

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงาน
เกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ เพื่อส่งเสริมความปลอดภัย
อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย
และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๓ ราย

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพงษ์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

Y900

COPY

Y900

COPY

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง

ของบริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๔-๐๐๐๙

๑. นางสาวอรอนงค์ ลีวงศ์ศักดิ์

๒. นางสาวไพบูลย์พร สัมพันธ์ทอง

๓. นางสาวยลดา พาลี

ทั้งนี้ ตั้งแต่วันที่ ๑๘ กันยายน พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๘ กันยายน พ.ศ. ๒๕๖๖



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง

ของบริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๔-๐๐๐๙

๑. นางสาวปนัดดา ร่มรุช

๒. นางสาวอภิรดี ชื่นอารมย์

๓. นางสาวจุฑามาศ เจริญพรหม

๔. นางสาววินิดา จำปาตัน

๕. นางสาวธัญลักษณ์ ชันโต

๖. นางสาวจุฑารัตน์ สุขขาเขต

๗. นางสาวศวิดา กิตติเนาวรัตน์

๘. นางสาวพรณา พงษ์เพชร

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

COPY

COPY

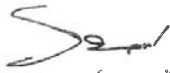
COPY

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง
ของบริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๔-๐๐๐๙

- | | |
|-----------------|----------------|
| ๑. นางวรรณเพ็ญ | เหลาจินดาวัฒน์ |
| ๒. นางสาวธนัชพร | กลั่นโสภณ |
| ๓. นายวัฒนา | โคตรหล้า |

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพงษ์ กวางแก้ว)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กบ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง

ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๔-๐๐๐๙

อนุญาตให้.....บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด.....

เลขทะเบียนนิติบุคคล.....๐๒๐๕๕๓๕๐๐๙๕๗๘.....

ตั้งอยู่ เลขที่ ๙๙๙ หมู่ที่ ๑๑ ตำบลหนองขาม อำเภอสรีราชา จังหวัดชลบุรี.....

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะ
การทำงานเกี่ยวกับระดับแสงสว่าง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ
เพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติ
ความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๓ ราย

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพงษ์ กวางแก้ว)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

Y4100

COPY

Y4100

COPY

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
ของบริษัท ฮีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๔-๐๐๐๙

- | | |
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| ๑. นางสาวอรอนงค์ | ลิ่งศักดิ์ |
| ๒. นางสาวไพบารณ | สังข์ทอง |
| ๓. นางสาวยลดา | พาลี |

ทั้งนี้ ตั้งแต่วันที่ ๑๗ กันยายน พ.ศ. ๒๕๖๖ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๗ กันยายน พ.ศ. ๒๕๖๖



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
ของบริษัท ฮีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๔-๐๐๐๙

- | | |
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| ๑. นางสาวปนัดดา | ร่มรุกข์ |
| ๒. นางสาวกิริติ | ชินอารมย์ |
| ๓. นางสาวจุฬามาศ | เจริญพรหม |
| ๔. นางสาววินิตา | จำปาตัน |
| ๕. นางสาวธัญลักษณ์ | ชินโต |
| ๖. นางสาวจุฬารัตน์ | สุชชาเกต |
| ๗. นางสาวศวิตา | กิตติเนาวรัตน์ |
| ๘. นางสาวพรนภา | พงษ์เพชร |

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

7409

COPY

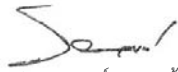
COPY

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
ของบริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๔-๐๐๐๙

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| ๑. นางวรรณเพ็ญ | เหลาจินดาวัฒน์ |
| ๒. นางสาวธนัชพร | กลั่นโสมณ |
| ๓. นายวัฒนา | โคตรหล้า |

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ ก.บ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน

ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๔-๐๐๐๙

อนุญาตให้.....บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด.....

เลขทะเบียนนิติบุคคล...๐๒๐๕๕๓๕๐๐๔๕๗๘.....

ตั้งอยู่ เลขที่ ๙๙๙ หมู่ที่ ๑๑ ตำบลหนองขาม อำเภอศรีราชา จังหวัดชลบุรี.....

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์
สภาวะการทำงานเกี่ยวกับระดับความร้อน ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ
เพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติ
ความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๓ ราย

ทั้งนี้ ตั้งแต่วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๒๙ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๓๐ ธันวาคม พ.ศ. ๒๕๖๔



(นายสมพจน์ กวางแก้ว)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

COPY

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ภาคผนวก จ

สรุปเอกสารการสอบเทียบอุปกรณ์เครื่องมือ

CERTIFICATE OF ANALYSIS

EPA PROTOCOL GAS

Cylinder No. : EB0145030



Airgas Specialty Gases
Airgas, L.L.C.
6141 Bacon Road
Bluff 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E03N199E15AC0U4
Cylinder Number: EB0145030
Laboratory: 124 - Plumsteadville - PA
PQVP Number: A12021
Gas Code: CH4,PPN,BALN
Reference Number: 160-40224242-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 350
Certification Date: Oct 15, 2021
Expiration Date: Oct 15, 2023

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA-821-R-12-001. This document is available at <https://www.epa.gov/traceability>. The purpose of this protocol is to ensure that the analytical results are traceable to the National Institute of Standards and Technology (NIST) and that the uncertainty is stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration material. All concentrations are in % v/v unless otherwise noted.

Do Not Use This Certificate Below 100°F (38°C) for Long-Term Storage

ANALYTICAL RESULTS				Assay Method	Assay Date
Component	Requested Concentration	Actual Concentration	Total Relative Uncertainty		
METHANE	180.0 PPM	171.0 PPM	G1	+/- 1.0% NIST Traceable	10/15/2021
PROPANE	185.0 PPM	167.0 PPM	G1	+/- 1.0% NIST Traceable	10/15/2021
NITROGEN	Balance				
CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08011603	K052554	100% PROPANE/AR	+/- 0.5%	May 15, 2025
NTRM	20060236	6162607	243.3 PPM PROPANE/AR	+/- 0.5%	Mar 17, 2027
ANALYTICAL EQUIPMENT					
Analytical Principle					
Last Multipoint Calibration					
Oct 13, 2021					
Oct 14, 2021					

Triad Data Available Upon Request

NOTES:
Gross Weight: 28.0 Kg
Net Weight: 4.9 Kg
PO# 5221004861



COPY

Approved for Release

DRY GAS METER MC572V

Serial No. : 0504003



Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : MC572V
Console serial : 0504003
DGM Model # : 5K25EX
DGM Serial # : 00009854

Calibration Condition

Cal Date : 22-Apr-24
Due Date : 23-Apr-25
Cal Report No : WDS-SV6704001
Ambient Temp (°C) : 25
Pressure (mm Hg) : 758
Relative Humidity (%) : 60

Factors/Conversion

Std. Temp (°C) : 23
Std. Pressure (mm Hg) : 750
K (K/mm Hg) : 0.3857

Reference Equipment

WTM Model : W-NK05-58 WTM Cal. Due Date : Dec 2023
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
15.00	13.0	144.5926	144.7899	26	27	60.08807	60.24392	29	28
10.00	25.0	144.8168	144.9795	27	27	60.29098	60.45472	27	27
8.00	50.0	145.0164	145.2002	28	28	60.49135	60.67317	29	27
7.00	80.0	145.2238	145.4291	28	28	60.69691	60.90186	29	28
5.00	120.0	145.4909	145.6692	28	29	60.96349	61.14145	27	26

Reference Meter (WTM)

Standardized Data				Calibration Results			
Test Meter		Reference Meter		Correction Factor		Flow Rate	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma" (Y)	Variation (ΔY)	Std & Corr	0.0212 SCMM
V _{avg} (m ³)	Q _{avg} m ³ /min	V _{avg} (m ³)	Q _{avg} m ³ /min			Q _{avg} (m ³ /min)	ΔH ₂
0.173	0.012	0.173	0.012	0.997	0.003	0.012	43.309
0.159	0.016	0.160	0.016	1.004	0.011	0.016	43.381
0.179	0.022	0.176	0.022	0.984	-0.009	0.022	45.447
0.201	0.029	0.199	0.028	0.989	-0.005	0.028	44.202
0.175	0.035	0.174	0.035	0.994	0.000	0.035	44.497
				0.993	Y Avg	44.167	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 ΔH₂, 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 ±0.2inches (5.1mm) H₂O

Approved By:
(Paipasu Chaisana)
Service Manager

Date: 22-Apr-24

COPY

TEMPERATURE DISPLAY CALIBRATION



Meter Console Information
Console Model : MC572V
Console serial : 0504003
Temp Indicator Model : 785-KF
Temp Indicator Serial : J205630

Calibration Conditions
Cal Date : 22-Apr-24
Due Date : 23-Apr-25
Cal Report No : WDS-SV6704001
Ambient Temp (°C) : 25
Pressure (mm Hg) : 758
Humidity (%) : 60

Reference Equipment
Temp Meter Model : Fluke 710B
Serial No : 60590035
Cal Date : 07-Apr-24
Files : 179
Serial No : 54620112
Cal Date : 06-Apr-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	-37.0	1.0
3	-58.0	-57.0	1.0
4	-149.0	-150.0	-1.0
5	260.0	259.0	-1.0
6	371.0	372.0	1.0
7	482.0	482.0	0.0
8	593.0	593.0	0.0
9	704.0	704.0	0.0
10	1039.0	1039.0	0.0
Maximum			1.0

Note
* For valid test results, the maximum difference between temperature readings should ±1.0°C (EPA Method 5, Section 6.1.1.8)
Perform all TC Channel calibrations. Except meter (DGM) channel

PASS

DGM Out Temperature Sensor Calibration			
Temperature (mm)	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	10.0	10.0	0.0
2	10.0	10.0	0.0
Ambient	26.5	26.0	-0.5
Heat	109.3	110.0	0.7

Note
The temperatures of the thermocouple and reference thermometers shall agree to within ±2 °F (EPA Method 5, section 10.5)
Temp. Difference ±2 °F or ±1.1 °C

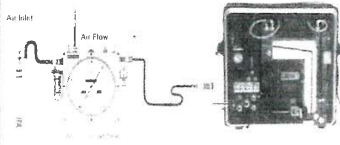
PASS

Approved By:
(Paipasu Chaisana)
Service Manager

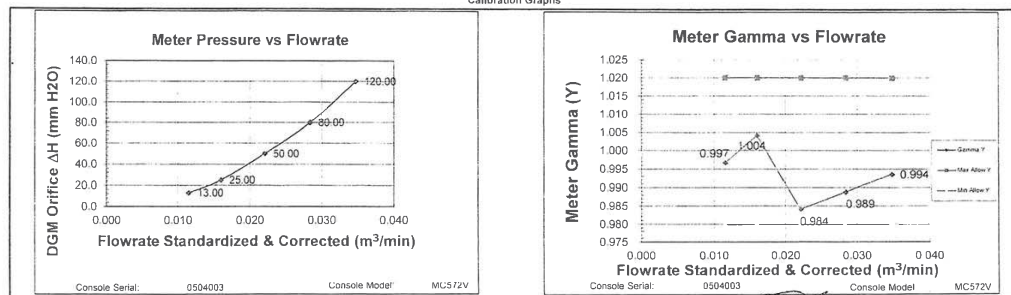
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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature	Equations	Calibration Train
<p>P_a - Barometric Pressure</p> <p>DGM - Dry Gas Meter</p> <p>K_1 - Constant based on standard temp and press</p> <p>O - Run time, in minutes</p> <p>P_m - ΔH (Meter Pressure, gauge)</p> <p>V_m - Volume collected by test meter, corrected for STP</p> <p>Q_{meas} - Calculated flow rate of test meter</p> <p>K - Critical orifice coefficient</p> <p>P_{ref} - Measured pressure of reference meter</p> <p>T_{ref} - Temperature measured in reference meter</p> <p>T_m - Temperature measured in test meter</p> <p>Y - Ratio of volume collected from test meter and orifice</p> <p>sc - Scaling Factor</p> <p>Counts_{sc} - Number of pulse counts, standardized</p> <p>Counts_{raw} - Number of raw pulse counts of a calibration run</p>	$V_{sc(std)} = Y * K_1 * \frac{V_{ref} * (P_{ref} + \frac{P_{ref}}{1.01325})}{T_{ref}}$ $V_{m(std)} = Counts_{std} * Y_{avg}$ $Counts_{std} = K_1 * \frac{C_{ref} * (P_{ref} + \frac{P_{ref}}{1.01325})}{T_{ref}}$ $Q_{ref(std)} = \frac{V_{ref(std)}}{t}$ $K_1 = \frac{T_{std}}{P_{std}}$ $Y_{avg} = \frac{V_{m(std)}}{V_{ref(std)}}$ $Y_{sc} = \frac{V_{m(std)}}{V_{ref(std)}}$ $V_{ref(std)} = \Delta H_{sc} * \frac{P_{ref} * (1.01325 * P_{std})}{T_{ref} * (T_{std} + \theta)}$	

Calibration Graphs



DRY GAS METER XC-572-OV

Serial No. : A2204323

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : XC-572-OV
Console serial : A2204323
DGM Model #: SK25EX
DGM Serial #: 00008294

Calibration Condition

Cal. Date: 22-May-24
Due Date: 22-May-25
Cal. Report No.: WDS-SV6704018
Ambient Temp (°C): 25
Pressure (mm Hg): 758
Relative Humidity (%): 60

Factors/Conversion

Std Temp (°C): 298
Std Pressure (mm Hg): 760
K_f (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W.NKCoDa-5B WTM Cal. Due Date: Dec. 2024
Gamma: 600245 Gamma: 1.0000

UUT Meter (DGM)						Reference Meter (WTM)					
Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp			
Φ	F _{test}	Initial	Final	Initial	Final	Initial	Final	Initial	Final		
15.00	13.0	194.6567	194.8274	26	27	61.39400	61.56423	28	27		
10.00	25.0	195.0941	195.2514	28	28	61.82541	61.98088	29	28		
8.00	50.0	195.2786	195.4572	28	28	62.00769	62.18342	28	27		
7.00	80.0	195.4877	195.6846	28	29	62.21353	62.40748	28	27		
5.00	120.0	195.7085	195.8796	29	29	62.43108	62.60020	26	27		

Standardized Data

Test Meter		Reference Meter		Correction Factor		Flow Rate		AHD (mm H ₂ O)	
Std Volume	Std Flow Rate	Std Volume	Std Flow Rate	"Gamma"	Variation	Std & Corr	0.0212 SCMM	Variation	
V _{test} (m ³)	Q _{test} m ³ /min	V _{ref} (m ³)	Q _{ref} m ³ /min	(Y)	(ΔY)	Q _{test} m ³ /min	ΔH _{test}	ΔH _{ref}	
0.167	0.011	0.166	0.011	0.994	0.008	0.011	47.022	-1.348	
0.153	0.015	0.151	0.015	0.986	0.000	0.015	48.311	-0.059	
0.174	0.022	0.171	0.021	0.981	-0.005	0.021	48.458	0.089	
0.192	0.027	0.189	0.027	0.981	-0.004	0.027	48.869	0.499	
0.167	0.033	0.165	0.033	0.986	0.000	0.033	49.189	0.819	
				0.985	* Y Avg	48.370		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_{ref}, 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: 
(Paitasu Chaisana)
Service Manager

WISDOM SCIENCE
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Date: 22-May-24

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TEMPERATURE DISPLAY CALIBRATION

Meter Console Information
Console Model: XC-572-OV
Console serial: A2204323
Temp Indicator Model: 765-KF
Temp Indicator Serial: JC05920

Reference Equipment
Temp Meter Model: Fluke 714B
Serial No: 63560035
Call Date: 07-Apr-24
Temp Meter Model: Fluke 179
Serial No: 5820112
Call Date: 08-Feb-24

Calibration Conditions
Cal Date: 22-May-24
Due Date: 22-May-25
Call Report No: WDS-SV6704018
Ambient Temp (°C): 25
Pressure (mm Hg): 758
Humidity (%): 60

Temperature Sensor Calibration

Reference Point	Ref Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	0	0.0	0.0
2	15.0	15.0	0.0
3	37.0	37.0	0.0
4	93.0	93.0	0.0
5	149.0	150.0	-1.0
6	260.0	259.0	1.0
7	271.0	272.0	-1.0
8	322.0	322.0	0.0
9	583.0	583.0	0.0
10	616.0	615.0	1.0
11	1038.0	1038.0	0.0
12	Maximum	Maximum	0.0

Note

* For wet bulb results, the maximum difference between temperature readings should be ±1.0°C (EPA Method 5, Section 6.1.1.8)
Perform all TC Channel calibrations except meter (DGM) channel

Reference Point	Ref Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	0	0.0	0.0
2	15.0	15.0	0.0
3	37.0	37.0	0.0
4	93.0	93.0	0.0
5	149.0	150.0	-1.0
6	260.0	259.0	1.0
7	271.0	272.0	-1.0
8	322.0	322.0	0.0
9	583.0	583.0	0.0
10	616.0	615.0	1.0
11	1038.0	1038.0	0.0
12	Maximum	Maximum	0.0

Difference Range

Temp. Difference: ±2 °F or ±1.1 °C

Note

The temperatures of the thermocouple and reference thermometers shall agree to within ±2 °F (EPA Method 5, section 10.5)

Approved By: 
(Paitasu Chaisana)
Service Manager

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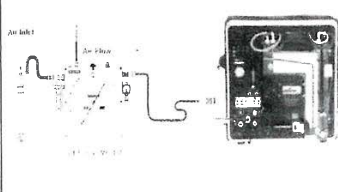
WISDOM SCIENCE SALE AND SERVICE GROUP COMPANY LIMITED
1322 Paitasu Boulevard, Suite 100, Easton, PA 18045
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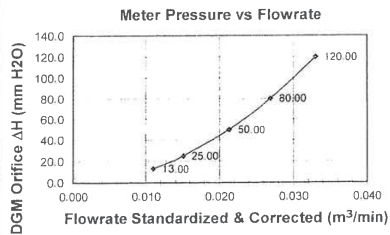
WISDOM SCIENCE SALE AND SERVICE GROUP COMPANY LIMITED
Address: 8115 Lupton Turnpike, Suite 100, Easton, PA 18045
Tel: 610-412-1122

Certificate of Calibration - Supplemental

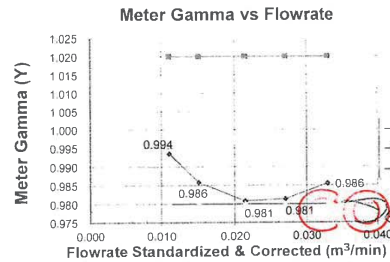
METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature	Equations	Calibration Train
<p>P_{bar} - Barometric Pressure DGM - Dry Gas Meter K_f - Constant based on standard temp and press Φ - Run time, in minutes P_m - ΔH (Meter Pressure, gauge) V_m - Volume collected by test meter, corrected for STP Q_{ref} - Calculated flow rate of test meter K_c - Critical orifice coefficient P_{ref} - Measured pressure of reference meter T_{ref} - 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</p>	$V_{m(std)} = Y * K_f \frac{V_m * (P_{bar} + \frac{P_{m(g)}}{13.6})}{T_m}$ $V_{m(std)} = Counts_{std} * Y_{sc(air)}$ $Counts_{std} = K_f \frac{Counts_{raw} * (P_{bar} + \frac{P_{m(g)}}{13.6})}{T_m}$ $Q_{ref(std)} = \frac{V_{m(std)}}{t}$ $K_c = \frac{T_{ref}}{T_{std}} \left(\frac{P_{ref} - P_{std}}{P_{ref} - P_{std}} \right)$ $Y_{sc} = \frac{Counts_{std}}{Counts_{raw}} \left(\frac{P_{ref} - P_{std}}{P_{ref} - P_{std}} \right)$	

Calibration Graphs



Console Serial: A2204323 Console Model: XC-572-OV



Console Serial: A2204323 Console Model: XC-572-OV

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 # : 00005432

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. (°C) : 298
Std. Pressure (mm Hg) : 760
K₁ (K/mm Hg) : 0.3857

Reference Equipment

WTM Model : W-NK04-5B 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
15.00	13.0	239.7603	239.9212	27	27	63.63889	63.79843	27	27
10.00	25.0	239.9406	240.0879	27	27	63.81777	63.97353	27	27
8.00	50.0	240.1147	240.2952	27	28	63.99028	64.16988	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				Calibration Results			
Test Meter	Reference Meter	Correction Factor	Flow Rate	Flow Rate	ΔH@ (mm H ₂ O)	ΔH@	Variation
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Q _{actual}	ΔH _g
V _{test} (m ³)	Q _{test} m ³ /min	V _{ref} (m ³)	Q _{ref} m ³ /min	(Y)	(ΔY)	Q _{calculated}	ΔH _g
0.157	0.010	0.155	0.010	0.991	-0.003	0.010	53.303
0.154	0.015	0.152	0.015	0.989	-0.005	0.015	47.860
0.176	0.022	0.175	0.022	0.993	-0.001	0.022	46.233
0.200	0.029	0.199	0.028	0.997	0.003	0.028	43.895
0.174	0.035	0.175	0.035	1.001	0.007	0.035	43.973
				0.994	= Y Avg.		47.053
							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 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O

Approved By: 
(Palpasu Chaisana)
Service Manager

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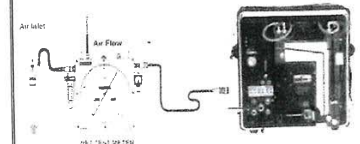
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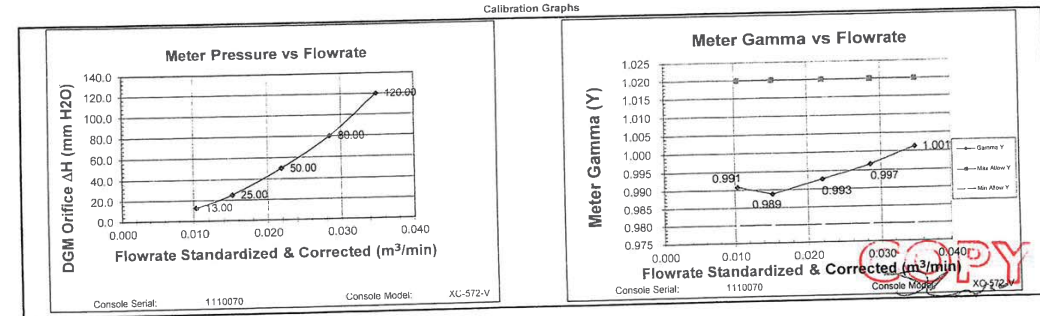
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DRY GAS METER XC-572-V

Serial No. : 1110070

Certificate of Calibration - Supplemental
METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature	Equations	Calibration Train
<p>P_{bar} - Barometric Pressure</p> <p>DGM - Dry Gas Meter</p> <p>K₁ - Constant based on standard temp and press</p> <p>θ - Run time, in minutes</p> <p>P_{me} - ΔH (Meter Pressure, gauge)</p> <p>V_m - Volume collected by test meter, corrected for STP</p> <p>Q_{meas} - Calculated flow rate of test meter</p> <p>K_c - Critical orifice coefficient</p> <p>P_{ref} - Measured pressure of reference meter</p> <p>T_m - Temperature measured in reference meter</p> <p>T_m - Temperature measured in test meter</p> <p>Y - Ratio of volume collected from test meter and orifice</p> <p>SC - Scaling Factor</p> <p>Counts_{SC} - Number of pulse counts, standardized</p> <p>Count_{total} - Number of raw pulse counts of a calibration run</p>	$V_{m(std)} = Y * K_1 \frac{V_m * (P_{bar} + \frac{P_{me}}{13.6})}{T_m}$ $V_{m(std)} = Counts_{std} * Y_{SC(1.7)}$ $Counts_{std} = K_1 \frac{Counts_{std} * (P_{bar} + \frac{P_{me}}{13.6})}{T_m}$ $Q_{m(std)} = \frac{V_{m(std)}}{\theta}$ $K_1 = \frac{T_{std}}{P_{std}}$ $Y_{SC} = \frac{V_{m(std)}}{Counts_{std}}$ $Y = \frac{V_{m(std)}}{V_{m(std)}}$ $M_{flow} \Delta H_g = \frac{P_{me} - 0.0011(P_{bar} + \frac{P_{me}}{13.6})}{T_m} * \left(\frac{T_m - 69}{T_{std} - 69} \right)^{1.4}$	



Meter Console Information
 Console Model : XC-572-V
 Console Serial : 1110070
 Temp Indicator Model : ID-45
 Temp Indicator Serial : -

Calibration Conditions
 Cal Date : 24-Jun-24
 Due Date : 24-Jun-25
 Cal Report No : WDS-SV0700007
 Ambient Temp (°C) : 25
 Pressure (mm Hg) : 758
 Humidity (%) : 80

Reference Equipment
 Temp Meter Model : Fluke 716B
 Serial No : 07-A2-24
 Cal Date : 07-A2-24
 Temp Meter Model : Fluke 179
 Serial No : 58620112
 Cal Date : 08-Feb-24

Temperature Sensor Calibration

Reference Point	Ref. Thermocouple Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	25.0	-17.0	1.0
2	38.0	38.0	-1.0
3	50.0	50.0	-1.0
4	148.0	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	594.0	-1.0
9	816.0	817.0	-1.0
10	1038.0	1039.0	-1.0
		Maximum *	1.0

Note

* For valid test results, the maximum difference between temperature readings should $\leq 1.0^\circ\text{C}$ (EPA Method 5, Section 6.1.8).
 Perform all TC Channel calibrations. Except meter (DCM) channel

DCM Out Temperature Sensor Calibration

Temperature Point	Ref. Thermocouple 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

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 :

(Signature)
 (Pitbasu Chaisana)
 Service Manager

WISDOM SCIENCE

บริษัท วิสโดม สاینซ์ แอนด์ เซอร์วิส จำกัด
 WISDOM SCIENCE SALE AND SERVICE GROUP COMPANY LIMITED

Address: 8115 Lumphini Town Unit 800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224/1225/1226/1227/1228/1229/1230/1231/1232/1233/1234/1235/1236/1237/1238/1239/1240/1241/1242/1243/1244/1245/1246/1247/1248/1249/1250/1251/1252/1253/1254/1255/1256/1257/1258/1259/1260/1261/1262/1263/1264/1265/1266/1267/1268/1269/1270/1271/1272/1273/1274/1275/1276/1277/1278/1279/1280/1281/1282/1283/1284/1285/1286/1287/1288/1289/1290/1291/1292/1293/1294/1295/1296/1297/1298/1299/1300/1301/1302/1303/1304/1305/1306/1307/1308/1309/1310/1311/1312/1313/1314/1315/1316/1317/1318/1319/1320/1321/1322/1323/1324/1325/1326/1327/1328/1329/1330/1331/1332/1333/1334/1335/1336/1337/1338/1339/1340/1341/1342/1343/1344/1345/1346/1347/1348/1349/1350/1351/1352/1353/1354/1355/1356/1357/1358/1359/1360/1361/1362/1363/1364/1365/1366/1367/1368/1369/1370/1371/1372/1373/1374/1375/1376/1377/1378/1379/1380/1381/1382/1383/1384/1385/1386/1387/1388/1389/1390/1391/1392/1393/1394/1395/1396/1397/1398/1399/1400/1401/1402/1403/1404/1405/1406/1407/1408/1409/1410/1411/1412/1413/1414/1415/1416/1417/1418/1419/1420/1421/1422/1423/1424/1425/1426/1427/1428/1429/1430/1431/1432/1433/1434/1435/1436/1437/1438/1439/1440/1441/1442/1443/1444/1445/1446/1447/1448/1449/1450/1451/1452/1453/1454/1455/1456/1457/1458/1459/1460/1461/1462/1463/1464/1465/1466/1467/1468/1469/1470/1471/1472/1473/1474/1475/1476/1477/1478/1479/1480/1481/1482/1483/1484/1485/1486/1487/1488/1489/1490/1491/1492/1493/1494/1495/1496/1497/1498/1499/1500/1501/1502/1503/1504/1505/1506/1507/1508/1509/1510/1511/1512/1513/1514/1515/1516/1517/1518/1519/1520/1521/1522/1523/1524/1525/1526/1527/1528/1529/1530/1531/1532/1533/1534/1535/1536/1537/1538/1539/1540/1541/1542/1543/1544/1545/1546/1547/1548/1549/1550/1551/1552/1553/1554/1555/1556/1557/1558/1559/1560/1561/1562/1563/1564/1565/1566/1567/1568/1569/1570/1571/1572/1573/1574/1575/1576/1577/1578/1579/1580/1581/1582/1583/1584/1585/1586/1587/1588/1589/1590/1591/1592/1593/1594/1595/1596/1597/1598/1599/1600/1601/1602/1603/1604/1605/1606/1607/1608/1609/1610/1611/1612/1613/1614/1615/1616/1617/1618/1619/1620/1621/1622/1623/1624/1625/1626/1627/1628/1629/1630/1631/1632/1633/1634/1635/1636/1637/1638/1639/1640/1641/1642/1643/1644/1645/1646/1647/1648/1649/1650/1651/1652/1653/1654/1655/1656/1657/1658/1659/1660/1661/1662/1663/1664/1665/1666/1667/1668/1669/1670/1671/1672/1673/1674/1675/1676/1677/1678/1679/1680/1681/1682/1683/1684/1685/1686/1687/1688/1689/1690/1691/1692/1693/1694/1695/1696/1697/1698/1699/1700/1701/1702/1703/1704/1705/1706/1707/1708/1709/1710/1711/1712/1713/1714/1715/1716/1717/1718/1719/1720/1721/1722/1723/1724/1725/1726/1727/1728/1729/1730/1731/1732/1733/1734/1735/1736/1737/1738/1739/1740/1741/1742/1743/1744/1745/1746/1747/1748/1749/1750/1751/1752/1753/1754/1755/1756/1757/1758/1759/1760/1761/1762/1763/1764/1765/1766/1767/1768/1769/1770/1771/1772/1773/1774/1775/1776/1777/1778/1779/1780/1781/1782/1783/1784/1785/1786/1787/1788/1789/1790/1791/1792/1793/1794/1795/1796/1797/1798/1799/1800/1801/1802/1803/1804/1805/1806/1807/1808/1809/1810/1811/1812/1813/1814/1815/1816/1817/1818/1819/1820/1821/1822/1823/1824/1825/1826/1827/1828/1829/1830/1831/1832/1833/1834/1835/1836/1837/1838/1839/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Calibration Certificate

Certificate No: G 660469
Date of issue : 17-Aug-23



Calibration Certificate

Certificate No. : G 660469



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 :
Customer name : Entech Thailand Consulting 1992 Company Limited
Customer address : 683 Moo 11, Sukhagarn 8 Road, Nongtham, Si Racha, Chon Buri 20280

Total pages of certificate : 2 pages
Receiving no. : L-230525
Receiving date : 10-Aug-23
Parameter of calibration : Gas Calibration (Oxygen 2.488, 10.04, 21.03 %vol, Carbon Monoxide 80.14, 302, 1003 ppm, Nitrogen Dioxide 80.95 ppm, Nitric Oxide 151.5 ppm, Sulphur Dioxide 100.8 ppm)
Condition of UUC : Used
Ambient condition :
Temperature : 23.4 ± 0.5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yeark 48, Tongprasongthong, Lakki, Bangkok 10210
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 coverage is applied only to item under test. Customer must provide a valid certificate for the calibration.
This Calibration Certificate may not be reproduced or used in full or in part without the permission of the issuing laboratory. Calibration certificates without signature and seal are not valid. The results relate only to the items tested/calibrated.
This calibration certificate documents are traceable to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 17-Aug-23

Kornchai
Mr. Kornchai Khandoung
Calibration Technician

D. W. W. W.
Mrs. Mongkoll Wongpettee
Technical Manager

FM-CL-09-C Rev.8

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Issued Date 28/02/16



Entech Industrial Solution Co., Ltd.

17/121 Soi Ngamwongwan 47 Yeark 48, Tongprasongthong, Lakki, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Fax ID : 0105555555551 www.entech.co.th

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O ₂) 2.488 % Vol	4219/21	Linde	30-Sep-25
Oxygen (O ₂) 10.04 % Vol	CG-0132-21	Nmt	18-Nov-25
Oxygen (O ₂) 21.02 % Vol	CG-0441-22	Nmt	14-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0441-22	Nmt	14-Feb-27
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Nitrogen Dioxide (NO ₂) 1003 ppm	2583/22	Linde	09-Aug-24
Nitric Oxide (NO) 151.5 ppm	3240/21	Linde	26-Jun-24
Sulphur Dioxide (SO ₂) 100.8 ppm	0161/23	Linde	22-Jan-25
Measured room conditions	5507/22	Linde	09-Nov-24

Measured room conditions :
Temperature : 23.8 °C Humidity : 62.1 %RH Pressure : 1008.9 mbar
Calibration conditions :
Gas Temperature : 24 °C Flow rate : 1.300 ml/min Gas pressure : 1016.8 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard		Mean of		Uncertainty
	Values	UUC	Error	(±)	
O ₂ (%vol)	2.498	2.55	0.052	0.15	
O ₂ (%vol)	10.04	10.11	0.07	0.20	
O ₂ (%vol)	21.02	21.14	0.12	0.30	
CO (ppm)	80.14	80	-0.14	3.0	
CO (ppm)	302	302	0	6.0	
CO (ppm)	1003	999	-4	12	
*NO ₂ (ppm)	80.96	81.5	0.54	8.0	
*NO (ppm)	151.5	150	-1.5	8.0	
*SO ₂ (ppm)	100.8	100	-0.8	6.0	

Remark : 1 cmol/mol = 1 %vol, 1 µmol/mol = 1 ppm.

* Calibrations marked with TSI Accredited "in this Certificate have been included for completeness."

End of Report

FM-CL-09-C Rev.8

Page 2 of 2



Entech Industrial Solution Co., Ltd.

17/121 Soi Ngamwongwan 47 Yeark 48, Tongprasongthong, Lakki, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Fax ID : 0105555555551 www.entech.co.th

UV/VIS SPECTROPHOTOMETER

Model : UV-1800

Serial No. : A11635101643 CD



Bara Scientific Co., Ltd.
183 Moo 11, Sukhaphibam 8 Rd., Nongkham, Siracha, Chonburi 20230
Tel : 02-6324300 Fax : 02-6375486-7
www.barascientific.com

Certificate of Calibration

Certificate No. BSCC-UV-14624 Number of Page(s) 1 of 3

Equipment UVM-1800 Shimadzu
Model UVM-1800
Manufacturer Shimadzu

Serial No. A11835101643 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, Sukhaphibam 8 Rd., Nongkham, Siracha, 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 WH-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 Accuracy is traceable to certificate No. 116616

The above certificate are traceable to SI unit through Siama Scientific Ltd.

(UKAS accredited calibration laboratory NO. 06559)

Calibrated by Mr. Poomjai Kunsawatvorakul

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 reprinted
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-UV-708-02 Rev.01 (2301/83)



Bara Scientific Co., Ltd.
183 Moo 11, Sukhaphibam 8 Rd., Nongkham, Siracha, Chonburi 20230
Tel : 02-6324300 Fax : 02-6375486-7
www.barascientific.com

Certificate of Calibration

Certificate No. BSCC-UV-14624 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
741.01	741.01	-0.01	0.18
879.41	879.53	-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
	0.2415	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	0.6595	-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.
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reprinted
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-UV-708-02 Rev.01 (2301/83)



Bara Scientific Co., Ltd.
183 Moo 11, Sukhaphibam 8 Rd., Nongkham, Siracha, Chonburi 20230
Tel : 02-6324300 Fax : 02-6375486-7
www.barascientific.com

Certificate of Calibration

Certificate No. BSCC-UV-14624 Number of Page(s) 3 of 3

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (A)
	0.0000	0.0000	0.0000	0.0042
420.0	0.5715	0.5729	0.0014	0.0042
	0.7087	0.7087	0.0000	0.0042
	1.0987	1.1035	0.0018	0.0042
	0.0000	0.0000	0.0000	0.0042
440.0	0.5561	0.5578	0.0017	0.0042
	0.7087	0.7087	0.0000	0.0042
	1.0767	1.0724	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
	0.5183	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
	0.7563	0.7563	0.0004	0.0042
	1.1131	1.1138	0.0007	0.0042

*CNR = Customer not request

4. Stray Light

Unit Under Calibration(UUC)		
Standard cut-off wavelength (nm)	Wavelength (nm)	Absorbance (A)
201.33x0.11nm	200.80	2.0111

The Stray Light Transmittance reference is less than 1.07% 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 reprinted
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-UV-708-02 Rev.01 (2301/83)

CERTIFICATE OF ANALYSIS

EPA PROTOCOL GAS

Cylinder No. : EB0062815



Airgas Specialty Gases
Airgas USA, LLC
10000 Airgas Road
Clarks Summit, NJ 08677-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N189E15ACX9C Reference Number: 82-401135335-1
Cylinder Number: E80062815 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,S02,BALN Certification Date: Mar 13, 2018
Expiration Date: Mar 13, 2028

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) Document EPA-824-R-12-001. All test results are certified to the accuracy and precision of the EPA Traceability Protocol. The uncertainty of the analysis is stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are as a percentage of the total gas mixture.

Do Not Use This Cylinder below 180 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NOX	50.00 PPM	50.55 PPM	G1	+/- 1.4% NIST Traceable
NITRIC OXIDE	50.00 PPM	50.50 PPM	G1	+/- 1.4% NIST Traceable
SULFUR DIOXIDE	50.00 PPM	51.01 PPM	G1	+/- 1.0% NIST Traceable
NITROGEN MONOXIDE	50.00 PPM	51.01 PPM	G1	+/- 1.0% NIST Traceable
NITROGEN	Balance	1877 PPM	G1	+/- 1.0% NIST Traceable

CALIBRATION STANDARDS		
Type	Lot ID	Concentration
NTRM	18059007	GC44254
PRM	12887	50.42 PPM NITRIC OXIDE/NITROGEN
PRM	12887	9.82 PPM NITROGEN DIOXIDE/AIR
NTRM	16011025	45.02 PPM SULFUR DIOXIDE/NITROGEN
NTRM	1260735	45.02 PPM SULFUR DIOXIDE/NITROGEN
The SEM, PM10 or PM2.5 noted above is only in reference to the OMS used in the assay and not part of the analysis.		
2468 PPM CARBON MONOXIDE/NITROGEN		
+/- 0.6%		

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicola 6700 APW1100381 CO	FTIR	Feb 08, 2018
Nicola 6700 APW1100381 NO	FTIR	Feb 15, 2018
Nicola 6700 APW1100381 NO2	FTIR	Feb 16, 2018
Nicola 6700 APW1100381 S02	FTIR	Mar 01, 2018

Trued Data Available Upon Request

NOTES:NET WEIGHT: 10.43lbs
GROSS WEIGHT: 60.93lbs
Purity: 99.999%

This calibration has been certified in accordance with the May 2012 EPA Traceability Protocol. All test results are certified to the accuracy and precision of the EPA Traceability Protocol. The uncertainty of the analysis is stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are as a percentage of the total gas mixture.



ACCREDITED

TESTING CERT No. 3082.05

Approved for Release

ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : 1126323724

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ASIA MEDICAL AND
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AND RESEARCH CENTER



ISO 15020:2005
CALIBRATION

Page 1 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphibarn 8 Rd., Nongkham,
Sirachha, Chonburi 20260

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Serial No. : 1126323724

ID No. : LABE 05/1

Date of Receipt : 22 December 2023

Date of Calibration : 22 December 2023

Calibrated by : Mr. Somwang Sangdee
Scientist

Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 25 December 2023
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 data and photo attached.

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).

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WWW.AMARC.CO.TH
Effective Date: 15/10/21

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ISO 15020:2005
CALIBRATION

Page 2 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE
Manufacturer : METTLER TOLEDO
Model : XS205DU
Capacity : Max 81 g / 220 g
Resolution : 0.01 mg / 0.1 mg
Serial No. : 1126323724
ID No. : LABE 05/1

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 : 80	Before adjustment	After adjustment
Nominal value	40	80	80
Standard weight	40.000054	80.000048	80.000054
Average reading of indicator	40.00026	80.00037	80.00077
Standard deviation	0.000015	0.000016	0.000008

Unit : g	Range : 200	Before adjustment	After adjustment
Nominal value	100	200	200
Standard weight	100.000042	200.000041	200.000041
Average reading of indicator	100.00003	200.00004	200.00001
Standard deviation	0.000005	0.000005	0.000003

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Certificate No. : 23-148799
Sample Code : 23-56200-001

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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 : 80		Range : 200	
Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	1.00748	0	1.0074
40	0.99753	100	0.9975
80	0.99751	200	0.9975

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	0.00000	0.00000	0.000012	2.05
0.01	0.0100025	0.01000	0.00000	0.000012	2.05
0.1	0.1000019	0.10001	-0.00001	0.000013	2.03
1	1.0000125	1.00001	0.00000	0.000015	2.02
5	5.0000208	5.00004	-0.00002	0.000021	2.00
10	10.0000004	10.00008	-0.00008	0.000026	2.00
20	20.0000030	20.00011	-0.00008	0.000036	2.00
50	50.0000014	50.00014	-0.00013	0.000068	2.00
100	100.0000042	100.0001	-0.0001	0.00016	2.00
150	150.0000056	150.0001	0.0000	0.00022	2.00
200	200.0000041	200.0002	-0.0002	0.00027	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 M2003.

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Certificate No. : 23-148799
Sample Code : 23-56200-001

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.

Weighing pan		Test weight : 50 and 100	
		Unit : g	
Range	Position	Reading of indicator	Reading of indicator
1	50.00015	100.0001	100.0001
2	50.00022	100.0001	100.0001
3	50.00008	100.0001	100.0001
4	50.00002	100.0000	100.0000
5	50.00016	100.0002	100.0002
6	50.00014	100.0001	100.0001
Maximum difference	0.00013	0.0001	0.0001

Condition of Calibration

1. Calibration Method : W.C.-004 based 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 Units maintained at :-

Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (natural mass number 1).

5. Reference standard instrument :

1) STANDARD WEIGHT 1 kg to 1 kg

Class : E2

ID No. : LB WE-79

Certificate No. : 23-105642

Due Date : 10 September 2024

End of Report

Ambient conditions		Min	Max
Temperature (°C)		22.8	23.0
Relative Humidity (%RH)		43.5	51.1
Air pressure (hPa)		1020.5	1024.5

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P.N. CC-024

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Fax: 02-518-6548
Rev.03
Effective Date: 10/07/21

ANALYTICAL BALANCE

Model : SECURA224-1S

Serial No. : 0036707137

BOD INCUBATOR
Model : TC445S
Serial No. : 0223/007275

SK

S K SALES AND SERVICE CO.,LTD.
194/56, 194/57 Thokhro Rd. Samsa Dam
Bang Khun Thien, Bangkok 10150
Tel.: 02-417-2144 Fax: 02-417-2155



Certificate of Calibration

Reference No. : C03190/2309-025
Customer : Eastern Thai Consulting 1982 Co.,Ltd.
: 603 Moo 11, Sukhaphiban 8, Tambol Nongtham,
: Saracha District, Chonburi 20230, Thailand
Equipment : Incubator
: Lovibond
Model : TC445S
Serial No. : 0223007275
ID No. :
Received Date : 15 September 2023
Calibrated Date : 15 September 2023
Issued Date : 18 September 2023
Environment :
Certificate No. : S2309-3014
Page 1 of 2

Ambient Temperature (°C)	27.5	Minimum Value	28.1	Maximum Value
Relative Humidity (% RH)	57		58	
AC Line Voltage (VAC)	224		226	
Place Of Calibration	Production Line			
Calibrated by	Mr. Teerasak Chaiyaporn			

Calibration Method

In-house method : SK-WI-23 base on Thai Laboratory Accreditation Scheme Publication Reference G-20

Condition of this result of calibration

1. Reference standard instrument
- | Instrument | Serial No. | Certificate No. | Due Date |
|---------------------------------|------------|-----------------|-----------------|
| 1) Data acquisition/switch unit | MY4407387 | L2305-268 | 4 November 2023 |
| 2) Multiplexer Module | MY41105123 | L2305-268 | 4 November 2023 |
2. This result of calibration was found accurate as shown on date and place of calibration only
3. This certificate can be traceable to International System of Unit :
: Through Thailand Institute of Scientific And Technological Research (TISTR)

Approved by :

Mr. Suphachai Sakri

Mr. Phayak Toolit

Miss Tantaporn Peltong

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2.0$, providing a level of confidence level of approximately 95 %

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Certificate No.: S2309-3014
Page 2 of 2

Table1 General Information

Working Area (W*L*H)	60 *56 *145 cm
Fresh Air	OFF

Table2 Chamber Performance

Setting Temperature (°C)	Average Indicating Temperature (°C)	Measured Stability (± °C)	Measured Uniformity (°C)	Overall Variation (± °C)
20.0	20.0	0.37	0.64	0.98

Table3 Temperature Distribution

Table 3 Temperature Distribution											
Setting Temperature (°C)		Average Standard Reading (°C)									Uncertainty (± °C)
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	
20.0		19.52	19.40	19.70	19.43	19.33	19.39	19.45	19.58	19.67	
										0.55	

Resolution : 0.1 (°C)

• Probe No. 9 is Reference Probe



- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the minimum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The reported uncertainty of measurement were excluded Uniformity and Stability

** End of Calibration Report **

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BOD INCUBATOR
ID No. : LABE 19/5



CERTIFICATE OF CALIBRATION

Certificate No. : 23-040788
Sample Code : 23-1878-002

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
663 Moo 11, Sukhaphan 8 Rd., Nongpham,
Siracha, Chonburi 20220
Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)
Equipment : Temperature controlled enclosures (Incubator)
Manufacturer : Lovibond
Model : TC445S
Serial No. : 0520/005227
ID No. : LABE 19/5
Date of Receipt : 21 April 2023
Date of Calibration : 21 April 2023

Condition of Calibration
1. Environment
1.1 Ambient temperature : Maximum 35.1 °C : Minimum 34.5 °C
1.2 Relative humidity : Maximum 51.8 % : Minimum 49.3 %
1.3 Line voltage supplied : Maximum 224.7 VAC : Minimum 221.9 VAC
2. Calibration method
TLAS-G-20 Guidelines for calibration and checks of temperature controlled enclosures.
3. Reference standard instrument
Data Acquisition WIR Sensor ID No. : Certificate No. : Due Date :
(RTD-PH00) LB-DA-08 (RTD-239 to RTD-247) 22-077888 09 August 2023

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. The result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of calibration item : Normal

Calibrated by : Mr. Sarawoot Thamno Approved by : (Mr. Somchai Niamrump)
Scientist
Issue date : 24 April 2023
The uncertainties are for a confidence probability of approximately 95%.
This calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.
The 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 use of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full respect with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).
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Phaholapha, Wang Thonglang, Bangkok 10310
TEL: 02-516-5949
FAX: 02-516-5949
WWW.AMARC.CO.TH
(Thailand) (S/N 717)



REPORT OF CALIBRATION

Certificate No. : 23-040788
Sample Code : 23-1878-002

Results of Calibration
Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC ^a setting (°C)	UUC ^a reading (°C)	#1	#2	#3	#4	#5	#6	#7	#8	#9 ^{av}	Uncertainty ± (°C)	Coverage factor k
20	20.0	20.0	20.06	19.92	19.96	19.89	19.93	20.08	19.97	19.79	19.86	0.42	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
20	0.32	0.37	0.85

Notes
UUC^a = Unit Under Calibration



Hot Air Oven
Model : UM 400
Serial No. : 900982

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CERTIFICATE OF CALIBRATION

Page 1 of 3
Certificate No. : 24-001944
Sample Code : 24-00983-001

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongkhum,
Sriracha, Chonburi 20230
Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(not Lab)
Equipment : Temperature controlled enclosures (Hot air oven)
Manufacturer : Memmert
Serial No. : 900982
Date of Receipt : 09 January 2024
Condition of Calibration
1. Environment
1.1 Ambient temperature : Maximum 30.6 °C : Minimum 29.2 °C
1.2 Relative humidity : Maximum 57.5 % : Minimum 46.4 %
1.3 Line voltage supplied : Maximum 229.5 VAC : Minimum 222.5 VAC
2. Calibration method
3. Reference standard instrument
Data Acquisition With Sensor ID No. Certificate No. Due Date
Instrument LB-0A-10 (RTD-257 to RTD-265) 23-066256 29 June 2024
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. Sarawoot Thammoo

Approved by

(Mr. Somchai Neampunt)
Signed for Director

Issue date

09 January 2024

The uncertainties are for a confidence probability of approximately 95%.
This calibration result is applied only to the above calibrated item and does not account for those on date and place of calibration only.
The calibration result 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.
This result of calibration was found accurate as shown on date and place of calibration only.
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Effective Date: 19/09/21

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REPORT OF CALIBRATION

Page 2 of 3
Certificate No. : 24-001944
Sample Code : 24-00983-001

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 factor k
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	
60	60.0	60.0	60.04	59.90	59.81	59.84	59.47	59.91	60.08	59.98	2.00
85	85.0	85.0	86.07	85.75	85.59	85.62	84.69	85.63	86.28	85.94	2.00
2. Characterization results											
Calibration point (°C)			Stability ± (°C)		Uniformity (°C)						Overall variation (°C)
60			0.11		0.49						0.80
85			0.09		1.13						1.72

Notes
· UUC* = Unit Under Calibration
[Signature]

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WWW.AMARC.CO.TH
Effective Date: 19/09/21

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REPORT OF CALIBRATION

Certificate No. : 24-001944
Sample Code : 24-00963 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 at the geometric center of the chamber.
2. Interior dimensions approx of chamber :
 $W = 40 \text{ cm}$; $D = 28 \text{ cm}$; $H = 39 \text{ cm}$
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.

The result expanded uncertainty of measurement U is stated as the standard uncertainty 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 ISO 15003.

End of Report

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LIQUID IN GLASS THERMOMETER

Model : Total Immersion

Serial No. : 43560



QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Lakong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qualitycalibration.com



CERTIFICATE No. : 23TT0864
REFERENCE No. : 7117-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER :
MODEL : PRECISION
SERIAL No. : 0 °C TO 100 °C
ID No. : 43560
RESOLUTION :
TYPE : LABEL 16/1
CONDITION AS RECEIVED : 0.1 °C
SUBMITTED BY : TOTAL IMMERSION
USED ITEM :
EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBAN 8 ROAD, NONGKHAM,
SRIRACHA, CHONBURI 20230

CALIBRATED BY : CHARUKIT L.
CALIBRATION DATE : 09-Nov-23
APPROVED BY :
ISSUED DATE : 09-Nov-23
RECEIVED DATE : 02-Nov-23

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

F-0010 REV /03

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QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Lakong, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qualitycalibration.com

CERTIFICATE No. : 23TT0864

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : LIQUID IN GLASS THERMOMETER
MANUFACTURER :
MODEL : PRECISION
ID No. : 0 °C TO 100 °C
RESOLUTION : LABEL 16/1
RECEIVED DATE : 0.1 °C
AMBIENT TEMPERATURE : 02-Nov-23
RELATIVE HUMIDITY : 23 °C ± 3 °C
SERIAL NUMBER : 43560
TYPE : TOTAL IMMERSION
CALIBRATION DATE : 09-Nov-23
RELATIVE HUMIDITY : 50 %RH ± 20 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON LAST CALIBRATION BY COMPARISON WITH STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT) INTO LIQUID BATH TEMPERATURE CONTROLLER. THE TEMPERATURE SCALE USED WAS BASED ON ITS-90.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD THERMOMETER	1502	77964	23T3927	08-Mar-24
2) PRECISION BATH	3814	616626	23T3927	08-Mar-24
3) PRECISION BATH	1502	A21105	22T13199	14-Dec-23
4) PRECISION BATH	CTB-40	1502	22T13198	09-Nov-23
5) PRECISION BATH	6045	32093	22T13198	09-Nov-23

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

NATIONAL INSTITUTE OF METROLOGY (THAILAND).
RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

STANDARD READING (°C)	UUC* READING (°C)	IMMERSION DEPTH (mm)	CORRECTION (°C)	EMERGENT STEM TEMPERATURE (°C)	UNCERTAINTY OF MEASUREMENT (±°C)
0.009	0.0	60	0.0090	N/A	0.26
25.01	23.0	165	0.0050	N/A	0.26
50.00	50.0	275	0.0040	N/A	0.26
99.991	100.0	360	-0.009	29.3	0.26

UUC* UNIT UNDER CALIBRATION

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

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F-0010 REV

pH Meter
Model : SevenCompact S220
Serial No. : B448305208



CERTIFICATE OF CALIBRATION

Supersede to Calibration Certificate No. 24-001949
Page 1 of 3
Certificate No. : 24-001949/1
Sample Code : 24-00963-006

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
663 Moo 11, Sukhaphan 8 Rd., Nongbham,
Siracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
Date of Receipt : 09 January 2024
Condition of Calibration : SevenCompact S220
ID No. : LABE 11/4
Date of Calibration : 09 January 2024

1. Environment
1.1 Ambient temperature : 22.4 ± 0.2 °C 1.2 Relative humidity : 56.4 % ± 2.1 %
2. Calibration method
In house method WI-CL-019, based on direct measurement by using standard voltage calibrator and using certified reference material (CRM).
3. Reference standard / Certified reference material
- | Instrument | ID No. | Certificate No. | Due Date |
|------------------------------|-----------|-----------------|-------------------|
| 3.1 Voltage Calibrator | LB-ANC-01 | 2353244 | 03 October 2024 |
| 3.2 Digital Thermometer | LB-TH-33 | 23-098974 | 25 August 2024 |
| Certified Reference Material | Lot. No. | Ref No. | Expire Date |
| 3.3 Buffer Solution pH 4.008 | 919273 | PH216L5 | 24 September 2025 |
| 3.4 Buffer Solution pH 6.986 | 947727 | PH107L5 | 06 November 2024 |
| 3.5 Buffer Solution pH 9.597 | 919278 | PH220L5 | 24 September 2024 |
4. This certificate is traceable to the international system of unit (SI Unit).
- 4.1 Instrument No. 3.1 through Technology Promotion Association (Thailand-Japan).
- 4.2 Instrument No. 3.2 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.
- 4.3 Buffer Solution No. 3.3 and No. 3.5 traceable to CIPA Chem (through primary measurement method-Harned cell using calibrated thermometer, barometer, and nanovoltmeter Accredited laboratory ISO/IEC 17025 and ISO/IEC 17034).
- 4.4 Buffer Solution No. 3.4 traceable to CIPA Chem (CIPA RefH HARNED CELL LGN 612/5737; CIPA RefH HARNED CELL LGN 612/3986 Accredited laboratory ISO/IEC 17025 and ISO/IEC 17034).
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. Nuttipatt Timula
Approved by : (Mr. Sotchara Neamput)

Issue date : 31 January 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is valid only for 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 found it to be competent to perform the calibration of the instrument. The certificate is valid only for the instrument and the material as stated on the certificate. The certificate may not be reproduced and when it is for any use with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

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Effective Date 15/01/21



REPORT OF CALIBRATION

Supersede to Calibration Certificate No. 24-001949
Page 3 of 3
Certificate No. : 24-001949/1
Sample Code : 24-00963-006

Equipment : pH Meter (Digital Thermometer with sensor)

Thermometer readout

Manufacturer : METTLER TOLEDO
Model : SevenCompact S220
Serial No. : B448305208
ID No. : LABE 11/4
Resolution : 0.1 °C
Range : -5.0 °C to 130.0 °C

Thermometer sensor

Manufacturer : METTLER TOLEDO
Model : InLab Expert Pro-ISM
Serial No. : 2453982
ID No. : N/A

Condition of Calibration

1. Environment
1.1 Ambient temperature : 22.6 °C ± 0.1 °C
1.2 Relative humidity : 55.1 % ± 3.3 %

2. Calibration method
2.1 The calibration use in house method WI-CL-021, by comparison with standard thermometer
2.2 The calibration by comparison unit under calibration (UUC) to the standard thermometer in a calibration bath at the controlled temperature.

2.3 The temperature scale in use of this laboratory is the international temperature scale of 1990 (ITS-90).

3. Reference standard instrument

Instrument	Model	ID. No.	Certificate No.	Due date
3.1 Resistance Thermometer	PT-100	RTD-90	23-098974	25 August 2024
3.2 Thermometer Readout	GT-11	LB-TH-33	23-098974	25 August 2024

4. This certificate is traceable to the international system of unit (SI Unit).
Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (Accreditation Under TLAS Laboratory Calibration No.0752)

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

6. Condition of Calibration item : Normal

Results of Calibration

Calibration point °C	Average of standard reading °C	Unit under calibration		Expanded uncertainty k	Coverage factor k
		Immersion depth mm	Average reading °C	Correction value °C	
25	25.000	120	25.0	0.000	± 0.14
					2.00

Notes

- Calibration results without adjustment

The result reported 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 GUM 1995.



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REPORT OF CALIBRATION

Supersede to Calibration Certificate No. 24-001949
Page 2 of 3
Certificate No. : 24-001949/1
Sample Code : 24-00963-006

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
Range : -5.000 pH to 20.000 pH ; ± 2000.0 mV ; -5.0°C to 130.0°C

Resolution : 0.01 pH ; 0.1 mV ; 0.1 °C
Model : SevenCompact S220
ID No. : LABE 11/4

Results of Calibration

Part 1. DC Voltage measurement
pH Meter Serial No. : B448305208

Nominal Value pH	Applied DC Voltage mV		Average indicator reading mV		Uncertainty mV	Coverage factor k
0	414.113		433.9		± 0.083	2.00
4	177.477		177.4		± 0.083	2.00
7	0.000		0.1		± 0.083	2.00
10	-177.477		-177.3		± 0.083	2.00
14	-414.113		-413.8		± 0.083	2.00

Part 2. Performance of Electrode system
Electrode Manufacturer : METTLER TOLEDO
Electrode Serial No. : 2453982
Model : InLab Expert Pro-ISM

Three-Point Calibration at pH4, pH7 and pH10
Percent Slope : 96.3

Standard Buffer Solution pH (@ 25 °C)	Average indicator reading		Error Value	Uncertainty pH	Coverage factor k
	pH	mV	pH		
4.008	4.01	182.1	0.002	± 0.010	2.00
6.866	7.00	7.8	0.014	± 0.011	2.00
9.997	10.01	-167.2	0.013	± 0.011	2.00

The result reported 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 GUM 1995.



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STANDARD WEIGHT 50 g

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ASIA MEDICAL AND
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CALIBRATION 0152

Page 1 of 3

Certificate No. : 22-052238
Sample Code : 22-19150-003

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibam 8 Rd., Nongpham,
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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022

Signed for Director
(Mr. Somchai Neamput)

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 data 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 capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standard 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).

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CALIBRATION 0152

Page 2 of 3

Certificate No. : 22-052238
Sample Code : 22-19150-003

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
			(mg)	\pm (mg)	
50 g	-0.324	49.999676 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 to a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with ISO/IEC 17025.

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Effective Date: 15/01/21

Certificate No. : 22-052238
Sample Code : 22-19150-003

REPORT OF CALIBRATION

Condition of Calibration:

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.20 Kg/m³
2. Calibration Method : Direct comparison weighing according to OIML R111 : 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-79	21-079366	22 September 2022

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 -

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STANDARD WEIGHT 100 g

Certificate No. : 22-052239
Sample Code : 22-19150-004

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongtham,
Siracha, Chonburi 20230Location 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022
(Mr. Somchai Niamsunt)
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.

The Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the competence of the laboratory and its traceability to the international 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).

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Effective Date: 15/10/21Certificate No. : 22-052239
Sample Code : 22-19150-004

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5 °C, Relative humidity 50% ± 10% and air density 1.18 kg/m³
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-79	21-079366	22 September 2022

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 -

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Certificate No. : 22-052239
Sample Code : 22-19150-004

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 (mg)	Conventional Mass	Expanded Uncertainty (mg)	Maximum Permissible Error \pm (mg)	ID No.
100 g	-0.171	99.999829 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 ISO 5450:2003

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STANDARD WEIGHT 50 g

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Certificate No. : 22-052237
Sample Code : 22-19150-002

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022

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 units 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).

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Certificate No. : 22-052237
Sample Code : 22-19150-002

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
50 g	(mg)		(mg)	± (mg)	
	-0.111	49.999889 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 M0003

[Signature]

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Page 2 of 3

Certificate No. : 22-052237
Sample Code : 22-19150-002

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.18 kg/m³
2. Calibration Method : Wt-CL-007 base on OIML R 111-1 : 2004(E)
3. Reference standard instrument

Instrument	ID No.	Class	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	LB-WF-79	E2	21-079366	22 September 2022

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 -

Amara

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E-mail: amarc@amarc.co.th
www.amarc.co.th
Effective Date: 15/01/21

UV/VIS SPECTROPHOTOMETER

Model : UV - 1800

Serial No. : A11635101643 CD



Bara Scientific Co., Ltd.
988 U Chu Liang Building Floor7 Rama4 Road
Bangkok 10300
Tel: 02-8324300 Fax: 02-83754827
www.barascientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-152/23
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 CD
ID No. N/A
Date of receipt 25 April 2023
Date of calibration 25 April 2023
Date of issue 27 April 2023
Customer name Eastern Thai Consulting 1992 Co.,Ltd
Address 683 Moo 11, Sukkaphibarn 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (22.4±23.1) °C (On site)
Humidity (44.5±45.2) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method WH-UV-702-01 based on ASTM E275-01

Traceability
Wavelength Accuracy is traceable to certificate No. 94780 and 94775
Photometric Accuracy is traceable to certificate No. 94808 and 100147
Stray Light is traceable to certificate No. 94791
The above certificate are traceable to SI unit through Starna Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr. Pannaphong Phamekikul

Approved by

Mr. Kanchit Choothep
Technical 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
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Mr. Kanchit Choothep
Technical Manager

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FM/UV-708-02 Rev 01 (230163)



Bara Scientific Co., Ltd.
988 U Chu Liang Building Floor7 Rama4 Road
Bangkok 10300
Tel: 02-8324300 Fax: 02-83754827
www.barascientific.com



Certificate of Calibration

Certificate No. BSCC-UV-152/23 Number of Page(s) 3 of 3

Calibration Results:

3. Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
420.0	0.0000 0.5405 0.7327 1.0756	0.0000 0.5308 0.7335 1.0759	0.0000 0.0020 0.0008 0.0002	0.0042 0.0042 0.0042 0.0042
440.0	0.0000 0.5391 0.7355 1.0509	0.0000 0.5405 0.7360 1.0501	0.0015 0.0005 0.0005 -0.0008	0.0042 0.0042 0.0042 0.0042
465.0	CNR CNR CNR CNR	CNR CNR CNR CNR	CNR CNR CNR CNR	CNR CNR CNR CNR
546.1	0.0000 0.5045 0.6984 0.9316	0.0000 0.5044 0.6985 0.9309	0.0000 -0.0001 0.0001 -0.0008	0.0042 0.0042 0.0042 0.0042
590.0	CNR CNR CNR CNR	CNR CNR CNR CNR	CNR CNR CNR CNR	CNR CNR CNR CNR
635.0	0.0000 0.5183 0.6864 0.9747	0.0000 0.5178 0.6868 0.9739	0.0000 -0.0005 -0.0004 -0.0008	0.0042 0.0042 0.0042 0.0042

*CNR = Customer not request

4. Stray Light*

Standard cut-off wavelength (nm)	Wavelength (nm)	Unit Under Calibration(UUC) Transmission (%)	Absorbance (A)
200.75±0.1 nm	200.72	0.9630	2.0184

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-CNSC 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
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FM/UV-708-02 Rev 01 (230163)



Bara Scientific Co., Ltd.
988 U Chu Liang Building Floor7 Rama4 Road
Bangkok 10300
Tel: 02-8324300 Fax: 02-83754827
www.barascientific.com



Certificate of Calibration

Number of Page(s) 2 of 3

Certificate No. BSCC-UV-152/23

Calibration Results:

1. Wavelength Accuracy

Certified Wavelength (nm)	UUC (nm)	Error (nm)	Uncertainty (±nm)
287.71	287.65	-0.06	0.18
445.92	445.90	-0.02	0.18
536.52	536.35	-0.17	0.18
741.02	740.99	-0.03	0.18
879.41	879.27	-0.14	0.18

2. Photometric Accuracy (UV)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (±A)
235	0.0000 0.7311	0.0000 0.7313	0.0000 0.0002	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 0.6306	0.0000 0.6314	0.0000 0.0008	0.0075 0.0075

*CNR = Customer not request

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
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ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : 1126323724

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ASIA MEDICAL AND
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ISO 15020:2005
CALIBRATION

Page 1 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphibarn 8 Rd., Nongkham,
Sirachha, Chonburi 20260

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Serial No. : 1126323724

ID No. : LABE 05/1

Date of Receipt : 22 December 2023

Date of Calibration : 22 December 2023

Calibrated by : Mr. Somwang Sangdee
Scientist

Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 25 December 2023
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 data and photo attached.

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).

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Effective Date: 15/10/21

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ISO 15020:2005
CALIBRATION

Page 2 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE
Manufacturer : METTLER TOLEDO
Model : XS205DU
Capacity : Max 81 g / 220 g
Resolution : 0.01 mg / 0.1 mg
Serial No. : 1126323724
ID No. : LABE 05/1

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 : 80	<input checked="" type="checkbox"/> Before adjustment	<input type="checkbox"/> After adjustment
Nominal value	40	80	80
Standard weight	40.000054	80.000048	80.000054
Average reading of indicator	40.00026	80.00037	80.00077
Standard deviation	0.000015	0.000016	0.000008

Unit : g	Range : 200	<input checked="" type="checkbox"/> Before adjustment	<input type="checkbox"/> After adjustment
Nominal value	100	200	200
Standard weight	100.000042	200.000041	200.000041
Average reading of indicator	100.00003	200.00004	200.00001
Standard deviation	0.000005	0.000005	0.000003

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Effective Date: 15/10/21

Certificate No. : 23-148799
Sample Code : 23-56200-001

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 : 80		Range : 200	
Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	1.00748	0	1.0074
40	0.99753	100	0.9975
80	0.99751	200	0.9975

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	0.00000000	0.00000	0.00000	0.000012	2.05
0.01	0.01000025	0.01000	0.00000	0.000012	2.05
0.1	0.10000019	0.10001	-0.00001	0.000013	2.03
1	1.00000025	1.00001	0.00000	0.000015	2.02
5	5.00000028	5.00004	-0.00002	0.000021	2.00
10	10.00000004	10.00008	-0.00008	0.000026	2.00
20	20.00000030	20.00011	-0.00008	0.000036	2.00
50	50.00000014	50.00014	-0.00013	0.000068	2.00
100	100.00000042	100.0001	-0.0001	0.00016	2.00
150	150.00000056	150.0001	0.0000	0.00022	2.00
200	200.00000041	200.0002	-0.0002	0.00027	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 M2003.

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THA 10304Tel: 02-518-2422
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WWW.AMARCO.CO.TH
Effective Date: 10/02/21Certificate No. : 23-148799
Sample Code : 23-56200-001

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.

Weighing pan		Test weight : 50 and 100	
		Unit : g	
Range	Position	Reading of indicator	Reading of indicator
1	50.00005	100.0001	100.0001
2	50.00022	100.0001	100.0001
3	50.00008	100.0001	100.0001
4	50.00002	100.0000	100.0000
5	50.00016	100.0002	100.0002
6	50.00014	100.0001	100.0001
Maximum difference		0.00013	0.0001

Condition of Calibration

1. Calibration Method : W.C.-004 based on UKAS L48 is 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 Units maintained at :-

Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (natural measurement).

5. Reference standard measurement:

Instrument : 1) STANDARD WEIGHT 1 kg to 1 kg

Class : E2

ID No. : LB WE-79

Certificate No. : 23-105642

Due Date : 10 September 2024

End of Report

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Effective Date: 10/02/21

ATOMIC ABSORPTION SPECTROPHOTOMETER

Model : Pin AAcle 900F

Serial No. : PFBS22080801

PinaAcle 900F Preventive Maintenance (PM)				
Company Name:	Eastern Thai Consulting 1992 Co.,Ltd.			
Address	683 Moo 11 Sukapibul 8 Rd. Nong Khiam,Si Racha, Chonburi 20230			
[Instrument Location]:	Serial Number:	PM Number:	2 of 2	
	PFBSZ2080801	Telephone Number:		
Customer Name (if applicable):	Kiwanchai	Service Order Number:	WO-02863148	
Customer Support Engineer Name:	25-Oct-2024	Next PM Due Date: (pp-mm-yyYY)	25-Apr-2025	
Date PM Performed: (pp-mm-yyYY)				
Standard Labor Hours to Complete PM :			5 hours	

Part Number	Release	Publication Date
09370145 Rev.9	A	January 2018



Scope of the PM is to ensure the continued functionality of the PinaAcle 900F 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 customer should save their method before the PM begins. This 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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PerkinElmer shall not be liable for incidental or consequential damages in connection with the furnishing or use of this document.

Component List

Component / Specific Model	Serial #	Configuration Notes
FIA5100		

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
B0501696	Fan Filters	NA
N3160156	O-Ring Kit for Sampling Introduction (Stainless Steels Nebulizer)	NA
N3160157	O-Ring Kits for Sampling Introduction (Plastic Nebulizer)	NA
N301714	Replacement Acetylene Filter Cartridge	NA
TH021022	Replacement Air Filter Cartridge	NA

Additional Reagents and Standards Required for PM			
Part Number (if applicable)	Description	Quality	Batch/Lot # Expiration Date (m/y)
N9300183	1000 mg/L Copper Standard	AR	27-39CUY1 APR-2025

Additional Reagents and Standards Required for PM (Customer Support Solution)			
Part Number (if applicable)	Description	Quantity	Batch/Lot # Expiration Date (m/y)
N/A	DI Water	250 mL	AR
N/A	0.5% HNO ₃	250 mL	AR

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

- General:**
 - ✓ Review the instrument performance with the customer and document any recent problems.
 - ✓ Inspect the customer log book and make any appropriate PM entries.
 - ✓ Perform general inspection of system for cleanliness.
- PC Instrument Software:**
 - ✓ Instrument Software user files/databases archived, packed, and/or deleted as needed.
- Mechanical:**
 - ✓ Inspect and clean all fans and filters. Replace filters if necessary
 - ✓ Inspect all gas lines for leaks and/or wear. Replace if needed.
 - ✓ Clean exterior of the instrument.
 - ✓ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
 - ✓ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking cloth width.
 - ✓ Inspect the condition of the cap, burner head, and nebulizer O-rings. Replace if necessary.
 - ✓ Check the condition of the cap, burner head, and nebulizer O-rings. Replace if necessary.
 - ✓ Check the drain system for signs of wear. Replace worn or damaged parts.
 - ✓ Visually check for proper flame conditions when lighting the AIC-CH2 and N2O-C2H2 flames (if applicable).
- Electrical:**
 - ✓ Inspect PC boards. Clean if necessary.
 - ✓ Carefully check all internal and external cable connections.
 - ✓ Check instrument firmware revisions upgrade to current levels (if necessary)
 - ✓ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.
- Optics:**
 - ✓ Inspect and clean the sample compartment windows, if needed.
 - ✓ Inspect optics. Clean or replace if necessary.
- Gasses:**
 - ✓ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinaAcle 900 Series Pre-Installation Checklist SDB.
 - ✓ Verify that the acetylene filter and air filter element is dry. Replace if necessary.

7. Flame Interlock Checks:

Description: Check to ensure that all safety interlocks are closed.

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/CH ₄ Flame correctly shuts down	Active	Pass
Drain Sensor	Air/CH ₄ Flame correctly shuts down	Active	Pass
Nebulizer Sensor	Air/CH ₄ Flame correctly shuts down	Active	Pass
CH ₄ Pressure Sensor	Air/CH ₄ Flame correctly shuts down	Active	Pass
Air Pressure Sensor	Air/CH ₄ Flame correctly shuts down	Active	Pass
Burner Head Sensor	Closing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Pass

8. After PM Performance tests:

8.1 Detector Linearity with Barium

Description: Ensures that the detector is linear in the Visible Range.

Parameter	Specification	Certificate Value at 589.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	1.0531	1.0516	Pass
0.2 A ND Filter	± 5% from Cert.	0.1806	0.1791	Pass

8.2 Baseline Noise at 1.0 Absorbance with Barium

Description: Ensures that a high absorbance will not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0013	Pass

8.3 A4 Baseline Noise with Copper

Description: Check baseline noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.001	0.0001	Pass

8.4 D₂ Background Compensation with Copper

Description: Verifies the instruments ability to compensate for Background absorption.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	± 0.010	-0.0204	Pass

8.5 A4-BG Baseline Noise with Copper

Description: Ensures that background correction does not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	± 0.005	0.0003	Pass

8.6 A4-BG Baseline Noise with Arsenic

Description: Ensures that background correction does not produce excessive noise at a low wavelength.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0004	Pass

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity S5 Neb (if applicable)	> 0.250 Abs.	NA	NA
2 mg/L Sensitivity HS Neb (if applicable)	> 0.250 Abs.	0.3874	Pass

10. Review:

- ☒ Review with the customer PM work performed.
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

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Additional Comments

Additional Comments Regarding the PM
None

Review

The preventive maintenance checks and if applicable performance tests for PinAAcLe 900F have been completed.

This PinAAcLe 900F ☒ Passes ☐ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:

KL S.

Authorized Customer Representative:

Date:

25-Oct-2024
(DD-MMM-YYYY)

Date:

25-Oct-2024
(DD-MMM-YYYY)

COPY

ANALYTICAL BALANCE

Model : SECURA224-1S

Serial No. : 0036707137

AMARC

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CENTRE



KSC 153-1531705
CALIBRATION

Page 1 of 4

Certificate No. : 23-148800
Sample Code : 23-56200-002

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphitarn 8 Rd., Nongkham,
Siracha, 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 : 22 December 2023

Date of Calibration : 22 December 2023

Calibrated by : Mr. Somwang Sangdee
Scientist

Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 25 December 2023

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 standard 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).

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Effective Date: 15/10/21



KSC 153-1531705
CALIBRATION

Page 2 of 4

Certificate No. : 23-148800
Sample Code : 23-56200-002

REPORT OF CALIBRATION

ELECTRONIC BALANCE

Equipment : SARTORIUS

Manufacturer : 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 checked="" type="checkbox"/> Before adjustment	<input checked="" type="checkbox"/> After adjustment
Nominal value	100	200	200
Standard weight	100.000042	200.000041	200.000041
Average reading of indicator	99.9998	199.9998	200.0000
Standard deviation	0.00006	0.00007	0.00003

Unit : g	Range : 220	<input type="checkbox"/> Before adjustment	<input type="checkbox"/> After adjustment
Nominal value	100	200	200
Standard weight	100.000042	200.000041	200.000041
Average reading of indicator	99.9998	199.9998	200.0000
Standard deviation	0.00006	0.00007	0.00003

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Effective Date: 15/10/21

Certificate No. : 23-148800
Sample Code : 23-56200-002

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	Sensitivity, S	Test Point	Sensitivity, S
	0	0.7900		
	100	0.8978		
	200	0.8978		

3. Departure of indication from nominal value, Linearity

Unit: g

Nominal Value	Standard Value	Average Reading	Correction Value	Expanded Uncertainty	Coverage Factor (k)
Unload	0.00000000	0.0000	0.0000	0.000086	2.00
0.01	0.01000025	0.0100	0.0000	0.000086	2.00
0.1	0.10000019	0.1000	0.0000	0.000087	2.00
1	1.00000025	1.0000	0.0000	0.000087	2.00
2	2.00000089	2.0000	0.0000	0.000087	2.00
5	5.00000208	5.0001	-0.0001	0.000088	2.00
10	10.00000004	10.0000	0.0000	0.000090	2.00
20	20.00000030	20.0000	0.0000	0.000093	2.00
50	50.00000014	50.0000	0.0000	0.00011	2.00
100	100.00000042	100.0000	0.0000	0.00016	2.00
200	200.00000041	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 M0003

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Sample Code : 23-56200-002

Page 4 of 4

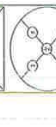
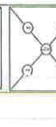
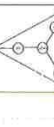
REPORT OF CALIBRATION

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.

Weighting pan	Test weight : 100	
<input checked="" type="radio"/> Circle	Unit : g	
<input type="radio"/> Triangular		
<input type="radio"/> Rectangular		
Range	Reading of Indicator	Reading of Indicator
Position	220	
1	100.0000	1
2	100.0000	2
3	100.0000	3
4	99.9999	4
5	100.0000	5
6	100.0000	6
Maximum difference	0.0001	



Condition of Calibration

1. Calibration Method : WIC-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 : 1) STANDARD WEIGHT 1mg to 1 kg
Class : E2
ID.No. : LBWE-71
Certificate No. : 23-105642
Due Date : 10 September 2024

- End of Report -

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Effective Date: 15/10/21

BAROMETER

Equipment : Analog Barometer

ID No. / Tag No. : BM001/41

CALIBRATION CERTIFICATE

Certificate No : L202405022-0013
Environment
Ambient Temperature : (25 ± 2)°C
Relative Humidity : (50 ± 15)%RH

STD Reading mbar	UUC Reading (mbar) Before Adjusted	UUC Reading (mbar) After Adjusted	UUC Error mbar	Uncertainty ± mbar	MPE ± mbar	Pass with Gai
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

Certificate No. : L202405022-0013
Date Issued : 06-May-24

Customer : Eastern Thai Consulting 1992 Co., Ltd.
682 Moo 11, Sukhaphara 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 Srichulikul

Calibration Method or Calibration Procedure Used
In-house method : CP-21 base on DKD-B 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 excepts with the prior written approval of the Miracle International Technology Company Limited.

Approved by: 
(Mr. Sarayuth Tochuai)

Page 1 of 2



STD = Standard
UUC = Unit Under Calibration
MPE = Maximum Permissible Error
Calibrated condition :
Pressure Medium
Mounting Position
Reference Level
Conversion Factor

Pass = [error] + [uncertainty] ≤ [MPE]
Fail = [error] + [uncertainty] > [MPE]

Description of UUC :
Range
Calibration Range
Scale Interval

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-P2310097 for Reference Pressure Monitor Serial No. 1598, Due 09-Nov-24

End of Certificate



Hot Air Oven
Model : UM 400
Serial No. : 900982



CERTIFICATE OF CALIBRATION

Certificate No. : 24-001944
Sample Code : 24-00963-001

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11, Sukhaphiban 8 Rd., Nongkham,

Sriacha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.

(not Lab)

Equipment : Temperature controlled enclosures (Hot air oven)
Manufacturer : Memmert
Model : UM 400Serial No. : 900982
ID No. : LABE171/1Date of Receipt : 09 January 2024
Date of Calibration : 09 January 2024

Condition of Calibration

1. Environment
1.1 Ambient temperature : Maximum 30.6 °C : Minimum 29.2 °C
1.2 Relative humidity : Maximum 57.5 % : Minimum 46.4 %
1.3 Line voltage supplied : Maximum 229.5 VAC : Minimum 222.5 VAC

2. Calibration method

TAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Data Acquisition With Sensor ID No. Certificate No. Due Date
(RTD-PT100) LB-0A-10 (RTD-257 to RTD-265) 23-096256 29 June 2024

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. Sarawoot Thammoo

Approved by

(Mr. Somchai Neampunt)

Scientist

09 January 2024

Issue date

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and has been accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the requirements of accreditation granted by the Thai Association of Calibration Laboratories (TACL) and is valid for use only for the purpose and conditions stated herein. It is not to be reproduced other than as full except with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

365 Soi Ladkras 122, Ladkras Road,

Phlabokha, Wang Thonglang, Bangkok 10310

PAC-01-114

TEL 02-516-2422

Rev 01

FAX 02-516-6949

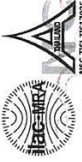
CONTACT@AMARC.CO.TH

WWW.AMARC.CO.TH

Effective Date: 15/10/21



Signed for Director



REPORT OF CALIBRATION

Certificate No. : 24-001944
Sample Code : 24-00963-001

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 :

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.

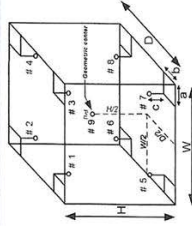


Figure: Example of sensor

installation positions

The result expected uncertainty of measurement U is stated as the standard uncertainty 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 GUM:2000

- End of Report -



REPORT OF CALIBRATION

Certificate No. : 24-001944
Sample Code : 24-00963-001

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C) reading (°C)	Measured temperature at each positions (°C)									Uncertainty ± (°C)	Coverage factor k
		#1	#2	#3	#4	#5	#6	#7	#8	#9		
60	60.0	60.04	59.90	59.81	59.84	59.47	59.91	60.08	59.98	59.97	0.25	2.00
85	85.0	86.07	85.75	85.58	85.62	84.69	85.83	86.28	85.94	85.77	0.34	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
60	0.11	0.49	0.80
85	0.09	1.13	1.72

Notes

* UUC* = Unit Under Calibration

365 Soi Ladkras 122, Ladkras Road,
Phlabokha, Wang Thonglang, Bangkok 10310
PAC-01-011TEL 02-516-2422
FAX 02-516-6949
Rev.03CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21

ICP-OES/Avio550
Serial No. : M81S2210101

ICP-OES/Avio550 Preventive Maintenance (PM)

Eastern Thai Consulting 1992 CLtd.

Company Name:	683 Moo 11 Sukapbal 8 Rd. Nong Kham, Si Racha, Chonburi 20230				
(Instrument Location):	Address	Serial Number:	PM Number:	Telephone Number:	2 of 2
	M81S2210101				
Customer Name					
(If applicable):					
Service Engineer Name:	Khwanchai		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
TH03370188 Rev.2	B	July 2020

PerkinElmer®

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
05955098	Air Filter-Spectrometer	N/A
N07520	Air Filter-RF Generator	N/A
05957731	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	Multi-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
N932946	VIS Wavecal Solution	AR	58-145CRT1 04/2025



Procedure Checklist

- Use (✓) to check off those steps in the checklist that have been completed.
- 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.

- Mechanical:**
 - ✓ Inspect and clean all fans and filters.
 - ✓ Inspect and replace torch components and necessary.
 - ✓ Inspect 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 sources.
 - ✓ 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 needle for blockages and proper, uniform flow.
- ✓ Inspect nitrogen H/Low purge and shear gas solenoids for proper function.
- ✓ Inspect the function of all spectrometer motors. Drive the motors from the Spectrometer DCM, [Lits, XY motor]
- ✓ 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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- ✓ Run an Axial & Radial BEC according to the A&T spec.

Test Axial BEC Calc:

Method "BEC-RL" For Samples "IB (2% HNO_3)" and "IS (N950-0221/100)", record Intensities.
Calculated BEC: $\text{BEC} = (\text{IB} * \text{Conc of Std}) / (\text{IS} - \text{IB})$. 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 Min:

Method "BEC-RL" For Samples "IB (2% HNO_3)" and "IS (N069-1579)", record Intensities.
Calculated BEC: $\text{BEC} = (\text{IB} * \text{Conc of Std}) / (\text{IS} - \text{IB})$. Where Conc of Std = 1,000 PPB

Element	Conc.	IB	IS	
Mn 527	1,000	596.9	253416.6	
IB*Conc	IS-IB	BEC	Spec	Pass/Fail
596900	252829.7	2.32	<45 PPB	Passed

- Review:**
 - ✓ Review with the customer PM work performed.
 - ✓ Discuss recommended customer supplied materials to have on hand.
 - ✓ Attach PM sticker.

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- 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 tube temperatures (top, bottom, in, optical base).
- ✓ Check detector temperatures.
- ✓ Check TEC voltages (LS/MDC)

Optical:

- ✓ Clean or replace the axial and radial view windows as necessary.
- Axial Window Replaced: ☐ Yes ☒ No
- Radial Window Replaced: ☐ Yes ☒ No

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	0.00228	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 $\leq 1\%$	0.26	Passed
Zn 213.856	%RSD $\leq 1\%$	0.21	Passed
Mn 257.610	%RSD $\leq 1\%$	0.20	Passed
La 379.478	%RSD $\leq 1\%$	0.21	Passed
Ba 455.403	%RSD $\leq 1\%$	0.21	Passed
Ba 453.408	%RSD $\leq 1\%$	0.19	Passed

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Additional Comments

Additional Comments Regarding the PM

None

Review

The preventive maintenance checks and if applicable performance tests for ICP-QES/Avio550 have been completed.

This ICP-QES/Avio550 Passes ☒ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	Date: 25-Oct-2024 (DD-MMM-YYYY)
Authorized Customer Representative:	Date: 25-Oct-2024 (DD-MMM-YYYY)

COPY

LIQUID IN GLASS THERMOMETER

Model / Type : 0-100 °C

Serial No. : 43560



CALIBRATION LABORATORY CO., LTD.
210-11/14, 55 Soi Praewit Manok 29 Ywa 4, Praewit Manok Rd, Ladprao, Bangkok 10230
Tel. 02-578-0253-4 Fax. 02-578-2672 www.calibration.com E-mail: lab@calibration.com



CERTIFICATE OF CALIBRATION

FOR	
NOMENCLATURE	: LIQUID IN GLASS THERMOMETER
MANUFACTURER	: AA PRECISION
MODEL / TYPE	: 0-100 °C
SERIAL NO.	: 43560[LABE 161]
CLID. NO.	: 23405905
JOB CONTROL NO.	: 241031116258
CALIBRATION SERVICE	: <input checked="" type="checkbox"/> IN-LABORATORY <input type="checkbox"/> ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 3 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 Hemtanan
Calibration Engineer

Approved By : Mongkol Yotsontorn
Authorized Signatory

05 November 2024



CALIBRATION LABORATORY CO., LTD.
210-11/14, 55 Soi Praewit Manok 29 Ywa 4, Praewit Manok Rd, Ladprao, Bangkok 10230
Tel. 02-578-0253-4 Fax. 02-578-2672 www.calibration.com E-mail: lab@calibration.com

REPORT OF CALIBRATION

FOR	
NOMENCLATURE	: LIQUID IN GLASS THERMOMETER
MANUFACTURER	: AA PRECISION
MODEL / TYPE	: 0-100 °C
SERIAL NO.	: 43560[LABE 161]
DATE OF CALIBRATION	: 04 November 2024

ENVIRONMENT CONDITIONS :
Temperature : (23 ± 2) °C Relative Humidity : (55 ± 10) % RH

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPTH-02 based on ASTM E 77-07 as calibration guidelines. The calibration was performed by comparison with Calibration Bath, Precision Thermometer and IPTCT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Calibration Bath, Kamble Model OB-222 ULT OB-222 S/N. 17115653, 17115654.
2. Precision Thermometer, ASL Model F200-A-S S/N. 01443303 with IPTCT S/N. L0191A-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 (203)67, TT-0106-23, 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-402 M:2022)"





CALIBRATION LABORATORY CO., LTD.
210-11-14, 5F, Seonpu Street, Seoul 150-740, Korea
Tel: 02-578-0353-4 Fax: 02-578-2872 www.calibration.com E-mail: lab@cal-lab.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC Reading were recorded and the mean 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 ± (°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

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page 3 of 3



edccalibration

Certificate No. Q24116258

F3-01145/12-23

MERCURY ANALYZER

Model : RA-4500

Serial No. : 21780504

EASTREN THAI CONSULTING 1992

Mercury Analyzer
RA-4500

Preventive Maintenance Report

SERIAL No. RA-4500 :	21780504
Sample Tube	5 mL
Soft version :	Ver 2.0.8
ROM version :	Ver 2.0.2
DATE :	5 August 2024
DUE DATE :	5 February 2025

INSPECTED BY : *Chayanon T.*
(Chayanon T.)

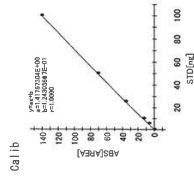
APPROVED BY : *DDU*
(Kitchai S.)



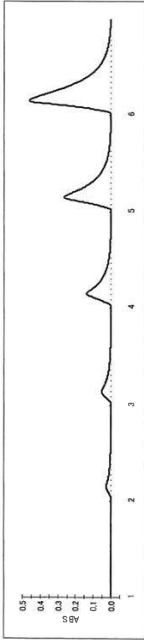
COAX GROUP CORPORATION LTD.

1131/62 64 325-331 Nakornchaisri road,
Kuang ThanonNakornchaisri, Dusit, Bangkok 10300 Thailand
Tel. 02-2435263, 02-6682436 Fax. 02-2437386

Title : Preventive Maintenance RA-4500 SN:21780504
Date : 05-Aug-24
Name : Coax Group Corporation Ltd.
Memo : Calibration Curve 0-100ng



STD	No.	STD [ppb]	SVOL [mL]	CVOL [mL]	DVOL [mL]	STD [ng]	AREA [ON]	MEAS [ng]	Dev [%]	Note
	1	0.000	5.000	5.000	0.000	0.0066	-0.0830	-		
	2	50.000	0.100	5.000	5.000	7.0381	4.8769	2.5		
	3	50.000	0.200	5.000	5.000	14.0505	9.8233	1.8		
	4	50.000	0.500	5.000	5.000	25.0000	36.0982	25.3104	1.2	
	5	50.000	1.000	5.000	5.000	71.3659	50.2525	0.5		
	6	50.000	2.000	5.000	5.000	141.6364	99.8200	0.2		



SMP	No.	NAME	SVOL [mL]	CVOL [mL]	DVOL [mL]	AREA [ON]	MEAS [ng]	CONC [ug/L]	Note
	1	50 ppb	0.500	5.000	5.000	36.0505	25.3417	50.6834	
	2	50 ppb	0.500	5.000	5.000	34.0679	23.9432	47.8864	
	3	50 ppb	0.500	5.000	5.000	34.6353	24.3434	48.6868	

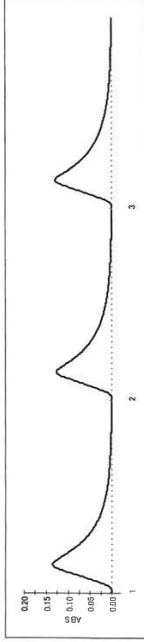
Statistics	No.	NAME	TRY	AV [ug/L]	SD [ug/L]	Cv [%]
	1	50 ppb	3	48.08553	1.4405011	2.93

Mercury Analyzer RA-4500 SN : 21780504

ITEMS	SPECIFICATIONS	RESULT	JUDGE
1. Quantity	-	Accessories are completed.	GOOD
2. Appearance	2.1 Overall Appearance 2.2 Parts / Cables	No visible damage. Correctly placed and connected.	GOOD
3. Indication	Nameplate / Label	Plate and Label are indicated.	GOOD
4. Self check	-	All items are "PASS"	GOOD
5. Calibration Curve	No Pretreatment (Low) (r) > 0.9990 Average: 50 ± 5 ug/L C.V. ≤ 3.0%	0-100ng : Max.Dev. 5.0% 1.0000 49.086 ug/L 2.93%	OK
6. Repeatability	50 ug/L (n=3)	-	OK
7. Blank	-	Less than 0.001 (PEAK)	OK

Apparatus

NAME	Date Certified	Expiration
Mercury (CP Standard (1000 ug/mL) AccuStandard, Inc. Lot Z23035027	March 10, 2023	March 10, 2028



Self Check

Heat check-PASS!! (24.54deg[05:00] -> 28.84deg[03:00]
Sensor check-PASS!! (916- BG= 830)
Leak check-PASS!! (0.18L/min)
Drift check-PASS!! (0.002394% -> 0.002391% = 0.000491%)



pH Meter

Model : SevenCompact S220

Serial No. : B448305208

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ASIA MEDICAL AND
AGRICULTURAL
LABORATORY
AND RESEARCH CENTER



MSC-TS-TS17025
CALIBRATION/MSL

Page 1 of 3

Supersede to Calibration Certificate No. 24-001949

Certificate No. : 24-001949/1

Sample Code : 24-00563-006

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphum 8 Rd., Nongkham,
Sriacha, Chonburi 20290

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
ID No. : LABE 11/4
Date of Receipt : 09 January 2024
Condition of Calibration

1. Environment : 22.4 ± 0.2 °C 1.2 Relative humidity : 58.4 % ± 2.1 %

2. Calibration method
In house method Wt.Cl-019, based on direct measurement by using standard voltage calibrator and using certified reference material (CRM).

3. Reference standard / Certified reference material

Instrument	ID No.	Certificate No.	Due Date
3.1 Voltage Calibrator	LB-AMC-01	2353244	03 October 2024
3.2 Digital Thermometer	LB-TH-33	23-096974	25 August 2024
Certified Reference Material	Lot. No.	Ref No.	Expire Date
3.3 Buffer Solution pH 4.008	919273	PH016L5	24 September 2025
3.4 Buffer Solution pH 6.866	94727	PH107L5	06 November 2024
3.5 Buffer Solution pH 9.597	919278	PH220L5	24 September 2024

4. This certificate is traceable to the international system of unit (SI Unit).

4.1 Instrument No. 3.1 through Technology Promotion Association (Thailand-Japan).

4.2 Instrument No. 3.2 through Asia Medical and Agriculture Laboratory and Research Center Public Company Limited.

4.3 Buffer Solution No. 3.3 and No. 3.5 traceable to CPA Chem (through primary measurement method-Harned cell using calibrated thermometer, barometer, and nanovoltmeter Accredited laboratory/ ISO/IEC 17025 and ISO/IEC 17034).

4.4 Buffer Solution No. 3.4 traceable to CPA chem (CPA RefN HARNED CELL LGN 612/5737; CPA RefN HARNED CELL LGN 612/3986 Accredited laboratory/ ISO/IEC 17025 and ISO/IEC 17034).

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. Nuttapin Timulha
Scientist

Approved by : (Mr. Sathchai Nampunt)

Issue date : 31 January 2024



The uncertainties are for a confidence probability of approximately 95%.

This calibration result is valid only for the above calibrated item and was issued for use 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 the performance of the calibration service. The certificate is valid for the period of accreditation and is subject to the conditions of accreditation. The 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).

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AND RESEARCH CENTER



MSC-TS-TS17025
CALIBRATION/MSL

Page 2 of 3

Supersede to Calibration Certificate No. 24-001949

Certificate No. : 24-001949/1

Sample Code : 24-00563-006

REPORT OF CALIBRATION

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
ID No. : LABE 11/4
Range : -3.000 pH to 20.000 pH ; ± 200.0.0 mV ; -5.0°C to 130.0°C

Resolution : 0.01 pH ; 0.1 mV ; 0.1 °C
Model : SevenCompact S220

Results of Calibration

Part 1. DC Voltage measurement

pH Meter Serial No. : B448305208

Nominal Value pH	Applied DC Voltage mV		Average indicator reading		Uncertainty mV	Coverage factor k
			mV	pH		
0	414.113		413.9	0.00	± 0.083	2.00
4	177.477		177.4	4.00	± 0.083	2.00
7	0.000		0.1	7.00	± 0.083	2.00
10	-177.477		-177.3	10.00	± 0.083	2.00
14	-414.113		-413.8	14.00	± 0.083	2.00

Part 2. Performance of Electrode system

Electrode Manufacturer : METTLER TOLEDO

Electrode Serial No. : 2453982

Model : mLab Expert Pro-ISM

Three-Point Calibration at pH4, pH7 and pH10

Percent Slope : 98.3

Standard Buffer Solution pH (@ 25 °C)	Average indicator reading		Error Value		Uncertainty pH	Coverage factor k
	pH	mV	pH	pH		
4.008	4.01	182.1	0.002	0.010	± 0.010	2.00
6.866	7.00	7.8	0.014	± 0.011	± 0.011	2.00
9.997	10.01	-167.2	0.013	± 0.011	± 0.011	2.00

The result reported 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 ISO/IEC 17025.



CALIBRATION 0332

Page 3 of 3

REPORT OF CALIBRATION

Supersede to Calibration Certificate No. 24-001849

Certificate No. : 24-001849/1

Sample Code : 24-00963-006

Equipment : pH Meter (Digital Thermometer with sensor)

Thermometer readout

Manufacturer

: METTLER TOLEDO

Model

: SevenCompact S220

Serial No.

: B448305208

ID No.

: LABE 11/4

Resolution

: 0.1 °C

Range

: -5.0 °C to 130.0 °C

Thermometer sensor

Manufacturer

: METTLER TOLEDO

Model

: InLab Expert Pro-ISM

Serial No.

: 2453982

ID No.

: N/A

Condition of Calibration

1. Environment

1.1 Ambient temperature : 22.6 °C ± 0.1 °C

1.2 Relative humidity : 55.1 % ± 3.3 %

2. Calibration method

2.1 The calibration use in house method WI-CL-021 by comparison with standard thermometer

2.2 The calibration by comparison unit under calibration (UUC) to the standard thermometer in a calibration bath at the controlled temperature.

2.3 The temperature scale in use of this laboratory is the international temperature scale of 1990 (ITS-90).

3. Reference standard instrument

Instrument

Model

ID No.

Certificate No.

Due date

3.1 Resistance Thermometer

PT-100

RTD-90

23-098974

25 August 2024

3.2 Thermometer Readout

GT-11

LRTH-33

23-098974

25 August 2024

4. This certificate is traceable to the international system of unit (SI Unit).

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (Accreditation Under TLAS Laboratory Calibration No.0152)

5. The result of calibration was found accurate as shown on data and place of calibration only.

6. Condition of Calibration item : Normal

Results of Calibration

Calibration point °C	Average of standard reading °C	Unit under calibration		Expanded uncertainty °C	Coverage factor k
		Immersion depth mm	Average reading °C		
25	25.000	120	25.0	± 0.14	2.00

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 GUM 10000

- End of report -

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P.M.C. Co., Ltd.

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Printed Date 19/10/21

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STANDARD WEIGHT 50 g

Certificate No. : 22-052238
Sample Code : 22-19150-003

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1982 CO., LTD.
683 Moo 11, Sukhapibon 8 Rd., Nongtham,
Siracha, Chonburi 20230Location 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022
Approved by : (Mr. Sornchai Neamput)
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 calibration laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding international standard 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).

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CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/01/21Certificate No. : 22-052238
Sample Code : 22-19150-003

REPORT OF CALIBRATION

Condition of Calibration:

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.20 kg/m³
2. Calibration Method : Direct comparison weighing according to OIML R111: 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-79 : 21-078366 : 22 September 2022Asia 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

Certificate No. : 22-052238
Sample Code : 22-19150-003

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
50 g	-0.324	49.999676 g	(mg) 0.10	± (mg) 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 to a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with ISO 15493:2003

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WWW.AMARC.CO.TH
Effective Date: 15/01/21

STANDARD WEIGHT 100 g



Certificate No. : 22-052239
Sample Code : 22-19150-004

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongpham,
Siracha, Chonburi 20230

Location of Calibration : Asai 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 : 18 May 2022
Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022

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 data and plots 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 units 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 Asai Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

Certificate No. : 22-052239
Sample Code : 22-19150-004

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	Expanded	Maximum	ID No.
		Mass	Uncertainty	Permissible Error	
	(mg)		(mg)	\pm (mg)	
100 g	-0.171	99.999829 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

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Certificate No. : 22-05239
Sample Code : 22-19150-004

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.18 kg/m³
2. Calibration Method : HK 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-79	21-079366	22 September 2022

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 -

[Signature]

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STANDARD WEIGHT 50 g

Certificate No. : 22-052237
Sample Code : 22-19150-002

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongkham,
Sriacha, Chonburi 20230Location 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022(Mr. Sornchai Nampant)
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 irreducibility 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).

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WWW.AMARC.CO.TH
Effective Date: 15/10/21Certificate No. : 22-052237
Sample Code : 22-19150-002

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative Humidity 50% ± 10% and air density 1.18 kg/m³
2. Calibration Method : WP-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-79	21-079366	22 September 2022

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 Items: 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 -

Certificate No. : 22-052237
Sample Code : 22-19150-002

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
50 g	(mg)		(mg)	± (mg)	
50 g	-0.111	49.999889 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 GUMS M0003

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Effective Date: 15/10/21

SPECTROPHOTOMETER

Model : PROVE 100

Serial No. : 1613110857



CERTIFICATE OF CALIBRATION

Instrument : SPECTROPHOTOMETER
Model : PROVE 100
Date of Calibration : Feb 9, 2024
Customer Name : Eastern Thai Consulting 1992 Co., Ltd.
Procedure used

The wavelength accuracy and the linearity of the absorbance measurement of photometers are checked using Check solutions according to Merck calibration laboratory work instruction.

Measurements results

Function	Absorbance measurement. All data shown below as received values of blank solution before adjustment.				
Check Solution (Abs.)	Wavelength (nm)	Desired Absorbance (Abs.)	Measured Absorbance (Abs.)	Error (Abs)	
0.000	445	0.000 ± 0.005	0.000	0.000	
0.000	525	0.000 ± 0.005	0.000	0.000	
0.000	690	0.000 ± 0.005	0.000	0.000	

Function : Absorbance measurement:
All data shown below as received values of blank solution before adjustment.



CERTIFICATE OF CALIBRATION

Function : Absorbance measurement:
All data shown below were final value of standard solution after adjustment.

Check Solution* (Abs.)	Desired Absorbance (Abs.)	Allowed tolerance (Abs.)	Actual Absorbance (Abs.)	Assessment Yes/No
445-1	0.197	± 0.020	0.189	Yes
445-2	0.497	± 0.030	0.481	Yes
445-3	0.990	± 0.040	0.970	Yes
445-4	1.494	± 0.050	1.474	Yes
525-1	0.198	± 0.020	0.191	Yes
525-2	0.493	± 0.030	0.485	Yes
525-3	0.988	± 0.040	0.966	Yes
525-4	1.485	± 0.050	1.471	Yes
690-1	0.204	± 0.020	0.197	Yes
690-2	0.504	± 0.030	0.494	Yes
690-3	0.987	± 0.040	0.989	Yes
690-4	1.498	± 0.050	1.493	Yes

* Spectroquant Photocheck (Check Solution) Lot : KC959606

- Check solution for this certification is traceable to : Reference Photometer Agilent Cary 4000 checked and calibrated using NIST-grey glass filter SGW 1930 and Holmiumoxide Solution HST 15044 2024. The wavelength accuracy and the linearity of the absorbance measurement were calculated from the absorbance of the 1 cm cell using the path length of the round cell and is entered as the desired



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2 of 4

CERTIFICATE OF CALIBRATION

INSTRUMENT : SPECTROPHOTOMETER
MANUFACTURER : Merck KGaA, Darmstadt, Germany
MODEL : PROVE 100
SERIAL No. : 1613110857
CLIENT : Eastern Thai Consulting 1992 Co., Ltd.
DATE OF ISSUE : Feb 9, 2024

CERTIFICATE OF CALIBRATION

Software version: 1.5.1

Wavelength Accuracy			
Equipment	Nominal value	Tolerance limit	Result
Holmium Oxide Solution Standard 6	365.1 nm	359.1 ~ 365.1 nm	361.0 nm P
	385.3 nm	382.3 ~ 390.3 nm	385.5 nm P
	415.5 nm	411.5 ~ 419.5 nm	415.6 nm P
	431.4 nm	427.4 ~ 435.4 nm	430.0 nm P
	485.3 nm	481.3 ~ 489.3 nm	485.2 nm P
	537.6 nm	533.6 ~ 541.6 nm	537.3 nm P
Photometric Accuracy			
Equipment	Nominal value	Tolerance limit	Actual value
Neutral Density 1.00 Abs.	1.079 A	1.067 ~ 1.091 A	1.074 A P
Helium 566-F4	1.032 A	1.004 ~ 1.060 A	1.010 A P
Stray Light	1.050 A	1.042 ~ 1.058 A	1.048 A P
Equipment	Wavelength	Nominal value	Actual value
UV-Vis Standard 2 Sodium Nitrite Solution	340 nm	±0.10 %T	0.05 %T P
Self-test Hardware			
No visual flaws, no burrs, no loose parts and fastenings			P

APPROVED SIGNATORY

NAME : Mr. Rawat Rattanachethakul
(SERVICE ENGINEER)

SIGNATURE : _____

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CERTIFICATE No. WO-02723295



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3 of 4



6 of 4

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,
Siracha, Chonburi 20230Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)Equipment : Digital thermo-hygrometer
Manufacturer : testo
Serial No. : 45106737
Date of Receipt : 23 May 2024Model : 608-H1
ID No. : LABE 08/7
Date of Calibration : 27-28 May 2024Condition 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: W-CCL 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-PP-03 (DP)	TH-0064-23	07 August 2024
3.2 Digital Thermometer	Optidew 401	LB-DP-03 & LB-PP-03 (Temp.)	23-103423	03 September 2024
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-69	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 Lohabai
Scientist

Approved by

(Mr. Sornchai Neampunt)
Signed for Director

Issue date

30 May 2024

The uncertainties are for a confidence probability of approximately 95%.

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 responsibility to recognized national standards and for 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).

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Effective Date 15/07/21

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 measurements (U) is stated in the table of uncertainties 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 JGAS M2003.

- End of Report -


NSG-TS-1537025
CALIBRATION 0152

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Effective Date 15/07/21

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Phaholapha, Wang Thonglang, Bangkok 10310
PM-CL-018

TEL 02-516-2422

FAX 02-516-6849

Rev. 01

UV/VIS SPECTROPHOTOMETER

Model : UV-1800

Serial No. : A11635101643 CD



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor 7 Rama 4 Road
Siam Bangkok Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375486-7
www.barscientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-14624
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 OD
ID No. LABE 03/2
Date of receipt 22 April 2024
Date of calibration 29 April 2024
Customer name Eastern Thai Consulting 1992 Co., Ltd.
Address 683 Moo 11, Sukhaphahum 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (22.9-24.1) °C (On site)
Humidity (41.7-48.9) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method W-LUV-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. 116610 and 116224
Sray Light is traceable to certificate No. 116616
The above certificate are traceable to SI unit through Sigma Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr. Poomjai Koswatorakul

Approved by

Mr. Santhi Tambonakadi
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 measurement results and also advertising the company name
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-LUV-702-02 Rev.01 (23/01/23)



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor 7 Rama 4 Road
Siam Bangkok Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375486-7
www.barscientific.com



Certificate of Calibration

Number of Page(s) 1 of 3

Certificate No. BSCC-UV-14624
Equipment UV/Vis Spectrophotometer
Model UV-1800
Manufacturer Shimadzu
Serial No. A11635101643 OD
ID No. LABE 03/2
Date of receipt 22 April 2024
Date of calibration 29 April 2024
Customer name Eastern Thai Consulting 1992 Co., Ltd.
Address 683 Moo 11, Sukhaphahum 8 Rd., Nongkham, Sriracha, Chonburi 20230

Temperature (22.9-24.1) °C (On site)
Humidity (41.7-48.9) %RH (On site)

Equipment condition Good Operation

Calibration Location Analysis Department

Calibration Procedure In-house method W-LUV-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. 116610 and 116224
Sray Light is traceable to certificate No. 116616
The above certificate are traceable to SI unit through Sigma Scientific Ltd.
(UKAS accredited calibration laboratory NO. 0659)

Calibrated by Mr. Poomjai Koswatorakul

Approved by

Mr. Santhi Tambonakadi
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 measurement results and also advertising the company name
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-LUV-702-02 Rev.01 (23/01/23)



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Certificate of Calibration

Certificate No. BSCC-UV-14624

Number of Page(s) 3 of 3

Calibration Results:

3 Photometric Accuracy (Visible)

Wavelength (nm)	Certified Absorbance (A)	UUC (A)	Error (A)	Uncertainty (ΔA)
425.0	0.0000 0.5715 0.7087	0.0000 0.5729 0.7087	0.0000 0.0014 0.0000	0.0042 0.0042 0.0042
440.0	0.0000 0.5561 0.6668	0.0000 0.5578 0.6669	0.0000 0.0017 0.0001	0.0042 0.0042 0.0042
465.0	CNR CNR CNR	CNR CNR CNR	CNR CNR CNR	CNR CNR CNR
546.1	0.0000 0.5193 0.6937	0.0000 0.5213 0.6940	0.0000 0.0020 0.0003	0.0042 0.0042 0.0042
560.0	CNR CNR CNR	CNR CNR CNR	CNR CNR CNR	CNR CNR CNR
635.0	0.0000 0.5605 0.7579	0.0000 0.5624 0.7579	0.0000 0.0019 0.0004	0.0042 0.0042 0.0042

*CNR = Customer not request

4.Sray Light*

Standard cut-off wavelength (nm)	Wavelength (nm)	Unit Under Calibration(UUC) Transmission (%)	Absorbance (A)
201.3350.11nm	200.80	0.9750	2.0111

The Sray light transmission reference is less than 1.0% and Sray light absorbance reference is greater than 2.00A
*Sray 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 measurement results and also advertising the company name
except in full, without written approval of the Bara Scientific Co., Ltd.

FM-LUV-702-02 Rev.01 (23/01/23)



Bara Scientific Co., Ltd.
968 U Chu Liang Building Floor 7 Rama 4 Road
Siam Bangkok Bangkok Thailand 10500
Tel : 02-6324300 Fax : 02-6375486-7
www.barscientific.com



Certificate of Calibration

Certificate No. BSCC-UV-14624

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 (ΔA)
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

The above results are valid exclusively for the calibrated item(s) as mention in this report / Certificate
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FM-LUV-702-02 Rev.01 (23/01/23)



ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : 1126323724

AMARC

ASIA MEDICAL AND
AGRICULTURAL LABORATORY
AND RESEARCH CENTER



ISO 15020:2005
CALIBRATION

Page 1 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphibarn 8 Rd., Nongkham,
Sirachha, Chonburi 20260

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Serial No. : 1126323724

ID No. : LABE 05/1

Date of Receipt : 22 December 2023

Date of Calibration : 22 December 2023

Calibrated by : Mr. Somwang Sangdee
Scientist

Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 25 December 2023
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 data and photo attached.

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).

381 Sri Ladprao 122, Ladprao Road,
Phayathai, Wang Thonglang, Bangkok 10310
Rev.05

TEL: 02-516-2422
FAX: 02-516-6849

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21

AMARC

ASIA MEDICAL AND
AGRICULTURAL LABORATORY
AND RESEARCH CENTER



ISO 15020:2005
CALIBRATION

Page 2 of 4

Certificate No. : 23-148799
Sample Code : 23-56200-001

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE
Manufacturer : METTLER TOLEDO
Model : XS205DU
Capacity : Max 81 g / 220 g
Resolution : 0.01 mg / 0.1 mg
Serial No. : 1126323724
ID No. : LABE 05/1

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 : 80	Before adjustment	After adjustment
Nominal value	40	80	80
Standard weight	40.000054	80.000048	80.000054
Average reading of indicator	40.00026	80.00037	80.00077
Standard deviation	0.000015	0.000016	0.000008

Unit : g	Range : 200	Before adjustment	After adjustment
Nominal value	100	200	200
Standard weight	100.000042	200.000041	200.000041
Average reading of indicator	100.00003	200.00004	200.00001
Standard deviation	0.000005	0.000005	0.000003

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Effective Date: 15/10/21

Certificate No. : 23-148799
Sample Code : 23-56200-001

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 : 80		Range : 200	
Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	1.00748	0	1.0074
40	0.99753	100	0.9975
80	0.99751	200	0.9975

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	0.00000000	0.00000	0.00000	0.000012	2.05
0.01	0.01000025	0.01000	0.00000	0.000012	2.05
0.1	0.10000019	0.10001	-0.00001	0.000013	2.03
1	1.00000025	1.00001	0.00000	0.000015	2.02
5	5.00000028	5.00004	-0.00002	0.000021	2.00
10	10.00000004	10.00008	-0.00008	0.000026	2.00
20	20.00000030	20.00011	-0.00008	0.000036	2.00
50	50.00000014	50.00014	-0.00013	0.000068	2.00
100	100.00000042	100.0001	-0.0001	0.00016	2.00
150	150.00000056	150.0001	0.0000	0.00022	2.00
200	200.00000041	200.0002	-0.0002	0.00027	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 M2003.

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THA 10304Tel: 02-518-2422
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WWW.AMARCO.CO.TH
Effective Date: 10/02/21Certificate No. : 23-148799
Sample Code : 23-56200-001

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.

Weighing pan		Test weight : 50 and 100	
		Unit : g	
Range	Position	Reading of indicator	Reading of indicator
1	50.00015	100.0001	100.0001
2	50.00022	100.0001	100.0001
3	50.00008	100.0001	100.0001
4	50.00002	100.0000	100.0000
5	50.00016	100.0002	100.0002
6	50.00014	100.0001	100.0001
Maximum difference	0.00013	0.0001	0.0001

Condition of Calibration

1. Calibration Method : W.C.-004 based on UKAS L48 is 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 Units maintained at :-

Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (natural measurement).

5. Reference standard measurement:

1) STANDARD WEIGHT 1 kg to 1 kg

Class: E2

ID No. LB WE-79

Certificate No. 23-105642

Due Date 10 September 2024

End of Report

381 Soi Ladprao 127, Ladprao Road,
Phaholaya, Wang Thonglang, Bangkok 10310
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Effective Date: 10/02/21

Page: 4 of 4

ATOMIC ABSORPTION SPECTROPHOTOMETER


Model : PinAAcle 900F

Serial No. : PFBS22080801

PinAcle 900F Preventive Maintenance (PM)

Company Name:	Eastern Thai Consulting 1992 Co.,Ltd.		
Address (Instrument Location):	683 Moo 11 Sukapbal 8 Rd. Nong Khao, Si Racha, Chonburi 20220		
Serial Number:	PFB222080801	PM Number:	2 of 2
Customer Name (If applicable):		Telephone Number:	
Customer Support (If applicable):	Khwanchai	Service Order Number:	WO-01886639
Engineer Name:		Next PM Due Date:	24-Apr-2024
Date PM Performed:	24-Oct-2023	(DD-MM-YYYY)	
Standard Labor Hours to Complete PM :	5 hours		

Part Number	Release	Publication Date
09370145 Rev.9	A	January 2018

 PerkinElmer

Scope
The purpose of this PM is to ensure the continued functionality of the PinAcle 900F 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. The customer, before making any changes that may affect the customer's analysis or calibration, including a recent 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
FIAS100		

Parts Lists

Parts Included with the PM			
Part Number (If applicable)	Description	Quantity	
80501696	Fan Filters	NA	
N3160156	O-Ring Kits for Sampling Introduction (Stainless Steels Nebulizer)	NA	
N3160357	O-Ring Kits for Sampling Introduction (Plastic Nebulizer)	NA	
N9301714	Replacement Acetylene Filter Cartridge	NA	
T1001022	Replacement Air Filter Cartridge	NA	

Additional Reagents and Standards Required for PM			
Part Number (If applicable)	Description	Quality	Expiry Date (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	26-8/CLY1
			30-Jan-2024

Additional Reagents and Standards Required for PM (Customer Support Solution)			
Part Number (If applicable)	Description	Quantity	Expiration Date (MM/YY)
N/A	DI Water	250 mL	AR
N/A	0.5% HNO ₃	250 mL	AR



Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

- General:**
 - ✓ Review the instrument performance with the customer and document any recent problems.
 - ✓ Inspect the customer log book and make any appropriate PM entries.
 - ✓ Perform general inspection of system for cleanliness.
- PC Instrument Software:**
 - ✓ Instrument Software user files/databases archived, packed, and/or deleted as needed.
- Mechanical:**
 - ✓ Inspect and clean all fans and filters. Replace filters if necessary
 - ✓ Inspect all gas lines for leaks and/or wear. Replace if needed.
 - ✓ Clean exterior of the instrument.
 - ✓ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Maintenance chapter section on cleaning the burner head and checking slot width. Replace if out of specification
 - ✓ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking slot width.
 - ✓ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
 - ✓ Check the drain system for signs of wear. Replace worn or damaged parts.
 - ✓ Visually check for proper flame conditions when lighting the Air-CH₂ and N₂O-CH₂ flames (if applicable).
- Electrical:**
 - ✓ Inspect PC boards. Clean if necessary.
 - ✓ Carefully check all internal and external cable connections.
 - ✓ Check instrument firmware revisions upgrade to current levels (if necessary)
 - ✓ Run Diagnostics Test with the Advanced Function on the Spectrometer page. Check the results in the Service Log folder in the Spectrometer PM Log Viewer.
- Optics:**
 - ✓ Inspect and clean the sample compartment windows, if needed.
 - ✓ Inspect optics. Clean or replace if necessary.
- Gasses:**
 - ✓ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAcle 900 Series Pre-Installation Checklist SDB.
 - ✓ Verify that the acetylene filter and air filter element is dry. Replace if necessary.



7. Flame Interlock Check:

Description: Check to ensure that all safety interlocks are closed.

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Pass
Drain Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Pass
Nebulizer Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Pass
C ₂ H ₂ Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Pass
Air Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Pass
Burner Head Sensor	Choking Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Pass

8. After PM Performance tests:

8.1 Detector Linearity with Barium

Description: Ensures that the detector is linear in the Visible Range.

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	1.0531	1.0290	Pass
0.2 A ND Filter	± 5% from Cert.	0.1806	0.1783	Pass

8.2 Baseline Noise at 1.0 Absorbance with Barium

Description: Ensures that a high absorbance will not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0015	Pass

8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.001	0.0001	Pass

8.4 D₂ Background Compensation with Copper

Description: Verifies the instruments ability to compensate for Background absorption.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0054	Pass

8.5 AA-BG Baseline Noise with Copper

Description: Ensures that background correction does not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0001	Pass

8.6 AA-BG Baseline Noise with Arsenic

Description: Ensures that background correction does not produce excessive noise at a low wavelength.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0002	Pass

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity SS Neb (if applicable)	> 0.250 Abs.	NA	NA
2 mg/L Sensitivity HS Neb (if applicable)	> 0.250 Abs.	0.3878	Pass

10. Review:

- ☒ Review with the customer PM work performed
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discard recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

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Additional Comments

Additional Comments Regarding the PM

Review

The preventive maintenance checks and if applicable performance tests for PmaAde 900F have been completed.

This PmaAde 900F Passes ☒ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:

Date: 24-Oct-2023
(PmaAde.com)

Authorized Customer Representative:


Date: 24-Oct-2023
(PmaAde.com)

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BAROMETER

Equipment : Analog Barometer


ID No. / Tag No. : BM001/41



MIRACLE INTERNATIONAL TECHNOLOGY CO., LTD.
214 Bangwaek Rd. Bangwaek Bangkok 10160
Tel: 0-2865-4647-8 Fax: 0-2865-4649 <http://www.mit.in.th>



NO. 0019 19 0001
BUREAU OF STANDARDS



IA

CALIBRATION CERTIFICATE

Certificate No. : L202405022-0013	Environment		Ambient Temperature : (23 ± 2)°C		Relative Humidity : (50 ± 15)%RH	
	STD Reading mbar	UUC Reading (mbar)	UUC Error mbar	Uncertainty ± mbar	MPE ± mbar	Pass with Gai
990.00 1000.00 1010.00 1020.00 1030.00	Before Adjusted	After Adjusted	After Adjusted	After Adjusted	After Adjusted	After Adjusted
	990	990	0.00	0.59	10.3	Pa
	1000	1000	0.00	0.59	10.3	Pa
	1010	1010	0.00	0.59	10.3	Pa
	1020	1020	0.00	0.59	10.3	Pa
	1030	1030	0.00	0.59	10.3	Pa

STD = Standard
UUC = Unit Under Calibration
MPE = Maximum Permissible Error
Calibrated condition : Pressure Medium
Mounting Position
Reference Level
Conversion Factor

Pass = [error] + [uncertainty] ≤ [MPE]
Fail = [error] + [uncertainty] > [MPE]

Air : Density = 1.19 kg/m³ @ 20°C, 1 bar
Vertical
at center of is dial
Multiply by 1.0 E-02 - Pa unit

Description of UUC : Range
Calibration Range
Scale Interval

950 - 1080 mbar Absolute
990 - 1030 mbar Absolute
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-P2310097 for Reference Pressure Monitor Serial No. 1598, Due 09-Nov-24

End of Certificate



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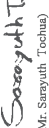
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Approved by: 
(Mr. Sunyuth Tochuat)

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GAS CHROMATOGRAPH

Model. : GC-2010 PLUS AF

Serial No. : C12095200986

SHIMADZU GAS CHROMATOGRAPH SYSTEM
GC-2010Plus Series

Operational Qualification

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	Date
Print Name	16 / 02 / 2023
Title	
Company	
• Reviewer	
Signature	Date
Print Name	16 / 02 / 2023
Title	
Company	
• Manager	
Signature	Date
Print Name	16 / 02 / 2023
Title	
Company	

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Operational Qualification

1-2 Scope

This Operational Qualification shall apply to the equipment installed at the following site.

(Address):	699 Mo. 11 Subhaphan 3 Rd Nongphim Sirote (Nongphim 2010)
(Company):	Eastern Tech Consulting 1992 Co., Ltd
(Department):	
(Installation Site):	Instrument Room GC/IC
(Equipment ID No.):	Gas Chromatograph LABE 0413
(Product Model Name):	GC-2010 Plus / AOC-201 / AOC-205

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Performer (signature):	Date: 16 / 02 / 2023
Reviewer (signature):	Date: 16 / 02 / 2023

Operational Qualification

Operational Qualification Record

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 signature line in the Pass/Fail checkboxes for "Not Applicable" items.

Here, inspection results are recorded along the procedure of Chapter 4 in Operational Qualification Process.

3-1 Gas Chromatograph GC-2010Plus

☒ Applicable ☐ Not Applicable

Component ID		Model Name		GC-2010Plus		Serial Number (SN)		LAB: 041/3		Model Name		GC-2010Plus		Serial Number (SN)		LAB: 041/3	
No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail
1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Standard self-diagnosis test	Verify the status and operation of self-diagnostic test.	Good	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	Standard self-diagnosis test	Verify the status and operation of self-diagnostic test.	Good	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	Standard self-diagnosis test	Verify the status and operation of self-diagnostic test.	Good	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Program version check	Verify the program version.	Version No. 1.0.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Program version check	Verify the program version.	Version No. 1.0.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Program version check	Verify the program version.	Version No. 1.0.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Temperature test	Verify that temperature is within normal.	Temperature is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4	Temperature test	Verify that temperature is within normal.	Temperature is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4	Temperature test	Verify that temperature is within normal.	Temperature is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Column inlet pressure test	Verify the accuracy of column inlet pressure.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5	Column inlet pressure test	Verify the accuracy of column inlet pressure.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5	Column inlet pressure test	Verify the accuracy of column inlet pressure.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature): [Signature] Date: 16 / 02 / 2024
Reviewer (signature): [Signature] Date: 17 / 02 / 2024

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Operational Qualification

Operational Qualification Record

3-2 AOC-20i Auto Injector

☒ Applicable ☐ Not Applicable☒ Single ☐ Dual system, main injector

Component ID		Model Name		AOC-20i		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9		Model Name		AOC-20i		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9	
No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail
1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<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"/>	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"/>	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

Component ID		Model Name		AOC-20i		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9		Model Name		AOC-20i		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9	
No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail
1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Display, LED test	Verify the display and LED operation.	LED Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	ROM - RAM self diagnosis	Verify that ROM and RAM memory operation normally.	Display shows "000"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<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"/>	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"/>	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"/>

Performer (signature): [Signature] Date: 16 / 02 / 2024
Reviewer (signature): [Signature] Date: 17 / 02 / 2024

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Operational Qualification

Operational Qualification Record

No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail
6	Pressure program test	Verify that the pressure is within normal.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6	Pressure program test	Verify that the pressure is within normal.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Flow rate test	Verify the flow rate is within normal.	Flow rate is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7	Flow rate test	Verify the flow rate is within normal.	Flow rate is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Temperature test	Verify the temperature is within normal.	Temperature is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8	Temperature test	Verify the temperature is within normal.	Temperature is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Column inlet pressure test	Verify the accuracy of column inlet pressure.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9	Column inlet pressure test	Verify the accuracy of column inlet pressure.	Pressure is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	Sensitivity test	Verify the sensitivity.	Sensitivity is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10	Sensitivity test	Verify the sensitivity.	Sensitivity is within normal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature): [Signature] Date: 16 / 02 / 2024
Reviewer (signature): [Signature] Date: 17 / 02 / 2024

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Operational Qualification

Operational Qualification Record

3-3 AOC-20s Auto Sampler

☒ Applicable ☐ Not Applicable

Component ID		Model Name		AOC-20s		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9		Model Name		AOC-20s		Serial Number (SN)		C 1 2 1 0 4 1 0 2 0 9	
No.	Item	Criteria	Results	Pass	Fail	No.	Item	Criteria	Results	Pass	Fail	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"/>	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"/>	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 version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	Firmware version check	Verify the version number.	Version number is displayed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature): [Signature] Date: 16 / 02 / 2024
Reviewer (signature): [Signature] Date: 17 / 02 / 2024

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Hot Air Oven
Model : UM 400
Serial No. : 900982

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ASIA MEDICAL AND AGRICULTURAL LABORATORY AND RESEARCH CENTER

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Page 1 of 3

CERTIFICATION 0352

Certificate No. : 24-001944
Sample Code : 24-00983-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongkhum,
Sriracha, Chonburi 20230
Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(not Lab)
Equipment : Temperature controlled enclosures (Hot air oven)
Manufacturer : Memmert
Serial No. : 900982
ID No. : UM-400
Date of Receipt : 09 January 2024
Date of Calibration : 09 January 2024

- Condition of Calibration
1. Environment
- 1.1 Ambient temperature : Maximum 30.6 °C : Minimum 29.2 °C
- 1.2 Relative humidity : Maximum 57.5 % : Minimum 46.4 %
- 1.3 Line voltage supplied : Maximum 229.5 VAC : Minimum 222.5 VAC
2. Calibration method
- TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.
3. Reference standard instrument
- Instrument : Data Acquisition With Sensor ID No. : Certificate No. : Due Date :
RTD-PH(00) LB-0A-10 (RTD-257 to RTD-265) 23-066256 29 June 2024

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. Sarawoot Thammoo

Approved by

(Mr. Somchai Neampunt)

Issue date

09 January 2024

Scientist

Signature

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The uncertainties are for a confidence probability of approximately 95%.
This calibration result is applied only to the above calibrated item and does not account as shown on date and place of calibration only.
The calibration result 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.
This result of calibration was found accurate as shown on date and place of calibration only.
The condition of calibration item is Normal.

Signature

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395 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
Ph.C. Co., Ltd.

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 19/09/21

395 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
Ph.C. Co., Ltd.

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 19/09/21

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Page 2 of 3

CERTIFICATION 0352

Certificate No. : 24-001944
Sample Code : 24-00983-001

REPORT OF CALIBRATION

Resolution : 0.1 °C
1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C) reading (°C)	Measured temperature at each positions (°C)								Uncertainty ± (°C)	Coverage factor k
		#1	#2	#3	#4	#5	#6	#7	#8		
60	60.0	60.04	59.90	59.81	59.84	59.47	59.91	60.08	59.98	0.25	2.00
85	85.0	86.07	85.75	85.59	85.62	84.69	85.63	86.28	85.94	0.34	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
60	0.11	0.49	0.80
85	0.09	1.13	1.72

Notes

· UUC* = Unit Under Calibration

Signature

REPORT OF CALIBRATION

Certificate No. : 24-001944
Sample Code : 24-00963 001

Page 3 of 3

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 at 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.

The result expanded uncertainty of measurement U is stated as the standard uncertainty 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 ISO 15003.

End of Report

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361 Soi Ladprao 922, Ladprao Road,
Phayathai, Wang Thonglang, Bangkok 10310
THAILAND

TEL 02-515-2422
FAX 02-515-0545
Rev.03

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/03/21

ICP-OES/Avio550

Serial No. : M81S2210101

ICP-OES/Avio550 Preventive Maintenance (PM)

Company Name:		Eastern Thai Consulting 1992 Co., Ltd.	
Address		683 Moo 11 Sukkapaban 8 Rd.Siracha, Chon Buri 20230	
(Instrument Location):			
Serial Number:	M8152210101	PM Number:	1 OF 2 W
Customer Name	K.Nunnaphat	Telephone Number:	038 481 197
(if applicable):		Service Order Number:	WO-0275-4304
Service Engineer Name:	K.Piyawit		
Date PM Performed: (DD-MMM-YYMM)	25-Apr-2024	Next PM Due Date: (DD-MMM-YYMM)	25-Oct-2024
Standard Labor Hours to Complete PM :		4 hours	

Part Number	Release	Publication Date
TH09370188 Rev.2	B	July 2020

PerkinElmer®

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 procedure may 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 instrument system. All changes are to be made and approved by the 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
Avio550Max	M8152210101	Synthetic S.I.0.0293

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
09955098	Air Filter-Spectrometer	N/A
N077520	Air Filter-RF Generator	N/A
09992731	Axial Window	N/A
80810377	Radial Window	N/A
N0770436	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	Multi-Element Standard	AR	61-176CRX1	30-JUN-2025
N9380221	DL Standard diluted 100 X	AR	59-091CRY1	30-JUN-2024
N0582152	Wave Cal Solution	AR	59-150CRX1	30-SEP-2024
N9302946	VIS Wavecal Solution	AR	59-113CR11	28-FEB-2025



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 tube 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
Aa 193.686 - Resolution	≤0.007	0.00534	Passed
Ni 331.684 - Resolution	≤0.008	0.00725	Passed
Ni 341.476 - Resolution	≤0.012	0.00891	Passed
La 408.672 - Resolution	≤0.020	0.01603	Passed
Ba 455.403 - Resolution	≤0.025	0.02190	Passed

Test Precision:

- ✓ Test for reproducibility of a set of measurement.

Parameter	Specification	Test Result	Pass/Fail
Aa 193.686	%RSD ≤ 1 %	0.65%	Passed
Zn 331.665	%RSD ≤ 1 %	0.66%	Passed
Mn 257.610	%RSD ≤ 1 %	0.41%	Passed
La 379.478	%RSD ≤ 1 %	0.51%	Passed
Ba 455.403	%RSD ≤ 1 %	0.32%	Passed
Ba 493.408	%RSD ≤ 1 %	0.30%	Passed



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 psig	76 psig
Torch Argon	67 psig	67 psig
Shear Gas	65 psig	65 psig
Water	35 psig	35 psig

- ✓ Check shear gas needle for blockages and proper, uniform flow.
- ✓ Inspect nitrogen, H2/O2 purge and shear gas solenoids for proper function.
- ✓ Inspect the function of all spectrometer motors. Drive the motors from the Spectrometer DCM, (elits, 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.



☑ Run an Axial & Radial BEC according to the A&T spec.

Test Axial BEC Cal:

Method "BEC-XL" For Samples "IB [2%HgO3]" and "IS (N930-0232/100)", record intensities.
Calculated BEC: BEC = (IB * Conc of Std) / (IS - IB), Where Conc of Std = 500 PPB

Element	Conc.	IB	IS	Pass/Fail
Cd 226	500	2,028.9	162,248.4	Spec
IB*Conc	15-IB	BEC		Pass/Fail
1,014,450	160,219.5	6.33	<150 PPB	Passed

Test Radial BEC Min:

Method "BEC-RL" For Samples "IB [2%HgO3]" 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	Pass/Fail
Mn 257	1,000	2,166.8	91,410.0	Spec
IB*Conc	15-IB	BEC		Pass/Fail
2,166,800	89,243.2	24.28	<45 PPB	Passed

6. Review:

- ☑ Review with the customer PM work performed.
- ☑ Discuss recommended customer supplied materials to have on hand.
- ☑ Attach PM sticker.

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Additional Comments

Additional Comments Regarding the PM

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:	Date: 25-Apr-2024 (DD-MMM-YY)
Authorized Customer Representative:	Date: 25-Apr-2024 (DD-MMM-YY)

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MERCURY ANALYZER

Model : RA-4500

Serial No. : 21780504

Eastern Thai Consulting 1992 Co., Ltd.

Automatic Mercury Analyzer

Model RA-4500

Preventive Maintenance Report

Serial No. : 21780504

Soft version : Ver 2.0.7

ROM version : Ver 2.0.1

Date : August 9, 2023

PM by : *John*
(Pathom S.)

Approved by : *P. Phongsakorn*
(Phongpan R.)



Coax Group Corporation Ltd.

1131/62,64,325-331 Nekomchaisri road,
Kwang ThanonNakornchaisri, Dusit, Bangkok 10300 Thailand
Tel. 02-2435263, 02-6682436 Fax. 02-2437386

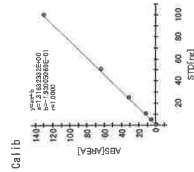
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Inspection result

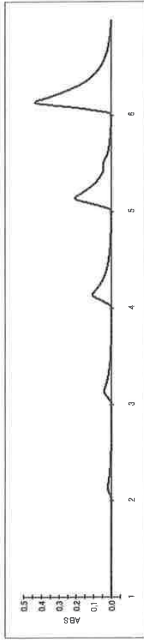
ITEM	STANDARD	RESULT	JUDGE
1. Self Check			
1.1 Leak check	0.14 - 2.0 L/min.	0.18 L/min	PASS
1.2 Sig/Ref check	3.0 - 4.0 volte	Sig:4.01V., Ref:4.09V.	PASS
1.3 Drift check	0.0000047 - 0.0000014	0.0000038	PASS
2. Analytical curve inspection(AREA)			
2.1 No Pretreatment	Correlation coefficient (r) ≥ 0.9990	1.0000	PASS
3. Repeatability(AREA)			
3.1 No Pretreatment 50ug/L, n=3		1. 50.353 ug/L 2. 51.477 ug/L 3. 51.306 ug/L C.V. ≤ 5%	PASS
4. Blank	Below 1.0(AREA)	0.386	OK

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Title : RA-4500 Preventive Maintenance
Date : 9/8/2566
Name : Coax Group
Memo : Calibration Curve (No Pretreatment)



STD No.	STD [ppb]	SVOL [mL]	CVOL [mL]	DVOL [mL]	STD [ng]	AREA [CN]	MEAS [ng]	Dev [%]	Note
1	0.000	5.000	5.000	0.000	0.3869	0.4405		-	
2	50.000	0.100	5.000	5.000	6.6907	5.2295	4.6		
3	50.000	0.200	5.000	10.000	12.4017	9.5691	4.3		
4	50.000	0.500	5.000	25.000	32.5205	24.8522	0.6		
5	50.000	1.000	5.000	50.000	65.2045	48.6520	0.6		
6	50.000	2.000	5.000	100.000	131.7590	100.2277	0.2		



SNP No.	NAME	SVOL [mL]	CVOL [mL]	DVOL [mL]	AREA [CN]	MEAS [ng]	CONC [ug/L]	Note
1	50ug/L	0.500	5.000	5.000	32.9478	25.1768	50.3536	
2	50ug/L	0.500	5.000	5.000	33.6675	25.7387	51.4774	
3	50ug/L	0.500	5.000	5.000	33.5749	25.6332	51.3064	

Statistics					
No.	NAME	TRY	AV [ug/L]	SD [ug/L]	Cv [%]
1	50ug/L	3	51.04580	0.6055294	1.19

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pH Meter

Model : SevenCompact S220

Serial No. : B448305208

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MSC-TS-TS17025
CALIBRATION0252

Page 1 of 3

Supersede to Calibration Certificate No. 24-001949

Certificate No. : 24-001949/1

Sample Code : 24-00563-006

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphum 8 Rd., Nongkhan,
Srinacha, Chonburi 20290

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Laboratory)

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
ID No. : LABE 11/4
Date of Receipt : 09 January 2024
Condition of Calibration : 09 January 2024

1. Environment : 22.4 ± 0.2 °C 1.2 Relative humidity : 58.4 % ± 2.1 %

2. Calibration method
In house method Wt.Cl-019, based on direct measurement by using standard voltage calibrator and using certified reference material (CRM).

3. Reference standard / Certified reference material

Instrument	ID No.	Certificate No.	Due Date
3.1 Voltage Calibrator	LB-AMC-01	2353244	03 October 2024
3.2 Digital Thermometer	LB-TH-33	23-096974	25 August 2024
Certified Reference Material			
3.3 Buffer Solution pH 4.008	919273	PH016L5	24 September 2025
3.4 Buffer Solution pH 6.866	94727	PH107L5	06 November 2024
3.5 Buffer Solution pH 9.597	919278	PH220L5	24 September 2024

4. This certificate is traceable to the international system of unit (SI Unit).

4.1 Instrument No. 3.1 through Technology Promotion Association (Thailand-Japan).

4.2 Instrument No. 3.2 through Asia Medical and Agriculture Laboratory and Research Center Public Company Limited.

4.3 Buffer Solution No. 3.3 and No. 3.5 traceable to CPA Chem (through primary measurement method-Harned cell using calibrated thermometer, barometer, and nanovoltmeter Accredited laboratory/ ISO/IEC 17025 and ISO/IEC 17034).

4.4 Buffer Solution No. 3.4 traceable to CPA chem (CPA RefN HARNED CELL LGN 612/5737; CPA RefN HARNED CELL LGN 612/3986 Accredited laboratory/ ISO/IEC 17025 and ISO/IEC 17034).

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. Nuttapin Timulha
Scientist

Approved by : (Mr. Satholai Nampunt)

Issue date : 31 January 2024



The uncertainties are for a confidence probability of approximately 95%.

This calibration result is valid only for the above calibrated item and was issued for use 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 the performance of the calibration service. The certificate is valid for the period of accreditation and the laboratory is not required to be re-audited for the period of accreditation. The 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).

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MSC-TS-TS17025
CALIBRATION0252

Page 2 of 3

Supersede to Calibration Certificate No. 24-001949

Certificate No. : 24-001949/1

Sample Code : 24-00563-006

Equipment : pH Meter
Manufacturer : METTLER TOLEDO
Serial No. : B448305208
ID No. : LABE 11/4
Range : -2.000 pH to 20.000 pH ; -5.0°C to 130.0°C

Resolution : 0.01 pH ; 0.1 mV ; 0.1 °C
Model : SevenCompact S220

Results of Calibration

Part 1. DC Voltage measurement

pH Meter Serial No. : B448305208

Nominal Value pH	Average indicator reading		Uncertainty mV	Coverage factor k
	mV	pH		
0	414.113	413.9	± 0.083	2.00
4	177.477	177.4	± 0.083	2.00
7	0.000	0.1	± 0.083	2.00
10	-177.477	-177.3	± 0.083	2.00
14	-414.113	-413.8	± 0.083	2.00

Part 2. Performance of Electrode system

Electrode Manufacturer : METTLER TOLEDO
Electrode Serial No. : 2453982
Model : INLab Expert Pro-ISM

Three-Point Calibration at pH4, pH7 and pH10

Percent Slope : 98.3

Standard Buffer Solution pH (@ 25 °C)	Average indicator reading		Error Value pH	Uncertainty pH	Coverage factor k
	pH	mV			
4.008	4.01	182.1	0.002	± 0.010	2.00
6.866	7.00	7.8	0.014	± 0.01	2.00
9.997	10.01	-167.2	0.013	± 0.01	2.00

The result reported 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 GUM X3:2000.



CALIBRATION 0332

Page 3 of 3

REPORT OF CALIBRATION

Supersede to Calibration Certificate No. 24-001849

Certificate No. : 24-001849/1

Sample Code : 24-00963-006

Equipment : pH Meter (Digital Thermometer with sensor)

Thermometer readout

Manufacturer

Serial No.

Resolution

Thermometer sensor

Manufacturer

Serial No.

: METTLER TOLEDO

: B448305208

: 0.1 °C

: METTLER TOLEDO

: 2453982

: SevensCompact S220

: LABE 11/4

: 5.0 °C to 130.0 °C

: InLab Expert Pro-ISM

: N/A

Condition of Calibration

1. Environment

1.1 Ambient temperature : 22.6 °C ± 0.1 °C

1.2 Relative humidity : 55.1 % ± 3.3 %

2. Calibration method

2.1 The calibration use in house method WI-CL-021 by comparison with standard thermometer

2.2 The calibration by comparison unit under calibration (UUC) to the standard thermometer in a calibration bath at the

controlled temperature.

2.3 The temperature scale in use of this laboratory is the international temperature scale of 1990 (ITS-90).

3. Reference standard instrument

Instrument : Model ID No. Certificate No. Due date

3.1 Resistance Thermometer PT-100 RTD-90 23-098974 25 August 2024

3.2 Thermometer Readout GT-11 LBTH-33 23-098974 25 August 2024

4. This certificate is traceable to the international system of unit (SI Unit).

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (Accreditation Under TLAS Laboratory

Calibration No.0152)

5. The result of calibration was found accurate as shown on data and place of calibration only.

6. Condition of Calibration item : Normal

Results of Calibration

Calibration point °C	Average of standard reading °C	Unit under calibration		Expanded uncertainty °C	Coverage factor k
		Immersion depth mm	Average reading °C		
25	25.000	120	25.0	± 0.14	2.00

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 GUM 10000

- End of report -

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Printed Date 19/10/21

STANDARD WEIGHT 50 g

Certificate No. : 22-052238
Sample Code : 22-19150-003

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1982 CO., LTD.
683 Moo 11, Sukhapibon 8 Rd., Nongtham,
Siracha, Chonburi 20230Location 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
31 May 2022
Approved by : (Mr. Sornchai Neamput)
Signed for Director

Issue date

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 compliance with the requirements of ISO 17025:2017 and its traceability to the corresponding international standards. The certificate is valid for the period of accreditation and its traceability to the corresponding international standards. 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).

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Effective Date: 15/01/21Certificate No. : 22-052238
Sample Code : 22-19150-003

REPORT OF CALIBRATION

Condition of Calibration:

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.20 kg/m³
2. Calibration Method : Direct comparison weighing according to OIML R111: 2004(E)
3. Reference standard instrument

Instrument : ID No. : Certificate No. : Due Date :
1) Standard Weight 1 mg to 1 kg : E2 : LB-WE-79 : 21-078366 : 22 September 20224. 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 -

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Effective Date: 15/01/21Certificate No. : 22-052238
Sample Code : 22-19150-003

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
50 g	-0.324	49.999676 g	(mg) 0.10	± (mg) 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 to a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with ISO 15020:2005

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Effective Date: 15/01/21

STANDARD WEIGHT 100 g



Certificate No. : 22-052239
Sample Code : 22-19150-004

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongpham,
Siracha, Chonburi 20230

Location of Calibration : Asai 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 : 18 May 2022
Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022

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 data and plots 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 Asai Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

Certificate No. : 22-052239
Sample Code : 22-19150-004

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	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
			(mg)	\pm (mg)	
100 g	-0.171	99.999829 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

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Certificate No. : 22-05239
Sample Code : 22-19150-004

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.18 kg/m³
2. Calibration Method : WICL 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	LBWE-79	21-079366	22 September 2022

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 -

Signature

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Effective Date: 15/7/21

STANDARD WEIGHT 50 g

Certificate No. : 22-052237
Sample Code : 22-19150-002

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongkham,
Sriacha, Chonburi 20230Location 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 : 18 May 2022

Date of Calibration : 30 May 2022

Calibrated by : Mr. Somwang Sangdee
Scientist
Issue date : 31 May 2022
Approved by : (Mr. Somschai Nampant)
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 irreducibility 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).

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Effective Date: 15/10/21Certificate No. : 22-052237
Sample Code : 22-19150-002

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative Humidity 50% ± 10% and air density 1.18 kg/m³
2. Calibration Method : WP-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-79	21-079366	22 September 2022

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 Items: 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 -
Certificate No. : 22-052237
Sample Code : 22-19150-002

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_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional Mass	Expanded Uncertainty	Maximum Permissible Error	ID No.
50 g	(mg)		(mg)	± (mg)	
	-0.111	49.999889 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 GUMS 100003

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Effective Date: 15/10/21

THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737

AMARO

ASIA MEDICAL AND
AGRICULTURAL LABORATORY
AND RESEARCH CENTER



CERTIFICATE OF CALIBRATION

Certificate No. : 23-055203
Sample Code : 23-21440-001

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
883 Moo 11, Sukhaphiban 8 Rd, Nongpham,
Srinacha, Chonburi 20220

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital Thermo-Hygrometer
Manufacturer : testo
Serial No. : 45106737
Date of Receipt : 25 May 2023

Model : 608-H1
ID No. : LABE 0817
Date of Calibration : 29 May 2023

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-C-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 Vision	LB-DP-02 & LB-OP-02 (DP)	TH-018722	05 December 2023
3.2 Digital Thermometer	Optidew Vision	LB-DP-02 & LB-OP-02 (Temp.)	23-014916	12 February 2024
3.3 Digital Thermometer	34872A	LBDA-07 with RTD-89	22-095535	08 September 2023

4. This certificate is traceable to the international system of unit (SI unit).

4.1 Instrument No. 31 Through National Institute of Metrology (Thailand).
4.2 Instrument No. 32 and 33 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

REPORT OF CALIBRATION

Certificate No. : 23-055203
Sample Code : 23-21440-001

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		Expanded uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.00	20.0	0.00	± 0.39
25	50	25.02	25.1	- 0.08	± 0.39
30	50	30.00	30.0	0.00	± 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	25.00	45.18	53.5	- 8.22	± 1.3
60	25.00	60.03	68.3	- 8.27	± 1.5
75	25.00	75.20	83.2	- 8.00	± 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 ISO 9003.

- End of Report -

Calibrated by : Miss Pornnada Lohabai
Scientist
31 May 2023

Approved by :
Scientist

(Mr. Sanchai Niamsung)
Signed for Director

Issue date : 31 May 2023

The uncertainty 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 for the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its capability to recognize national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced without the prior written permission of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARCO TH).

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WWW.AMARCO.TH

Effective Date : 30/07/21

THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737



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CERTIFICATE OF CALIBRATION

Customer : EASTERN THAN CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhaphiban 8 Rd., Nongkham,
Sriacha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital thermo-hygrometer
Manufacturer : testo
Serial No. : 45106737
ID No. : LABE 08/7
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: Wt-Ct 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.

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-49	23-103174	03 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 Lohabai
Scientist
Issue date : 30 May 2024
Signed for Director : (Mr. Somchai Neamputi)
The uncertainties are for a specific use and are not to be used for other purposes.
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 recognised national standards and for the unit of measurement realised 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).
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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
	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
	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 ISO 9003.

- End of Report -



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Serial No. : A11635101643 CD

Serial No. : A11635101643 CD

CM IN/ 700 07 000 01 122101831

FM-JV-709-02 Rev 01 (23/01/63)



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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 (±A)
420.0	0.0000	0.0000	0.0020	0.0042
	0.5715	0.5729	0.0014	0.0042
	0.7087	0.7087	0.0000	0.0042
440.0	1.0087	1.1055	0.0018	0.0042
	0.0000	0.0000	0.0000	0.0042
	0.5651	0.5578	0.0017	0.0042
465.0	0.6668	0.6669	0.0001	0.0042
	1.0757	1.0774	0.0017	0.0042
	CNR	CNR	CNR	CNR
546.1	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
580.0	0.0000	0.0000	0.0020	0.0042
	0.5193	0.5213	0.0020	0.0042
	0.6937	0.6940	0.0003	0.0042
635.0	1.0411	1.0426	0.0017	0.0042
	CNR	CNR	CNR	CNR
	CNR	CNR	CNR	CNR
650.0	0.0000	0.0000	0.0000	0.0042
	0.5605	0.5624	0.0019	0.0042
	0.7579	0.7593	0.0004	0.0042
*CNR = Customer not request				0.0042

4. Stray Light*

Standard cut-off wavelength (nm)	Wavelength (nm)	Unit Under Calibration(UUC) Transmission (%)	Absorbance (A)
201,3340,11nm	200,80	0.9750	2.0111

The Stray light transmission reference is less than 1.0% 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

The above results are valid exclusively for the calibrated item(s) as mentioned in this report. Calibration is not valid for other items. Advertising this report without approval of the Bara Scientific Co., Ltd. is prohibited.

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PM-UV-758-02 Rev.01 (23/01/63)

SOUND LEVEL CALIBRATOR

MODEL : NC-75

SERIAL No. : 34802645



Calibration Certificate

Equipment : SOUND CALIBRATOR

Manufacturer : RION

Model : NC-75

Serial No. : 98070488

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 SEPTEMBER 2023

Calibration Date : 12 OCTOBER 2023

Date of Issue : 16 OCTOBER 2023

Calibrated by :

Nahakorn Piatpaisan

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.

QF-TS12-04-04-020664

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Continuation of Calibration Certificate

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by based on IEC-60942-2:05 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 :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Millimeter	33461 A	MY53220104	EEL BP 300766	13-FEB-24
Digital Multimeter	33461 A	MY53220076	EEL BP 300767	13-FEB-24
Digital Multimeter	33461 A	MY60024273	EEL BP 310766	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-02KAI	34560495	AA-3002-23	14-FEB-24
Audio Analyzer	AYR-33460A	V744B6069	EF-0012-23	10-FEB-24

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).

QF-TS12-04-04-020664

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Continuation of Calibration Certificate

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.94	-0.06	0.14	0.49

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 (%)
0.24	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 %

End of Calibration Certificate

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QF-TS12-04-04-020664

T. Petchurai

SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322751

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

489-45/1 Sirthiporn Road, Bangjumru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.com



SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

489-45/1 Sirthiporn Road, Bangjumru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24138
Pages : 1 of 8

Cert. No. : ACL24138
Job No. : VL67AC0083
Pages : 2 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier 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 ± 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 Pisupaisan

Approved by :
(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-0009-4	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-1001-24	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).

Nathakorn Pisupaisan

(Thanakul Petchurai)

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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.

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		
For > 4 kHz to 10 kHz	0.2	0.2
For > 10 kHz to 20 kHz	0.1	0.1
6. Long - term stability		
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		
12. High level stability	0.2	0.25
	0.1	0.1

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)
14.2

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

Frequency Weighting	Measured value (dB)
A - weight	12.6
C - weight	19.0
Flat	24.4

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
125	0.0	0.0	0.0
1000	-0.1	-0.1	-0.1
8000	0.3	0.4	0.3
			±1.5
			±1.0
			±5.0

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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
63	-0.1	-0.1	-0.1
125	-0.1	0.0	-0.1
250	0.0	0.0	-0.1
500	0.0	0.0	-0.1
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.0	0.0

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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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±1.1
136.0	136.1	0.1	±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	109.1	0.1	±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	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1

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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 Weighing	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
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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	133.0	133.0	0.0	±3.0
One	136.4	135.5	-0.9	±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	
89.6	89.5	-0.1	±1.5

12. High level stability

Frequency Weighing	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. : 00322750

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, 483 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 Psaupaisan

Approved by : 
(Thanakul Peichurai)

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.

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 A-weighting 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-423CAI	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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ISO 17025
CALIBRATION 0394
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ISO 17025
CALIBRATION 0394

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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ISO 17025
CALIBRATION 0394

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)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	12.6
C - weight	19.3
Flat	24.5

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight Acceptance Limits
125	0.0	0.1	±1.5
1000	0.0	0.0	±1.0
8000	0.5	0.5	±5.0


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ISO 17025
CALIBRATION 0394

Cert. No. : ACL24137

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
63	-0.1	0.0	±2.0
125	0.0	0.0	±1.5
250	0.0	0.0	±1.5
500	0.0	0.0	±1.5
1000	0.0	0.0	±1.0
2000	0.0	0.1	±2.0
4000	0.0	0.0	±3.0
8000	0.0	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. : ACL24137

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	39.0	0.0	±1.1
34.0	34.0	0.0	±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

Cert. No. : ACL24137

Job No. : VC67AC0083

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. Time burst response

Time Weighting	Time burst duration, T _b (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
Slow	200	800	134.0	134.1	0.1	±1.0
	2	8	108.0	108.0	0.0	1.5 ; -5.0
SEL	200	800	127.6	127.6	0.0	±1.0
	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

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	133.0	133.0	0.0	±3.0
One	136.4	135.6	-0.8	±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	
89.6	89.5	-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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BAROMETER

Equipment : Analog Barometer

ID No. / Tag No. : BM001/41



CALIBRATION CERTIFICATE

Certificate No. : L202405022-0013
Date Issued : 08-May-24

Customer : Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Suddapibarn 8 Rd., Nongbham, 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 Srichuikul

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:
(Mr. Sarayuth Tothua)



Certificate No. : L202405022-0013
Environment
Ambient Temperature : $(25 \pm 2)^{\circ}\text{C}$
Relative Humidity : $(50 \pm 15)\%\text{RH}$

STD Reading mbar	UUC Reading (mbar) Before Adjusted	UUC Reading (mbar) After Adjusted	UUC Error mbar	Uncertainty \pm mbar	MPE \pm mbar	Pass / Fail 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
UUC = Unit Under Calibration
MPE = Maximum Permissible Error
Calibrated condition :
Pressure: Medium
Mounting Position
Reference Level
Conversion Factor

Pass = $|\text{error}| + |\text{uncertainty}| \leq |\text{MPE}|$
Fail = $|\text{error}| + |\text{uncertainty}| > |\text{MPE}|$

Air Density = 1.19 kg/m^3 @ 20°C , 1 bar
Vertical
at center of its dial
Multiply by 1.0 E-102 - 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. CLI-IP230097 for Reference Pressure Monitor Serial No. 1598, Due 09-Nov-24

End of Certificate



Serial No. : C12095200986

Rev. 3.31

Operational Qualification

Operational Qualification Record

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		QC-2010Plus AE			
Serial Number (SN)		L A B E 0 4 / 3					
No	Item	Criteria			Results	Pass	Fail
1	Display, LED test	Verify the display and LED operation.	ALL LED's light.	LED adjustment is possible.	Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Standard self-diagnostic test	Verify the status and operation of all self-diagnostic test.	"Good" displayed as the result of the self-diagnostic test.				<input checked="" type="checkbox"/>
3	Firmware version check	Verify the version number and build number.	Median number and build number are displayed.	The version No. and build No. matches the controlled version.	Ver. Build No.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Temperature test	Verify that temperature control is normal.	TEMP LED light green		Set value	Measured value	<input checked="" type="checkbox"/>
			Displayed actual value	(Name)	0.1 MPa	0.1 MPa	
			Temperature controller	Pressure gauge reading	0.1 MPa	0.1 MPa	
			COIL	Pressure gauge reading	0.1 MPa	0.1 MPa	
			IN1	Pressure gauge reading	0.1 MPa	0.1 MPa	
5	Column inlet pressure test	Verify the accuracy of the column inlet pressure.	Pressure gauge reading		0.1 MPa	0.1 MPa	<input checked="" type="checkbox"/>
			COIL	Pressure gauge reading	0.1 MPa	0.1 MPa	
			IN2	Pressure gauge reading	0.1 MPa	0.1 MPa	
			IN3	Pressure gauge reading	0.1 MPa	0.1 MPa	
			IN4	Pressure gauge reading	0.1 MPa	0.1 MPa	

Performer (signature): *[Signature]* Date: 16 / 07 / 2023
Reviewer (signature): *[Signature]* Date: 17 / 8 / 2023

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Operational Qualification

Operational Qualification Record

3-2 AOC-20i Auto Injector

☒ Single ☐ Dual system, main injector☒ Applicable ☐ Not Applicable

Model Name		AOC-20i			
Component ID		Serial No. (SN)			
		C 1 2 1 2 4 1 0 2 0 9			
No.	Item	Criteria	Results	Pass	Fail
1	Display, LED	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. The version number matches the controlled version.	0, 00 9, 41 0	<input checked="" 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

Component ID		Model Name	AOC-20i			
Serial No. (SN)						
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.	Version No. matches the controlled version number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Basic operation test	Verify that the auto injector basic operation is correct.		Ver. No. 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): *[Signature]* Date: 16 / 07 / 2023
Reviewer (signature): *[Signature]* Date: 17 / 8 / 2023

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Primary Flow Calibrator

Serial No. : 110619 , 207510

INNOVATIVE INSTRUMENT CALIBRATION LAB

INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE

7109 MOO 13, SOI SINTANAKORN 11 (TAMNEN BANG KAI 1),

AMPHIE BANG PHU SAHUT PRAKAN PROVINCE 10240 THAI AND

Tel : (6680-2116-5666) FAX: (6680-2116-7140)

INNOVATIVE

ANAB

ANAB Member Recognition Body

ACCREDITED BY

ISO 17025

Calibration

Validated Equipment Only

ACCREDITED

INNOVATIVE INSTRUMENT CALIBRATION LAB

INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE

7109 MOO 13, SOI SINTANAKORN 11 (TAMNEN BANG KAI 1),

AMPHIE BANG PHU SAHUT PRAKAN PROVINCE 10240 THAI AND

Tel : (6680-2116-5666) FAX: (6680-2116-7140)

INNOVATIVE

ANAB

ANAB Member Recognition Body

ACCREDITED BY

ISO 17025

Calibration

Validated Equipment Only

ACCREDITED

Certificate of Calibration

Customer : Essiem Thai Consulting 1992 Co., Ltd.
Certificate No : 24-AFM-023
Request No : Req-2024-0095

Name :
Address : 683 Moo 11, Sukhapibam 8 Rd., Nangkhun, Srinacha, Chonburi 20210

Unit Under Calibration Details
Measurement Item : Primary Flow Calibrator
Manufacturer : Bos
Model : Defender 510-L
Serial Number : 110619
Sensor Model : -
Sensor Serial Number : -

ID : -

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 0.3 °C

Humidity : 55 %RH ± 3% RH

Barometric Pressure : 1013 hPa ± 10 hPa

Received Date : 11 January 2024

Calibration Date : 30 January 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard

Air Flow Meter

Air Flow Meter

Pressure meter

Model

Serial Number

Traceable

Due Calibration

18501010006

19031011003

08030057

GT 11

CPG2400

4100DKDU651882

TPA

9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne AZLA Accreditation No. 3943.01

Note :

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

Calibration By :
Mr. Noppadol Luangt
Service Calibration Engineer

Approved By :
Mr. Pait Mallaveon
Calibration Engineer Supervisor

Issue Date :
30 January 2024



INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7109 MOO 13, SOI SINTANAKORN 11 (TAMNEN BANG KAI 1),
AMPHIE BANG PHU SAHUT PRAKAN PROVINCE 10240 THAI AND
Tel : (6680-2116-5666) FAX: (6680-2116-7140)



Certificate No : 24-AFM-023
Request No : Req-2024-0095

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.80	101.23	0	0.00	0.0000	0.0058
24.40	101.18	50	49.629	-0.4	3.3
24.40	101.16	100	100.73	0.7	2.8
24.30	101.13	200	198.30	-1.7	5.6
24.30	101.10	300	298.14	-1.9	8.4
24.40	101.06	400	397.45	-3	11
24.20	101.00	500	496.93	-3.1	7.1

Note
STD: Standard UUC: Unit Under Calibration

- UUC Reference Condition: At atmospheric pressure and room temperature condition

- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

End of Certificate



Certificate of Calibration

Customer : Easton Thai Consulting 1992 Co., Ltd.
Certificate No : 24-AFM-022
Request No : Req-2024-0094
Address : 683 Moo 11, Sukhaphan 8 Rd., Nongkham, Srinacha, Chonburi
2020

Unit Under Calibration Details
Measurement Item : Primary Flow Calibrator
Manufacturer : MesaLabs
Model : Defender 510-M
Serial Number : 207510
ID : -

Location of Calibration : LAB 4 AIR VELOCITY METER
Calibration Environment and Details
Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 30 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 11 January 2024
Calibration Date : 30 January 2024

Calibration Procedure : In-house included CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensodyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensodyne	12 July 2024
Temperature meter	GT 11	08000657	Qebum	27 February 2024
Pressure meter	EPG2400	4100KDU/651862	TPA	9 November 2024

Traceability :
This Certificate is traceable to SI Unit through Sensodyne A2LA Accreditation No. 3943.01
Note :
The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k = 2, providing a level of confidence approximately 95 %.

Calibration By : Mr. Noppadorn Lumgatt
Service Calibration Engineer
Approved By : Mr. Peet Muthayom
Calibration Engineer Supervisor
Issue Date : 30 January 2024

Certificate No : 24-AFM-022
Request No : Req-2024-0094

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.80	101.23	0	0.00	0.0003	0.0038
24.70	101.58	101	101.48	0.5	2.6
24.80	101.50	200	200.14	1.1	5.6
24.70	101.50	500	503.87	3.9	7.1
24.80	101.50	1003	1010.1	7	14
24.70	101.60	2002	2014.6	13	29
24.60	101.33	2995	3007.6	13	43
24.60	101.65	4027	4007.5	-19	57
24.50	101.70	5035	5010.7	-24	72

Note
STD : Standard
UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and mean temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{ref}}{T}$$

where Q : Flow Rate
P : Absolute Pressure
T : Absolute Temperature
Meas : Measurement Condition
ref : Standard Condition

* Indicates non accredited

End of Certificate

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Agilent CrossLab Start Up Services Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure maximum operational uptime and reliability for your business.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your GCs operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

Agilent 7890 GC Preventive Maintenance Checklist

Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts not included in the Parts List section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance additional costs must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about **Agilent Technologies services**, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/repair>
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>.
- To access **Agilent University** visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resources Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>.
- Need technical support, FAQs, supplies? – visit our **Support Home page** <http://www.agilent.com/search/support>.
- Videos** about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>.
- 7890B Manuals** are also available on Agilent.com:
 - Safety** https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
 - Installation and First Startup** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Installation.pdf
 - Operation Manual** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Operation.pdf
 - Maintaining Your GC** https://www.agilent.com/cs/library/usermanuals/public/GS430-90552-207890B_Maintaining%20GCs.pdf

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Check "Section not applicable" checkboxes in the checklist using either a "X" or tick mark "-".
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- **Ask the customer to sign the *Service Completion* section including the customer's and your signature.**

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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System Information

- ☒ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	GC-7890B
Instrument System Site and Location	Secot Co., Ltd. Inghent room.

CN19493147

List System Component Product Numbers	List the Serial Numbers of each Component
1. G7400B	CN19493147
2. G4513A	CN1910080
3. G4514A	CN1980006
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components, settings as defined by current Service Notes.
- ☒ Check for required firmware updates and verify with customers if they would like them installed.
- ☒ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is in tune, OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Preventive Maintenance Procedure

Clean and inspect GC

- ☒ Unplug power cord from the power source.
- ☒ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☒ Inspect internal connectors for proper contact and placement.
- ☒ Reconnect Power to the GC. Power the GC on and verify the power on self test passed.
- ☒ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☒ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☒ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☒ For the inlets installed, perform inlet maintenance as defined in the 7890 manual - "Maintaining Your GC" for the inlet(s) installed.
- ☒ Replace the split vent trap cartridge filter on units with these inlets: Split/Spitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☒ The inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☒ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or carbon deposits, clean the ignitor. Examine the FID collector and castle assemblies for contamination - clean as necessary.

Zero Sensors and Leak test

- ☒ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
- ☒ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual".
- ☒ If the GC is in preparation for an Operational Qualification, then the pressure decay test defined within that protocol be used for the test.
- ☒ Record if test passed or failed in the results table.

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ALS Maintenance

- ☐ Section NOT applicable
- ☒ Check all cabling and configuration settings between GC, tray, and injectors.
- ☒ Vacuum or remove any dust, especially around fans.
- ☒ Check operation of all fans.
- ☒ Check syringe for smooth plunger operation.
- ☒ Check for smooth operation of the needle support - clean if necessary

Restore Instrument

- ☒ Restore the normal operating conditions or customer method using the Data System.
- ☒ Purge the system with carrier flow for 15 minutes
- ☒ Bake out the system, then restore the normal operating conditions
- ☒ After equilibration, check and record the post PM detector signal output values.
- ☐ Results should be similar or lower than the detector outputs recorded prior to PM.
- ☐ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Signature Page Service Review

- ☐ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review with the customer this service, parts replaced, and test results obtained.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's comments box or if necessary, in the customer's IQ records.
- ☒ Supply the customer with a copy of the Smart Alerts flyer.
- ☒ Describe Smart Alerts to the customer.
- ☒ Install Smart Alerts if requested.

7890 GC Test Results Table

Detector Signal Outputs	Before PM Service	After PM Service
Front detector output <i>FID</i>	<i>N/A</i>	<i>19.6-2</i>
Back detector output <i>FID</i>	<i>N/A</i>	<i>20.6</i>
AUX detector output	<i>N/A</i>	<i>N/A</i>
Pressure decay test	Expected test result	Actual test result
Front inlet pressure decay test	Pass	<i>Pass</i>
Back inlet pressure decay test	Pass	<i>Pass</i>

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7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	7890A/B	<i>N/A</i>
SSL Capillary Inlet PM kit, split	5188-6496	7890A/B	<i>2</i>
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	<i>N/A</i>
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	<i>N/A</i>
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	<i>N/A</i>
PP Inlet PM kit	5188-6498	7890A/B	<i>N/A</i>
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	<i>N/A</i>
MMI Cleaning Kit	G3510-60820	7890A/B	<i>N/A</i>
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	<i>N/A</i>
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	<i>N/A</i>
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	<i>N/A</i>
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	<i>N/A</i>
Standard 0.11-inch FID Jet for capillary FID base	G1531-80560	7890A/B	<i>1</i>
High Temperature 0.18-inch FID Jet for capillary FID base	G1531-80620	7890A/B	<i>N/A</i>
Standard 0.18-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	<i>N/A</i>
Standard 0.11-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	<i>N/A</i>
High Temperature 0.18-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	<i>N/A</i>
NPD Jet, universal fit, 0.11-inch ID	G1534-80580	7890A/B	<i>N/A</i>
NPD Jet, universal fit, 0.11-inch ID Extended tip	G1534-80590	7890A/B	<i>N/A</i>
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	<i>N/A</i>
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	<i>N/A</i>
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	<i>N/A</i>

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Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Service Completion

Service request number *606041153* Date service completed *29 May 2023*
 Agilent signature *[Signature]* Customer signature *[Signature]*
 Total number of pages in this document *9* *Pages*

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 Agilent Document Number: D0019618
 DE number: 44166-759722222
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Certificate of Completion

Learner Name: Saenguthai Saeng Tarak

Title Of Course: AN-ASP/CE/CSE-GC-1-001-M: 7890/7820 GC and OL GC Standalone Chemstation I&F/Service

Completion Date: November 23, 2014

Certified By Company: Learning at Agilent

All Service and Support training certificates have the following specific limitations.

A certificate for Service and Support training is only valid while employed by Agilent Technologies or while working as an Agilent-authorized service provider, through which the service employee has ongoing access to Agilent's: Safety Alerts, Service Notes, internal technical updates, update training, current documentation, technical support, current parts, and parts updates. Completion of training alone, without being employed by Agilent Technologies, does not qualify an individual to safely install, service or maintain Agilent products.

Document Name:

Operator's training certificate and qualifications



Certificate of Completion

Learner Name: Saenguthai Tarak

Title Of Course: ANCE-GCMS-2-01-ID: 59771 EICHES MSD GC-MS OPER. HW SW - Intro, Repair and Troubleshooting

Completion Date: March 18, 2016

Certified By Company: Learning at Agilent

All Service and Support training certificates have the following specific limitations.

A certificate for Service and Support training is only valid while employed by Agilent Technologies or while working as an Agilent-authorized service provider, through which the service employee has ongoing access to Agilent's Safety Alerts, Service Notes, internal technical updates, update training, current documentation, technical support, current parts, and parts updates. Completion of training alone, without being employed by Agilent Technologies, does not qualify an individual to safely install, service or maintain Agilent products.

Date: September 6, 2016 6:11:18 PM
System ID: SGR551X1YW

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Certificate of Completion

Learner Name: Saenguthai Saeng Tarak

Title Of Course: AN-CE-GC-II-022-A: Advanced GC Detectors Application and Troubleshooting Labs

Completion Date: November 25, 2014

Certified By Company: Learning at Agilent

All Service and Support training certificates have the following specific limitations.

A certificate for Service and Support training is only valid while employed by Agilent Technologies or while working as an Agilent-authorized service provider, through which the service employee has ongoing access to Agilent's Safety Alerts, Service Notes, internal technical updates, update training, current documentation, technical support, current parts, and parts updates. Completion of training alone, without being employed by Agilent Technologies, does not qualify an individual to safely install, service or maintain Agilent products.

BAROMETER

Equipment : Analog Barometer

ID No. / Tag No. : BM001/41



CALIBRATION CERTIFICATE



Certificate No. : L202405022-0013
Date Issued : 08-May-24

Customer : Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Sukkapharm 8 Rd., Nongkhum, 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 Srithuikul

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:
(Mr. Saruth Srithuikul)



Certificate No : L202405022-0013
Environment : Ambient Temperature : $(25 \pm 2)^{\circ}\text{C}$
Relative Humidity : $(50 \pm 15)\%$ 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
UUC - Unit Under Calibration
MPE - Maximum Permissible Error
Calibrated condition : Pressure Medium
Mounting Position
Reference Level
Conversion Factor

Description of UUC :
Range
Calibration Range
Scale Interval

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
JRPC Certificate No. CL-14230097 for Reference Pressure Monitor Serial No. 1398, Due 09-Nov-24

End of Certificate



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.	Gen Change Management LANSF 0413
Installation Site	Technical Room GC 1/C
<p>The undersigned performer reports that the Operational Qualification Protocol has been successfully completed for the system stated above.</p> <p>• Performer</p>	
Signature	Date
Print Thomas Pongphak	15 / 02 / 2024
Title Service Engineer	
Company Pongphak Scientific Co., Ltd.	
<p>The undersigned reviewer and manager report that the performer has completed the Operational Qualification Protocol successfully.</p> <p>• Reviewer</p>	
Signature	Date
Print Pongphak Pongphak	15 / 02 / 2024
Title Scientist	
Company Pongphak Pongphak Consulting 2549 Co., Ltd.	
<p>• Manager</p>	
Signature	Date
Print Pongphak Pongphak	15 / 02 / 2024
Title HS	
Company Pongphak Pongphak Consulting 2549 Co., Ltd.	

The undersigned reviewer and manager report that the performer has completed the Operational Qualification Protocol successfully.

• Reviewer _____

- Manager

Company Future Tech Consulting Pvt. Ltd

COPY

Operational Qualification

[illegible]
$$D_{\lambda} = f_{\lambda, \text{max}}(u) - f_{\lambda, \text{min}}(u, v, w) =$$

עליון

Date: 15 / 08 / 2024

Date:

Rev. 3.31

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Operational Qualification

☒ Single ☐ Dual system, main injector

3-2 AOC-20i Auto Injector

☒ Applicable ☐ Not Applicable

Model Name		AOC-231	
Component ID		DATE	S/N
C 1 2 1 2 5 4 1 0 3 0 4			
No.	Item	Criteria	Results
1	Display, LED	Verify the display and LED	All LEDs light, except decimal point.
2	ROM, RAM	Verify that ROM and RAM memory operations <u>normally</u>	Display shows "000".
3	Firmware version check	Verify file: Version number matches the program version.	Version No. 00000000 Model No. 00000000
4	Basic operation test	Verify that the auto injector basic operation is correct.	Sample injected into the I/C and O/C operation starts.

☒ Not Applicable ☐ Dual system, sub injector

Component ID	Model Name	Criteria	Results	Pass	Fail
Serial No. (S/N)					
No.	Item				
1	Display, LED test	Verify the display and LED AIL LED 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	Program version check	Verify the version number matches the version	Version No. displayed The version number matches the compiled version number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Basic operation test	Verify that the vector generator injects sample No. 2 transferred to the basic operation is correct.	Version No. displayed The version number matches the compiled version number. The vector generator injects sample No. 2 transferred to the basic operation is correct.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature):

1960-1961

Date: 15 102 12024

Date: 11/1/2014

Rev. 3.31

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3-3 AOC-20s Auto Sampler

3-4 SPL-2010Plus Split/Splitless Injection Unit

☒ Applicable ☐ Not Applicable

Component ID		Model Name		AOC-20s	
Serial No. (S/N)		L P D E		Q217	
No.	Item	Criteria	Results	Pass	Fail
1	Initial operation test	Verify that the auto sampler basic LED lights green, not red.		<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Performance version check	Version number is displayed. The version number matches the controlled version number.	Version No. Controlled Ver. No.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Performer (signature): [Signature] Date: 15 / 03 / 2024
Reviewer (signature): [Signature] Date: 15 / 03 / 2024

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Primary Flow Calibrator
Serial No. : 110619 , 207510

Certificate of Calibration

Certificate No : 24-AFM-023

Request No : Req-2024-0095

Customer

Name : Eastern Thai Consulting 1992 Co., Ltd.
Address : 683 Moo 11, Sukhaphan 8 Rd., Nongkham, Srikachha, Chonburi
20230

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator
Manufacturer : Bios
Model : Defender 510-L
Sensor Serial Number : -
Serial Number : 110619
ID : -

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 11 January 2024
Calibration Date : 30 January 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator


Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qrebon	27 February 2024
Pressure meter	CPQ2400	4100KDU0651N82	TPA	9 November 2024


Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

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

Calibration By : 
Mr. Noppadon Luangnit
Service Calibration Engineer

Approved By : 
Mr. Pech Mahavorn
Calibration Engineer Supervisor
Issue Date : 30 January 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

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Certificate of Calibration

Certificate No : 24-AFM-022

Request No : Req-2024-0094

Customer

Name : Eastern Thai Consulting 1992 Co., Ltd.
Address : 683 Moo 11, Sukhaphan 8 Rd., Nongkham, Srikachha, Chonburi
20230

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator
Manufacturer : MesaLabs
Model : Defender 510-M
Sensor Serial Number : -
Serial Number : 207510
ID : -

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 11 January 2024
Calibration Date : 30 January 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator


Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qrebon	27 February 2024
Pressure meter	CPQ2400	4100KDU0651N82	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

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

Calibration By : 
Mr. Noppadon Luangnit
Service Calibration Engineer

Approved By : 
Mr. Pech Mahavorn
Calibration Engineer Supervisor
Issue Date : 30 January 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

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Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.80	101.23	0	0.00	0.0000	0.0058
24.40	101.18	50	49.629	-0.4	3.3
24.40	101.16	100	100.73	0.7	2.8
24.30	101.13	200	198.30	-1.7	5.6
24.30	101.10	300	298.14	-1.9	8.4
24.40	101.05	400	397.45	-3	11
24.20	101.00	500	496.93	-3.1	7.1

Note

STD: Standard UUC: Unit Under Calibration

- UUC Reference Condition : At atmospheric pressure and room temperature condition

- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

• Indicates non accredited

End of Certificate

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The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate No : 24-AFM-022

Request No : Req-2024-0094

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.80	101.23	0	0.00	0.0000	0.0058
24.70	101.38	100	101.48	0.5	2.8
24.80	101.50	200	201.14	1.1	5.6
24.70	101.50	500	503.87	3.9	7.1
24.80	101.50	1003	1031.1	7	14
24.70	101.60	2002	2014.6	13	29
24.60	101.33	2995	3007.6	13	43
24.60	101.65	4027	4007.5	-19	57
24.50	101.70	5035	5010.7	-24	72

Note

STD: Standard UUC: Unit Under Calibration

- UUC Reference Condition : At atmospheric pressure and room temperature condition

- Flow Rate was corrected for non-standard operating condition by using equation

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

• Indicates non accredited

End of Certificate

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The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

SOUND LEVEL CALIBRATOR

MODEL : NC-75

SERIAL No. : 34802645

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

451-451/1 Sindhon Rd.,Banghumu, Bangklok 10700 THAILAND.
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:center@sithiporn.com http://www.sithiporn.com



Cert. No. : ACC23087
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 ± 3) °C

Pressure : (101.3 ± 3) kPa

Relative Humidity : (50.0 ± 20) %

Received Date : 06 SEPTEMBER 2023

Calibration Date : 12 OCTOBER 2023

Date of Issue : 16 OCTOBER 2023

Calibrated by :

Nedakorn Pisuaisan

Approved by :

T. Petchu.
(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.

QF-TS12-04-04-020664

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SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC23087
Job No. : VC66AC0097
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by based 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 :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL BP 3000/66	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL BP 3000/67	13-FEB-24
Digital Multimeter	33461A	MY60024273	EEL BP 3100/66	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	06-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	3456095	AA-3002-23	14-FEB-24
Audio Analyzer	AVR-3360A	V744B6069	EF-0011-23	10-FEB-24

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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QF-TS12-04-04-020664

QF-TS12-04-04-020664

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T. Petchu.

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.94	-0.06	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 (%)
0.24	0.10	2.0

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 %

End of Calibration Certificate

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Y. Petha

SOUND LEVEL METER
MODEL : NL-42A
SERIAL No. : 00322745

Cert. No. : ACL24134
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322745 / 196468 / 15477
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 :**

Y. Petchu.
(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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Cert. No. : ACL24134
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	MY53202742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 210267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 200267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 220267	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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Y. Petchu.

Cert. No. : ACL24134
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
5. Frequency and time weightings at 1 kHz	0.2	1.0
6. Long - term stability	0.1	0.2
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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Y. Petchu.

Cert. No. : ACL24134
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)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.3
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)	Acceptance Limits
	Flat	A-weight
125	0.0	0.0
1000	-0.1	± 1.5
8000	0.8	-0.1
	0.9	± 5.0

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Y. Petchu.

Cert. No. : ACL24134
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	-0.1	-0.1	±2.0
125	-0.1	0.0	-0.1	±1.5
250	0.0	0.0	-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	0.1	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
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
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
A - weight	94.0	94.0	0.0	±0.3

Cert. No. : ACL24134
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	131.9	-0.1	±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	26.9	-0.1	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1

Cert. No. : ACL24134
Job No. : VC67AC0083
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, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
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
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leqpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.2	-0.2	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
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

SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322755



Acoustic Laboratory (Thailand) Co., Ltd.
6/57 Soi Phoen Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com



Certificate of Calibration

Certificate No.: S2402-0651-01

Customer: Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Sukhaphum 8 Rd.
Nongkham, Sriracha, Chonburi 20230

Date of calibration: 2024-03-04

Date of issue: 2024-03-26

Instrument Calibrated: Sound Level Meter

Manufacturer: NL-42A (Meter), UC-59 (Microphone), NH-25 (Preamplifier)

Model: 00322755 (Meter), 21966 (Microphone), 22336 (Preamplifier)

Serial no:

Calibration and verification performed:
Acoustical levels are stated relative to 20µPa. 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 4839 S/N31083
- Digital multimeter Keysight SM HP34401A
- Ultra-low distortion function generator Stanford SRS DS360 S/N123625
- Acoustic sound calibrator Brüel & Kjær 1 Neq 1256 S/N12606542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NNM320568

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

This certificate of calibration is issued by Acoustic Laboratory (Thailand) ALT. It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full



Certificate No.: S2402-0651-01

Environmental conditions: Pressure: 101.325 kPa Temperature: 23.0 °C Relative humidity: 50 %RH
Reference conditions: 100.87 ± 0.10 kPa 23.5 ± 1.0 °C 57.0 ± 2.0 %RH
Measurement conditions:

1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)		Deviated value (dB)	Acceptance limit (dB)
	Before adjust	After adjust		
93.9	93.9	93.9	0.0	±1.0

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator Type NC-75 SN: 34234715

2. Self-generated noise

Frequency weightings (dB)		Measured value (dB)
A-Weighting		10.8
C-Weighting		15.3
Z-Weighting		20.7

3. Electrical signal test of frequency weighting at 91 dB

Frequency (Hz)	Deviation from various frequency weighting response curve			
	A-Weighting (dB)	C-Weighting (dB)	Z-Weighting (dB)	Acceptance limit (dB)
63	0.0	0.0	0.0	±2.0
125	0.1	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.1	0.1	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	-0.1	-0.1	-0.2	±2.0
4000	-0.3	-0.3	-0.3	±3.0
8000	0.1	0.1	0.0	±5.0

Date of calibration : 2024-03-04
2024-03-26
Date of issue : 2024-03-26



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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	94.0	0.0	±0.3
LAeq	94.0	0.0	±0.3

5. Long term stability

Time interval (min:ss)	Start level (dB)	Stop level (dB)	Deviated value (dB)	Acceptance limit (dB)
28:58	94.0	94.0	0.0	±0.3

Date of calibration : 2024-03-04

Date of issue : 2024-03-26

2024-03-26

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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	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	-0.1	±1.1
38.0	38.0	0.0	±1.1
37.0	36.9	-0.1	±1.1
36.0	35.9	-0.1	±1.1

Date of calibration : 2024-03-04

Date of issue : 2024-03-26

2024-03-26

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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	89.0	0.0	±1.1
92.6	92.6	0.0	±1.1
93.6	93.6	0.0	±1.1
94.6	94.6	0.0	±1.1
95.6	95.6	0.0	±1.1
96.6	96.6	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	44.1	0.1	±1.1
40.0	39.9	-0.1	±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 : 2024-03-04

Date of issue : 2024-03-26

2024-03-26

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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	104.0	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
130.9	130.9	0.0	±1.1
131.9	131.9	0.0	±1.1
132.8	132.8	-0.1	±1.1
133.9	133.9	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	78.9	-0.1	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±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	48.9	-0.1	±1.1
44.0	43.9	-0.1	±1.1
40.0	39.9	-0.1	±1.1
39.0	38.9	-0.1	±1.1
38.0	37.9	-0.1	±1.1
37.0	36.9	-0.1	±1.1
36.0	35.9	-0.1	±1.1

Date of calibration : 2024-03-04

Date of issue : 2024-03-26

2024-03-26

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Certificate No.: S2402-0651-01

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	116.0	0.0	+1.0,-2.5
	0.25	107.0	0.0	+1.5,-5.0
Slow	200	126.6	0.0	±1.0
	2	107.0	0.0	+1.0,-5.0
	200	127.0	0.0	±1.0
SEL	2	97.9	-0.1	+1.0,-2.5
	0.25			+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	127.4	-1.0	±3.0
Positive half cycle	130.4	130.1	-0.3	±2.0
Negative half cycle	130.4	130.1	-0.3	±2.0

9. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit (dB)
Positive one half cycle	138.9	0.2	±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 : 2024-03-04
2024-03-26
Date of issue : 2024-03-26



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Certificate No.: S2402-0651-01

Uncertainty of measurement

Parameters	Uncertainty
1. Indication at the calibration check frequency	0.12 dB
2. Self-generated noise	
- Frequency Weighting A	0.090 dB
- Frequency Weighting C	0.13 dB
- Frequency Weighting Z	0.090 dB
3. Electrical signal test of frequency weighting	
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	0.10 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, 14Hz, 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.

Replacement Calibration Certificate for calibration certificate number S2402-0651

Calibrated By:  Approved By:  (Mr. Atthakorn Sumpthan) (Mr. Pitupong Saraphan)

Date of calibration : 2024-03-04
2024-03-26
Date of issue : 2024-03-26

----- End of Certificate of Calibration -----



Registration number 0103564086235
6/57 Poomran Soi 42, Sai Mai, 10220 Bangkok Thailand
Tel (+66) 02-1296780 Email: info@altbkk.com
www.altbkk.com

NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0954

CERTIFICATE OF CALIBRATION

ISSUED BY	Cirrus Research plc
DATE OF ISSUE	19 January 2024
CERTIFICATE NUMBER 206864	



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

Page 1 of 2
Approved signatory
N.Smith
Electronically signed:

2.1

Dosemeter : IEC 61252-1993+A1:2000

CERTIFICATE OF CALIBRATION

Certificate Number:
206864

Page 2 of 2

Environmental conditions

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

Before	Pressure:	100.03 kPa	Temperature:	21,9 °C	Humidity:	34,8 %
After	Pressure:	100.06 kPa	Temperature:	21,7 °C	Humidity:	36,8 %

Test results summary

Test	Result
Linearity	Complies
Short Duration	Complies
Overload Latching	Complies
Frequency weighting	Complies
Absolute Acoustic Sensitivity	Complies

Test summary

Date of calibration: 19 January 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.

The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.

The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	KEYSIGHT	33511B	MY58001553
Attenuator	Cirrus Research	TS-952	78713
Environmental Monitor	Comet	TT510	18986334
doseBadge Reader	Cirrus Research plc	RC-110A	100488

Notes

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

Yates

Handwritten signature and red circular stamp.

NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0955



Cirrus Research plc
Acoustic House
Huntington Road
Huddersfield
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
N Smith
Electronically signed:


Dosemeter : IEC 61252-1993+A1:2000

Instrument information	
Manufacturer:	Cirrus Research plc
Model:	CR-110A
Serial number:	CB0955
Firmware version:	5.4

Test summary
Date of calibration: 19 January 2024
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.
The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment			
Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDDG6R6309
Attenuator	Cirrus Research	ZE 952	93882
Environmental Monitor	Comet	T7510	16966334
dosBadge Reader	Cirrus Research plc	RC-110A	40068

Notes

The certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory. The calibration was performed in accordance with the requirements of ISO/IEC 17025:2017. The results within this certificate relate only to the specific items of equipment identified and the expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

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CERTIFICATE OF CALIBRATION

Environmental conditions

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

Before	Pressure: 100.95 kPa	Temperature: 21.5 °C	Humidity: 35.2 %
After	Pressure: 100.93 kPa	Temperature: 21.7 °C	Humidity: 35.7 %

Test results summary

Test	Result
Linearity	Complies
Short Duration	Complies
Overload Latching	Complies
Frequency weighting	Complies
Absolute Acoustic Sensitivity	Complies

COPY

NOISE DOSI METER
MODEL : CR:110A
SERIAL No. : CB0956

CERTIFICATE OF CALIBRATION

ISSUED BY
DATE OF ISSUE
Cirrus Research plc
19 January 2024
CERTIFICATE NUMBER 206875

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

Page 1 of 2

Approved signatory
N.Smith
Electronically signed:

Page 1 of 2

Approved signatory
N.Smith
Electronically signed:

Dosemeter : IEC 61252-1993+A1:2000

CERTIFICATE OF CALIBRATION

Certificate Number: 206875

Page 2 of 2

Environmental conditions

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

Before	Pressure: 100.92 kPa	Temperature: 21.7 °C	Humidity: 36.0 %
After	Pressure: 100.93 kPa	Temperature: 21.5 °C	Humidity: 35.9 %

Test results summary

Test	Result
Linearity	Complies
Short Duration	Complies
Overload Latching	Complies
Frequency weighting	Complies
Absolute Acoustic Sensitivity	Complies

Test summary

Date of calibration: 19 January 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.

The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.

The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDD06F6309
Attenuator	Cirrus Research	ZE952	93892
Environmental Monitor	Comet	T7510	16966334
doSeBadge Reader	Cirrus Research plc	RC110A	40098

Notes

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

NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0957

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc
DATE OF ISSUE 19 January 2024 CERTIFICATE NUMBER 206874



Cirrus Research plc
Acoustic House
Bridgeway Road
Huddersfield
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
N Smith
Electronically signed:

Dosemeter : IEC 61252-1993+A1:2000

Instrument information

Manufacturer: Cirrus Research plc
Model: CR-110A
Serial number: CB0957
Firmware version: 5.4

Notes: Eastern Thai Consulting 1992 Co.,Ltd.
 683 Moo.11, Subphabitai 8 Rd., Nongkham,
 Siracha, Chonburi 20220

Test summary

Date of calibration: 19 January 2024
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.
The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	KEYSIGHT	33511B	MY58001553
Attenuator	Cirrus Research	ZE-962	78713
Environmental Monitor	Comet	T7510	16966334
doseBadge Reader	Cirrus Research plc	RC-110A	100498

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory. The calibration was performed in accordance with the requirements of the International System of Units (SI) and the approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

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CERTIFICATE OF CALIBRATION

Environmental conditions

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

Before Pressure: 100.66 kPa Temperature: 20.9 °C Humidity: 28.6 %
After Pressure: 100.89 kPa Temperature: 20.7 °C Humidity: 29.0 %

Test results summary

Test	Result
Linearity	Complies
Short Duration	Complies
Overload Latching	Complies
Frequency weighting	Complies
Absolute Acoustic Sensitivity	Complies

Certificate Number:
206874

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ภาคผนวก ช

ใบรับรองความสามารถห้องปฏิบัติการ



แบบ กมช./สมอ.๒
Form NSC/TISI 2

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 คอนซัลติ้ง 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



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 23-LB0251
(Certification No. 23-LB0251)



ชื่อห้องปฏิบัติการ
(Laboratory Name)

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 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)
สาขาสังแวดล้อม (Environmental field) 1. น้ำ (Water)	- โลหะหนัก (Heavy metal) • 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	- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23 rd edition 2017. Part 3030 F and 3120 B 

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thai Industrial Standards Institute)

หน้าที่ 1/5

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>สาขาสังแวดล้อม (Environmental field)</p> <p>1. น้ำ (ต่อ) (Water) (cont.)</p>	<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 5520 B</p>
<p>2. น้ำเสีย (Wastewater)</p>	<p>- โลหะหนัก (Heavy metal)</p> <p>• โครเมียม (Cr) 0.03 mg/L to 2.00 mg/L</p> <p>• ทองแดง (Cu) 0.03 mg/L to 2.00 mg/L</p> <p>• เหล็ก (Fe) 0.03 mg/L to 2.00 mg/L</p> <p>• ตะกั่ว (Pb) 0.03 mg/L to 2.00 mg/L</p> <p>• นิกเกิล (Ni) 0.03 mg/L to 2.00 mg/L</p> <p>• อลูมิเนียม (Al) 0.10 mg/L to 2.00 mg/L</p> <p>• แบเรียม (Ba) 0.03 mg/L to 2.00 mg/L</p> <p>• แคดเมียม (Cd) 0.03 mg/L to 2.00 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>

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
(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>2. น้ำเสีย (ต่อ) (Wastewater) (cont.)</p>	<p>- โลหะหนัก (ต่อ) (Heavy metal) (cont.)</p> <p>• แมงกานีส (Mn) 0.03 mg/L to 2.00 mg/L</p> <p>• เงิน (Ag) 0.05 mg/L to 2.00 mg/L</p> <p>• สังกะสี (Zn) 0.03 mg/L to 2.00 mg/L</p> <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))

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>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>

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thai Industrial Standards Institute)

หน้าที่ 4/5

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>สาขาสังแวดล้อม (Environmental field)</p> <p>4. บรรยากาศ (Ambient)</p>	<p>- ระดับเสียง (Sound Level)</p> <ul style="list-style-type: none"> ระดับเสียงเฉลี่ย L_{eqT} ช่วง 30.0 - 130.0 dB(A) ระดับเสียงสูงสุด L_{max} ช่วง 30.0 - 130.0 dB(A) 	<p>- ISO 1996 - 1 : 2016</p> <p>- ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (2540) เรื่องกำหนด มาตรฐานระดับเสียงโดยทั่วไป 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 การคำนวณค่าระดับเสียง 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 เรื่องวิธีการตรวจวัดระดับเสียงการรบกวน ระดับเสียงเฉลี่ย 24 ชั่วโมง และระดับเสียงสูงสุดที่เกิดจากการประกอบกิจการโรงงาน 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>

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thai Industrial Standards Institute)

หน้าที่ 5/5



ที่ อว 0303/18183

ใบรับรองความสามารถห้องปฏิบัติการทดสอบ

ใบรับรองฉบับนี้ให้ไว้เพื่อแสดงว่า

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

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

หมายเลขการรับรองระบบงานที่ ทดสอบ - 0159

รายละเอียดการรับรองดังขอข่ายการรับรองแนบท้าย

ออกให้ ณ วันที่ : 7 พฤศจิกายน 2566

หมดอายุ วันที่ : 6 พฤศจิกายน 2570

ลงชื่อ : 

(นางจันทร์น วรรณวิทย์)

นักวิทยาศาสตร์ชำนาญการพิเศษ

รักษาราชการแทน ผู้อำนวยการกองบริหารและรับรองห้องปฏิบัติการ

กองบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ
กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ที่ อว 0303/18183

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขุมวิท 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 - บีโอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 5220 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 3112 B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 4

กองบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลต์ติ้ง 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	- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 2540 C
		- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 2540 D
		- ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 4500-F ⁻ C

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 4

กองบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลต์ติ้ง 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	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 5220 C
		- ปริมาณ 0.001 mg/L ถึง 0.02 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 3112 B
		- บีโอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 4

กองบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตัง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม

อำเภอศรีราชา จังหวัดชลบุรี 20230

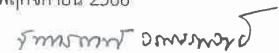
หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2 (ต่อ)	น้ำเสีย	- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L - สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L - ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 2540 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 2540 D Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 rd ed., 2017, part 4500-F ⁻ C

ออกให้ ณ วันที่ : 7 พฤศจิกายน 2566

ลงชื่อ :



(นางจันทร์น วรสรรพวิทย)

นักวิทยาศาสตร์ชำนาญการพิเศษ

รักษาราชการแทน ผู้อำนวยการกองบริหารและรับรองห้องปฏิบัติการ

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 4

กองบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม