

ภาคผนวก ง

ใบรับรองผลการตรวจวัดคุณภาพสิ่งแวดล้อม

ใบรับรองผลการตรวจวัดคุณภาพอากาศในบรรยากาศ



## Ambient Air Monitoring Results : Sulfur dioxide MTR-SPRC PLC-Refinery

Location : With in Refinery Plant, North

Monitor Period : 17-24 May 2025

Analyzer Model : API 100A

Station No : SS2-02

Serial No : 376

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 10 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 09 Jan 2026

Time	SO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
09:00 - 10:00	2.4	4.9	3.7	9.2	2.8	4.6	5.4
10:00 - 11:00	4.5	2.5	4.9	6.7	3.7	5.4	4.3
11:00 - 12:00	3.8	5.3	5.2	7.6	5.3	4.7	5.9
12:00 - 13:00	3.6	5.5	3.8	10.0	5.6	5.1	4.5
13:00 - 14:00	3.8	8.8	4.7	11.8	4.5	3.8	3.8
14:00 - 15:00	3.8	13.5	6.9	7.7	5.6	4.8	6.7
15:00 - 16:00	4.1	14.6	9.8	6.4	2.9	5.4	5.0
16:00 - 17:00	3.5	6.2	5.8	13.9	3.0	4.1	5.8
17:00 - 18:00	3.3	4.5	3.1	7.8	4.5	4.0	4.7
18:00 - 19:00	4.9	6.5	3.8	4.9	5.5	3.8	3.5
19:00 - 20:00	2.8	4.7	3.1	3.9	5.9	4.4	6.1
20:00 - 21:00	4.7	5.5	4.7	5.6	3.0	5.7	3.7
21:00 - 22:00	2.6	5.1	3.8	3.9	5.4	5.5	5.6
22:00 - 23:00	3.0	7.8	5.3	3.0	5.5	4.5	4.0
23:00 - 00:00	5.7	5.1	4.2	4.4	4.1	5.1	6.4
00:00 - 01:00	2.8	3.3	2.6	4.4	3.1	5.7	3.2
01:00 - 02:00	4.1	4.0	4.5	3.7	6.3	5.4	4.8
02:00 - 03:00	9.1	3.4	4.3	4.6	5.3	4.5	6.9
03:00 - 04:00	5.5	5.5	5.3	3.1	5.5	5.7	4.6
04:00 - 05:00	8.7	2.8	5.9	3.2	4.5	5.2	6.6
05:00 - 06:00	4.8	2.0	5.0	3.7	3.8	4.5	3.8
06:00 - 07:00	4.8	3.4	3.0	5.1	6.2	5.6	5.1
07:00 - 08:00	3.2	3.5	4.4	4.9	4.9	4.5	4.5
08:00 - 09:00	4.2	2.7	5.9	3.0	4.0	3.9	5.7
Average-24Hr*	4.3	5.5	4.7	5.9	4.6	4.8	5.0
Max-1Hr	9.1	14.6	9.8	13.9	6.3	5.7	6.9
Min-1Hr	2.4	2.0	2.6	3.0	2.8	3.8	3.2
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : \* Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

(Miss Preeda Somjai)  
 Technical Management Team



## Ambient Air Monitoring Results : Sulfur dioxide

### MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 17-24 May 2025

Analyzer Model : Teledyne T100

Station No : SS2-01

Serial No : 119

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

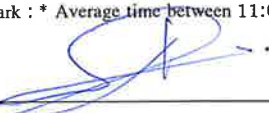
Certified Date : 10 Jan 2025


Cal Concentration (ppb) : 0,100,200,400

Expire Date : 09 Jan 2026

Time	SO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	4.1	3.0	3.8	8.4	5.6	3.0	4.1
12:00 - 13:00	3.9	2.4	5.2	11.2	4.6	3.4	4.2
13:00 - 14:00	2.1	10.6	3.3	8.5	5.0	4.9	6.2
14:00 - 15:00	5.2	13.0	6.9	6.9	3.8	2.6	3.5
15:00 - 16:00	5.2	12.2	7.7	7.0	3.9	4.8	5.5
16:00 - 17:00	4.5	6.2	7.6	15.0	4.3	2.4	3.6
17:00 - 18:00	3.4	4.7	3.4	7.5	2.4	3.6	5.1
18:00 - 19:00	4.9	6.7	3.5	4.4	4.9	3.9	4.6
19:00 - 20:00	3.9	5.0	4.0	2.3	5.4	4.4	4.6
20:00 - 21:00	4.5	1.7	5.6	2.7	3.3	4.3	5.5
21:00 - 22:00	2.7	3.5	3.4	3.1	4.4	3.5	5.2
22:00 - 23:00	3.2	8.1	3.3	5.1	2.4	4.7	5.6
23:00 - 00:00	2.2	3.2	3.3	3.5	4.5	3.1	5.5
00:00 - 01:00	2.0	4.0	4.4	4.3	3.1	4.1	3.9
01:00 - 02:00	3.0	3.2	3.8	3.2	6.5	4.4	5.8
02:00 - 03:00	5.9	4.5	3.4	3.5	2.8	4.7	3.7
03:00 - 04:00	8.2	2.7	5.0	3.6	6.5	5.5	5.5
04:00 - 05:00	6.1	2.0	4.7	5.3	5.3	3.1	6.1
05:00 - 06:00	2.0	2.5	4.0	4.4	6.1	5.1	5.5
06:00 - 07:00	2.8	4.3	3.5	4.0	2.9	3.6	4.9
07:00 - 08:00	2.7	4.8	4.6	3.6	5.6	3.8	5.0
08:00 - 09:00	2.9	2.4	7.6	3.6	4.9	3.2	5.3
09:00 - 10:00	5.5	4.2	9.0	4.1	4.0	5.4	3.4
10:00 - 11:00	1.7	5.0	7.5	3.2	4.5	5.1	5.5
Average-24Hr*	3.9	5.0	4.9	5.4	4.4	4.0	4.9
Max-1Hr	8.2	13.0	9.0	15.0	6.5	5.5	6.2
Min-1Hr	1.7	1.7	3.3	2.3	2.4	2.4	3.4
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : \* Average time between 11:00-11:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Preeda Somjai)  
 Technical Management Team





## Ambient Air Monitoring Results : Sulfur dioxide

### MTR-SPRC PLC-Refinery

Location : Ban Plong Community

Monitor Period : 17-24 May 2025

Analyzer Model : API 100A

Station No : SS2-04

Serial No : 083

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 10 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 09 Jan 2026

Time	SO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	3.1	3.2	5.4	7.1	5.1	4.9	6.3
11:00 - 12:00	4.3	3.7	5.7	7.2	5.0	4.9	5.1
12:00 - 13:00	4.8	4.0	5.9	9.0	3.7	6.4	5.4
13:00 - 14:00	3.2	11.0	6.2	10.3	4.1	5.1	4.8
14:00 - 15:00	3.6	12.0	7.8	7.8	3.8	3.7	5.5
15:00 - 16:00	3.5	12.9	7.8	7.7	4.6	6.0	4.4
16:00 - 17:00	3.6	7.7	6.6	14.1	4.5	5.1	4.0
17:00 - 18:00	3.9	2.4	5.7	8.4	4.0	6.1	4.6
18:00 - 19:00	5.4	6.5	4.3	4.4	3.9	4.7	4.9
19:00 - 20:00	2.8	2.9	5.9	4.0	4.4	2.8	5.5
20:00 - 21:00	4.0	3.7	4.5	4.3	3.8	3.2	5.8
21:00 - 22:00	3.7	3.5	6.0	3.9	3.5	3.3	6.4
22:00 - 23:00	5.7	7.8	5.5	5.5	6.3	6.7	6.1
23:00 - 00:00	4.1	3.1	4.5	6.0	2.6	4.8	4.8
00:00 - 01:00	2.9	4.7	4.9	3.4	5.4	3.6	4.4
01:00 - 02:00	4.5	5.2	3.9	4.3	5.4	5.2	4.5
02:00 - 03:00	7.9	2.0	6.1	4.3	3.5	4.2	6.0
03:00 - 04:00	5.5	2.4	4.2	3.8	4.2	4.0	6.4
04:00 - 05:00	6.9	4.0	6.0	3.6	3.8	4.8	4.8
05:00 - 06:00	3.5	5.1	4.9	4.6	4.2	5.4	4.9
06:00 - 07:00	2.6	2.9	5.7	4.1	4.9	5.7	6.1
07:00 - 08:00	2.8	4.9	5.0	4.6	4.4	2.8	5.5
08:00 - 09:00	5.5	5.2	5.4	5.2	6.1	3.5	5.8
09:00 - 10:00	3.9	3.7	12.0	5.0	6.5	6.3	3.6
Average-24Hr*	4.2	5.2	5.8	5.9	4.5	4.7	5.2
Max-1Hr	7.9	12.9	12.0	14.1	6.5	6.7	6.4
Min-1Hr	2.6	2.0	3.9	3.4	2.6	2.8	3.6
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : \* Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Ambient Air Monitoring Results : Nitrogen dioxide

### MTR-SPRC PLC-Refinery

Location : With in Refinery Plant, North

Monitor Period : 17-24 May 2025

Analyzer Model : API 200A

Station No : SS2-02

Serial No : 074

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
09:00 - 10:00	4.1	9.0	8.0	6.3	2.6	3.4	7.8
10:00 - 11:00	3.9	2.1	7.6	8.0	6.1	9.5	6.3
11:00 - 12:00	9.3	2.2	10.0	8.7	3.8	4.1	5.5
12:00 - 13:00	8.4	2.3	5.1	4.0	4.5	5.4	5.7
13:00 - 14:00	9.4	5.7	7.6	3.6	6.7	8.3	5.2
14:00 - 15:00	9.3	9.2	13.0	2.1	8.7	9.1	8.3
15:00 - 16:00	2.2	9.6	6.9	4.3	7.8	9.2	3.3
16:00 - 17:00	6.1	7.1	9.5	9.9	9.1	5.5	8.9
17:00 - 18:00	9.2	8.0	7.5	7.6	2.4	9.2	6.8
18:00 - 19:00	9.9	8.2	6.5	2.4	7.9	7.8	7.5
19:00 - 20:00	8.9	9.1	3.8	8.0	8.6	6.1	10.3
20:00 - 21:00	8.0	2.8	9.9	8.8	8.1	7.4	7.2
21:00 - 22:00	2.9	7.4	10.1	2.7	7.4	6.4	8.7
22:00 - 23:00	8.8	9.3	7.1	7.0	9.3	8.4	9.9
23:00 - 00:00	9.4	8.8	9.0	4.3	6.0	10.2	6.7
00:00 - 01:00	3.2	6.9	7.3	6.8	6.2	2.8	3.3
01:00 - 02:00	4.0	3.6	2.8	6.0	2.2	3.1	3.6
02:00 - 03:00	4.2	9.2	2.5	2.2	9.0	4.8	10.2
03:00 - 04:00	6.6	9.7	3.2	9.2	9.3	5.3	4.1
04:00 - 05:00	6.3	7.1	4.6	2.6	8.6	8.6	6.0
05:00 - 06:00	3.4	6.8	8.1	9.2	5.2	3.7	4.0
06:00 - 07:00	3.2	3.0	6.3	7.1	5.4	8.0	5.9
07:00 - 08:00	8.7	9.9	6.5	9.3	8.8	9.1	3.8
08:00 - 09:00	2.5	9.3	5.2	8.9	9.2	8.2	6.5
Average-24Hr*	6.3	6.9	7.0	6.2	6.8	6.8	6.5
Max-1Hr	9.9	9.9	13.0	9.9	9.3	10.2	10.3
Min-1Hr	2.2	2.1	2.5	2.1	2.2	2.8	3.3
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

Remark : \* Average-time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Ambient Air Monitoring Results : Nitrogen dioxide

### MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 17-24 May 2025

Analyzer Model : API 200A

Station No : SS2-01

Serial No : 1523

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	4.9	3.8	2.9	5.8	4.1	7.0	2.0
12:00 - 13:00	5.2	2.4	7.7	7.0	1.5	8.0	4.7
13:00 - 14:00	5.6	1.3	3.2	7.0	9.1	6.8	8.3
14:00 - 15:00	6.9	3.7	10.4	7.4	8.3	6.1	9.2
15:00 - 16:00	8.6	3.9	8.8	6.4	3.8	7.7	4.5
16:00 - 17:00	5.1	2.8	8.2	6.4	6.5	2.4	7.3
17:00 - 18:00	8.9	5.4	5.7	8.0	4.3	7.2	4.7
18:00 - 19:00	8.3	6.8	8.6	5.0	12.2	9.5	8.3
19:00 - 20:00	8.9	8.2	4.4	6.0	7.0	3.7	7.4
20:00 - 21:00	5.4	1.9	9.1	8.5	10.3	8.0	5.9
21:00 - 22:00	5.0	5.5	8.8	3.0	11.2	8.0	2.2
22:00 - 23:00	8.4	3.4	8.6	7.5	7.5	9.3	5.3
23:00 - 00:00	7.1	9.0	7.9	5.1	1.5	7.3	8.8
00:00 - 01:00	6.7	8.6	7.5	5.4	2.9	4.4	6.1
01:00 - 02:00	4.5	3.9	2.7	1.5	3.7	4.5	3.9
02:00 - 03:00	7.0	7.2	5.6	3.5	2.0	7.0	4.6
03:00 - 04:00	2.9	8.4	1.3	8.4	6.0	8.1	3.2
04:00 - 05:00	4.9	5.9	1.4	9.3	7.4	9.4	2.2
05:00 - 06:00	1.6	5.7	1.4	8.2	8.6	3.6	4.4
06:00 - 07:00	3.3	2.9	5.6	2.1	7.2	6.7	4.2
07:00 - 08:00	3.1	7.2	6.1	8.7	8.1	7.2	5.2
08:00 - 09:00	1.8	8.2	6.4	4.7	9.5	5.3	4.5
09:00 - 10:00	8.2	8.3	8.8	2.5	3.0	3.0	1.7
10:00 - 11:00	1.9	9.0	6.4	8.0	6.6	5.6	3.2
Average-24Hr*	5.6	5.6	6.1	6.1	6.3	6.5	5.1
Max-1Hr	8.9	9.0	10.4	9.3	12.2	9.5	9.2
Min-1Hr	1.6	1.3	1.3	1.5	1.5	2.4	1.7
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

Remark : \* Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Ambient Air Monitoring Results : Nitrogen dioxide

### MTR-SPRC PLC-Refinery

Location : Ban Plong Community

Monitor Period : 17-24 May 2025

Analyzer Model : Teledyne T200

Station No : SS2-04

Serial No : 110

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	NO2 Concentration (ppb)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	3.9	4.9	3.6	9.0	8.7	10.0	4.7
11:00 - 12:00	6.4	3.0	3.2	9.4	8.9	9.7	4.3
12:00 - 13:00	4.0	5.7	4.0	8.2	7.1	3.3	3.1
13:00 - 14:00	5.5	4.1	4.6	5.8	8.1	7.8	8.2
14:00 - 15:00	4.2	4.3	14.6	3.6	6.5	8.5	8.6
15:00 - 16:00	3.1	3.7	7.7	9.6	2.3	8.9	3.7
16:00 - 17:00	4.9	3.0	5.1	10.2	7.2	5.9	10.2
17:00 - 18:00	3.2	2.8	3.3	8.9	4.2	10.4	5.5
18:00 - 19:00	6.6	4.5	5.8	2.9	10.3	7.2	3.3
19:00 - 20:00	4.1	3.6	2.8	9.3	7.4	2.8	7.1
20:00 - 21:00	7.6	2.9	4.5	7.7	7.3	6.6	9.3
21:00 - 22:00	4.6	3.7	6.7	6.3	6.7	9.1	8.2
22:00 - 23:00	6.4	4.8	2.9	7.9	7.2	7.6	3.2
23:00 - 00:00	4.3	4.1	4.1	9.5	6.1	3.4	8.3
00:00 - 01:00	2.7	5.4	4.7	4.5	7.4	9.6	3.9
01:00 - 02:00	6.6	3.8	3.8	2.9	3.4	3.9	5.6
02:00 - 03:00	3.9	4.3	4.0	2.3	9.4	9.6	7.6
03:00 - 04:00	4.3	4.0	6.5	3.0	7.1	10.2	4.2
04:00 - 05:00	6.5	3.9	4.7	7.6	6.3	8.7	2.9
05:00 - 06:00	5.3	5.5	4.1	5.5	8.7	5.7	3.9
06:00 - 07:00	5.5	5.9	8.5	8.2	10.2	9.3	3.5
07:00 - 08:00	3.6	2.7	9.8	7.4	8.7	8.0	4.9
08:00 - 09:00	5.5	4.7	4.4	7.8	9.0	4.1	7.2
09:00 - 10:00	3.0	4.6	6.2	3.4	9.9	6.8	9.9
Average-24Hr*	4.8	4.2	5.4	6.7	7.4	7.4	5.9
Max-1Hr	7.6	5.9	14.6	10.2	10.3	10.4	10.2
Min-1Hr	2.7	2.7	2.8	2.3	2.3	2.8	2.9
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

Remark : \* Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Ambient Air Monitoring Results : Carbon monoxide MTR-SPRC PLC-Refinery

Location : With in Refinery Plant, North

Monitor Period : 17-24 May 2025

Analyzer Model : Thermo 48C

Station No : SS2-02

Serial No : 362

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	CO Concentration (ppm)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
09:00 - 10:00	0.1	0.1	0.2	0.5	0.4	0.6	0.3
10:00 - 11:00	0.3	0.1	0.4	0.5	0.1	0.3	0.4
11:00 - 12:00	0.1	0.1	0.1	0.1	0.2	0.3	0.2
12:00 - 13:00	0.1	0.1	0.2	0.1	0.1	0.3	0.1
13:00 - 14:00	0.3	0.1	0.4	0.4	0.2	0.2	0.4
14:00 - 15:00	0.3	0.2	0.2	0.5	0.3	0.4	0.1
15:00 - 16:00	0.2	0.1	0.5	0.2	0.2	0.4	0.5
16:00 - 17:00	0.4	0.1	0.3	0.4	0.1	0.3	0.3
17:00 - 18:00	0.3	0.3	0.2	0.4	0.2	0.3	0.3
18:00 - 19:00	0.3	0.3	0.3	0.2	0.2	0.2	0.1
19:00 - 20:00	0.4	0.1	0.5	0.3	0.6	0.5	0.2
20:00 - 21:00	0.5	0.2	0.7	0.5	0.6	0.4	0.3
21:00 - 22:00	0.4	0.2	0.5	0.4	0.6	0.2	0.4
22:00 - 23:00	0.3	0.2	0.7	0.5	0.7	0.3	0.4
23:00 - 00:00	0.5	0.1	0.7	0.4	0.4	0.1	0.3
00:00 - 01:00	0.3	0.4	0.5	0.1	0.5	0.4	0.1
01:00 - 02:00	0.3	0.3	0.3	0.4	0.4	0.3	0.1
02:00 - 03:00	0.3	0.7	0.3	0.4	0.3	0.1	0.1
03:00 - 04:00	0.3	0.5	0.2	0.3	0.1	0.1	0.3
04:00 - 05:00	0.5	0.5	0.3	0.3	0.6	0.3	0.3
05:00 - 06:00	0.3	0.3	0.6	0.2	0.4	0.2	0.4
06:00 - 07:00	0.4	0.4	0.5	0.5	0.2	0.6	0.2
07:00 - 08:00	0.3	0.5	0.4	0.5	0.4	0.2	0.2
08:00 - 09:00	0.4	0.1	0.5	0.7	0.4	0.7	0.4
Average-24Hr*	0.3	0.3	0.4	0.4	0.3	0.3	0.3
Max-1Hr	0.5	0.7	0.7	0.7	0.7	0.7	0.5
Min-1Hr	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

Remark : \* Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Ambient Air Monitoring Results : Carbon monoxide

### MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 17-24 May 2025

Analyzer Model : Teledyne 300E

Station No : SS2-01

Serial No : 1077

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025


Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	CO Concentration (ppm)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	0.2	0.1	0.1	0.3	0.2	0.1	0.7
12:00 - 13:00	0.1	0.1	0.1	0.2	0.1	0.3	0.1
13:00 - 14:00	0.1	0.1	0.2	0.2	0.5	0.1	0.4
14:00 - 15:00	0.2	0.1	0.5	0.1	0.5	0.4	0.4
15:00 - 16:00	0.1	0.3	0.5	0.3	0.5	0.5	0.3
16:00 - 17:00	0.3	0.1	0.5	0.4	0.1	0.4	0.4
17:00 - 18:00	0.1	0.1	0.2	0.1	0.4	0.4	0.3
18:00 - 19:00	0.5	0.3	0.2	0.3	0.5	0.3	0.2
19:00 - 20:00	0.5	0.2	0.2	0.3	0.5	0.1	0.4
20:00 - 21:00	0.4	0.3	0.6	0.1	0.7	0.2	0.2
21:00 - 22:00	0.2	0.2	0.6	0.4	0.6	0.1	0.3
22:00 - 23:00	0.9	0.1	0.5	0.4	0.5	0.4	0.4
23:00 - 00:00	0.6	0.1	0.7	0.3	0.4	0.1	0.5
00:00 - 01:00	0.5	0.3	0.4	0.5	0.2	0.3	0.3
01:00 - 02:00	0.3	0.3	0.3	0.1	0.4	0.3	0.2
02:00 - 03:00	0.3	0.2	0.5	0.3	0.3	0.3	0.2
03:00 - 04:00	0.5	0.2	0.5	0.2	0.1	0.5	0.1
04:00 - 05:00	0.4	0.7	0.3	0.2	0.6	0.2	0.2
05:00 - 06:00	0.5	0.5	0.2	0.2	0.5	0.3	0.2
06:00 - 07:00	0.2	0.7	0.5	0.2	0.6	0.6	0.2
07:00 - 08:00	0.5	0.3	0.6	0.5	0.5	0.5	0.2
08:00 - 09:00	0.2	0.4	0.7	0.6	0.3	0.5	0.1
09:00 - 10:00	0.1	0.2	0.5	0.5	0.3	0.4	0.1
10:00 - 11:00	0.1	0.2	0.6	0.1	0.3	0.3	0.4
Average-24Hr*	0.3	0.3	0.4	0.3	0.4	0.3	0.3
Max-1Hr	0.9	0.7	0.7	0.6	0.7	0.6	0.7
Min-1Hr	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

Remark : \* Average time between 11:00-11:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Preeda Somjai)  
 Technical Management Team



## Ambient Air Monitoring Results : Carbon monoxide

### MTR-SPRC PLC-Refinery

Location : Ban Plong Community

Monitor Period : 17-24 May 2025

Analyzer Model : Teledyne 300E

Station No : SS2-04

Serial No : 924

- Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

Certified Date : 08 Jan 2025

Cal Concentration (ppb) : 0,100,200,400

Expire Date : 07 Jan 2026

Time	CO Concentration (ppm)						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	0.1	0.1	0.1	0.5	0.4	0.5	0.4
11:00 - 12:00	0.1	0.1	0.1	0.4	0.4	0.3	0.3
12:00 - 13:00	0.1	0.1	0.2	0.2	0.1	0.2	0.5
13:00 - 14:00	0.2	0.2	0.2	0.2	0.5	0.1	0.4
14:00 - 15:00	0.1	0.2	0.2	0.2	0.2	0.3	0.1
15:00 - 16:00	0.1	0.2	0.2	0.4	0.1	0.3	0.5
16:00 - 17:00	0.1	0.1	0.1	0.2	0.1	0.3	0.4
17:00 - 18:00	0.2	0.1	0.1	0.1	0.2	0.3	0.4
18:00 - 19:00	0.2	0.1	0.1	0.3	0.5	0.4	0.4
19:00 - 20:00	0.1	0.1	0.2	0.2	0.4	0.2	0.3
20:00 - 21:00	0.3	0.1	0.4	0.4	0.8	0.3	0.5
21:00 - 22:00	0.1	0.1	0.3	0.2	0.4	0.3	0.4
22:00 - 23:00	0.2	0.1	0.4	0.2	0.4	0.5	0.4
23:00 - 00:00	0.5	0.1	0.3	0.2	0.2	0.3	0.1
00:00 - 01:00	0.4	0.1	0.3	0.1	0.3	0.1	0.1
01:00 - 02:00	0.3	0.2	0.4	0.3	0.4	0.2	0.2
02:00 - 03:00	0.5	0.3	0.4	0.3	0.5	0.2	0.1
03:00 - 04:00	0.4	0.5	0.2	0.4	0.3	0.5	0.2
04:00 - 05:00	0.2	0.5	0.3	0.2	0.2	0.5	0.1
05:00 - 06:00	0.5	0.4	0.4	0.2	0.2	0.7	0.2
06:00 - 07:00	0.4	0.3	0.2	0.5	0.6	0.5	0.3
07:00 - 08:00	0.5	0.4	0.2	0.2	0.4	0.6	0.1
08:00 - 09:00	0.2	0.1	0.4	0.9	0.3	0.6	0.2
09:00 - 10:00	0.2	0.1	0.4	0.4	0.4	0.2	0.1
Average-24Hr*	0.3	0.2	0.3	0.3	0.3	0.4	0.3
Max-1Hr	0.5	0.5	0.4	0.9	0.8	0.7	0.5
Min-1Hr	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

Remark : \* Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team





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### AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-Amb-2505-0160
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 18-20/05/2025
RECEIVE DATE	: 29/05/2025	ANALYTICAL DATE	: 06/06/2025
REPORT DATE	: 11/06/2025	SAMPLE CONDITION	: Normal
INSTRUMENT	: Impingment Absorption	SITE OPERATOR	: Mr.Siwanon Kulawong
CALIBRATOR MODEL	: Defender 520-H	SERIAL NO.	: 114069
STATION DESCRIPTION	: 1. Within the Refinery Plant 2. Map Ta Phut New Town 3. Ban Plong Community		

PARAMETER	SAMPLING DATE	UNIT	ND (Non-detectable)	RESULTS			REFERENCE METHODS
				1	2	3	
Hydrogen Sulfide	18/05/2025	ppm	<0.001	ND	ND	ND	Intersociety Committee
	19/05/2025	ppm	<0.001	ND	ND	ND	Method 701
	20/05/2025	ppm	<0.001	ND	ND	ND	

  
(Miss Pornnapa Budthum)

Analyst

  
(Miss Narisa Poowasanpetch)

Technical Management Team

**Remark :** 1. Reported analysis refers to submitted sample only.

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : 225003-Amb-2505-0160  
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 17-24/05/2025  
RECEIVED DATE : 29/05/2025 ANALYTICAL DATE : 29/05/2025-02/06/2025  
REPORT DATE : 06/06/2025 SAMPLE CONDITION : Normal  
OPERATOR : Mr.Siwanon Kulawong  
STATION DESCRIPTION : 1. Within the Refinery Plant 2. Map Ta Phut New Town  
3. Ban Plong Community

PARAMETER	SAMPLING DATE	UNITS	RESULTS			STANDARD*	REFERENCE METHODS
			1	2	3		
TSP (24 hr.)	17-18/05/2025	mg/m <sup>3</sup>	0.023	0.020	0.045	0.330	High Volume
	18-19/05/2025	mg/m <sup>3</sup>	0.019	0.026	0.047		Air Sampler/
	19-20/05/2025	mg/m <sup>3</sup>	0.024	0.042	0.026		Gravimetric
	20-21/05/2025	mg/m <sup>3</sup>	0.019	0.012	0.040		Method
	21-22/05/2025	mg/m <sup>3</sup>	0.029	0.026	0.052		
	22-23/05/2025	mg/m <sup>3</sup>	0.030	0.023	0.045		
	23-24/05/2025	mg/m <sup>3</sup>	0.020	0.010	0.028		

  
(Miss Pornnapa Budthum)

Analyst

  
(Miss Narisa Poowasanpetch)

Technical Management Team

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3. \* Notification of the National Environment Board, No.24, B.E.2547.



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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : 225003-Amb-2505-0160  
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 17-24/05/2025  
RECEIVED DATE : 29/05/2025 ANALYTICAL DATE : 29/05/2025-02/06/2025  
REPORT DATE : 06/06/2025 SAMPLE CONDITION : Normal  
OPERATOR : Mr.Siwanon Kulawong  
STATION DESCRIPTION : 1. Within the Refinery Plant 2. Map Ta Phut New Town  
3. Ban Plong Community

PARAMETER	SAMPLING DATE	UNITS	RESULTS			STANDARD*	REFERENCE METHODS
			1	2	3		
PM-10 (24 hr.)	17-18/05/2025	mg/m <sup>3</sup>	0.017	0.017	0.014	0.120	High Volume
	18-19/05/2025	mg/m <sup>3</sup>	0.014	0.016	0.023		Air Sampler
	19-20/05/2025	mg/m <sup>3</sup>	0.015	0.030	0.020		(Hi-Vol PM-10
	20-21/05/2025	mg/m <sup>3</sup>	0.011	0.010	0.026		Size Selective Inlet)
	21-22/05/2025	mg/m <sup>3</sup>	0.020	0.023	0.036		Gravimetric
	22-23/05/2025	mg/m <sup>3</sup>	0.015	0.019	0.007		Method
	23-24/05/2025	mg/m <sup>3</sup>	0.010	0.008	0.018		



(Miss Pornnapa Budthum)

Analyst



(Miss Narisa Poowasanpetch)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0048/68
SAMPLING BY	: SECOT Co., Ltd .	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 07-08/01/2025	ANALYTICAL DATE	: 10-11/01/2025
SAMPLING TIME	: 13:00-13:18	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 09/01/2025	FILE CODE	: 225003_TO-15_January
REPORT DATE	: 13/01/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	1.36	4.34	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15.1999

Siriwan Chimsa-nga  
(Miss Siriwan Chimsa-nga)

Analyst

Araya Tipparuk  
( Mrs. Araya Tipparuk )

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

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3. \* Notification of the Pollution Control Department, dated December 18,B.E.2551(2008), which was published in the Royal Government Gazette Vol. 126, Special Part 13D dated January 27, B.E. 2552 (2009).



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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0195/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/02/2025	ANALYTICAL DATE	: 08/02/2025
SAMPLING TIME	: 13:05-12:05	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/02/2025	FILE CODE	: 225003_TO-15_February
REPORT DATE	: 11/02/2025		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m <sup>3</sup> )
			Map Ta Phut New Town		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	0.84	2.68	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

*Siriwan Chimsa-nga*

(Miss Siriwan Chimsa-nga)

Analyst

*Araya Tipparuk*

( Mrs. Araya Tipparuk )

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0468/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 11-12/03/2025	ANALYTICAL DATE	: 16-17/03/2025
SAMPLING TIME	: 10:55-10:20	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 13/03/2025	FILE CODE	: 225003_TO-15_March
REPORT DATE	: 18/03/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	0.82	2.62	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst



( Mrs. Araya Tipparuk )

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0635/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/04/2025	ANALYTICAL DATE	: 08/04/2025
SAMPLING TIME	: 12:07-12:01	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/04/2025	FILE CODE	: 225003_TO-15_April
REPORT DATE	: 17/04/2025		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m <sup>3</sup> )
			Map Ta Phut New Town		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	0.28	0.89	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst

  
( Mrs. Araya Tipparuk )

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0783/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 02-03/05/2025	ANALYTICAL DATE	: 12/05/2025
SAMPLING TIME	: 12:52-12:00	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 04/05/2025	FILE CODE	: 225003_TO-15_May
REPORT DATE	: 13/05/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection				
	Map Ta Phut New Town				
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	0.99	3.16	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst



( Mrs. Araya Tipparuk )

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1052/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 06-07/06/2025	ANALYTICAL DATE	: 11/06/2025
SAMPLING TIME	: 13:17-12:40	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 08/06/2025	FILE CODE	: 225003_TO-15_June
REPORT DATE	: 12/06/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	1.02	3.26	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

*Siriwan Chimsa-nga*  
(Miss Siriwan Chimsa-nga)

Analyst

*Araya Tipparuk*

( Mrs. Araya Tipparuk )

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0048/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 07-08/01/2025	ANALYTICAL DATE	: 10-11/01/2025
SAMPLING TIME	: 13:05-12:05	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 09/01/2025	FILE CODE	: 225003_TO-15_January
REPORT DATE	: 13/01/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	2.03	6.48	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15, 1999

  
(Miss Siriwan Chimsa-nga)

Analyst



( Mrs. Araya Tipparuk )

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0195/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/02/2025	ANALYTICAL DATE	: 08/02/2025
SAMPLING TIME	: 12:46-11:46	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/02/2025	FILE CODE	: 225003_TO-15_February
REPORT DATE	: 11/02/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	1.43	4.57	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst



( Mrs. Araya Tipparuk )

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0468/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 11-12/03/2025	ANALYTICAL DATE	: 16-17/03/2025
SAMPLING TIME	: 10:40-10:00	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 13/03/2025	FILE CODE	: 225003_TO-15_March
REPORT DATE	: 18/03/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	2.03	6.48	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst

  
( Mrs. Araya Tipparuk )

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0635/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/04/2025	ANALYTICAL DATE	: 08/04/2025
SAMPLING TIME	: 11:07-10:51	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/04/2025	FILE CODE	: 225003_TO-15_April
REPORT DATE	: 17/04/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004 *	0.013	0.84	2.68	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

*Siriwan Chimsa-nga*  
(Miss Siriwan Chimsa-nga)

Analyst

*Araya Tipparuk*

( Mrs. Araya Tipparuk )

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0783/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 02-03/05/2025	ANALYTICAL DATE	: 12/05/2025
SAMPLING TIME	: 11:33-10:46	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 04/05/2025	FILE CODE	: 225003_TO-15_May
REPORT DATE	: 13/05/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	1.36	4.34	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
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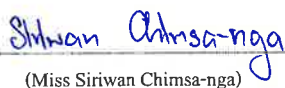
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\* AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1052/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 06-07/06/2025	ANALYTICAL DATE	: 11/06/2025
SAMPLING TIME	: 12:12-11:49	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 08/06/2025	FILE CODE	: 225003_TO-15_June
REPORT DATE	: 12/06/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m <sup>3</sup> )
	Non Detection		Ban Plong Community		
	ppbv	µg/m <sup>3</sup>	ppbv	µg/m <sup>3</sup>	
Benzene	0.004	0.013	0.99	3.16	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2<sup>nd</sup> : EPA Methods TO-15,1999

  
(Miss Siriwan Chimsa-nga)

Analyst

  
( Mrs. Araya Tipparuk )

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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 00.20-02.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 70	m	Flow Rate <sup>(1)</sup>	: 3,713	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 3.65	%
Temperature	: 288.42	°C	Moisture Content	: 13.08	%
Gas Velocity	: 16.79	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	3.65%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	117.67	94.82	240/320	7.282	22.200	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.จ-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-จ-0010

- Remark :**
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  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).





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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 00.20-02.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-28/05/2025
REPORT DATE	: 05/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 70	m	Flow Rate <sup>(1)</sup>	: 3,713	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 3.65	%
Temperature	: 288.42	°C	Moisture Content	: 13.08	%
Gas Velocity	: 16.79	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	3.65%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Mercury (Hg)	ND (<0.0003)	ND (<0.0002)	2.4/2.4	<0.00002	0.270	US. EPA Method 29
Lead (Pb)	0.03	0.02	5.0/5.0	0.002	0.560	US. EPA Method 29

(Mrs. Araya Tipparuk)

Analyst

REG.NO.จ-239-ค-0004

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-ค-0010

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  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).
  6. ND (Non-Detectable) means the lowest value that can be detected by the analyzer.



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### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 00.30-01.32 p.m.
RECEIVED DATE	: 26/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 70	m	Flow Rate <sup>(1)</sup>	: 3,713	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 3.65	%
Temperature	: 288.42	°C	Moisture Content	: 13.08	%
Gas Velocity	: 16.79	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	3.65%O <sub>2</sub>	7%O <sub>2</sub>	3.65%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	364.27	293.59	953.51	768.50	700/700	1,832/1,832	59.006	149.000	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	139.65	112.55	262.74	211.75	250/400	113 / 226	16.259	23.010	US. EPA Method 7E
Carbon Monoxide (CO)	342.43	275.99	392.15	316.06	554/690	634/790	24.267	24.320	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

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5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**RFCCU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 19, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.66	3.65	135.85	135.92	109.52
2	3.65	3.64	140.49	140.57	113.21
3	3.68	3.67	142.38	142.46	114.93
<b>Average</b>	<b>3.66</b>	<b>3.65</b>	<b>139.57</b>	<b>139.65</b>	<b>112.55</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.66	3.65	367.41	367.77	296.35
2	3.65	3.64	359.63	360.01	289.93
3	3.68	3.67	364.62	365.04	294.49
<b>Average</b>	<b>3.66</b>	<b>3.65</b>	<b>363.89</b>	<b>364.27</b>	<b>293.59</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.66	3.65	341.26	341.55	275.22
2	3.65	3.64	342.43	342.72	276.00
3	3.68	3.67	342.74	343.03	276.73
<b>Average</b>	<b>3.66</b>	<b>3.65</b>	<b>342.14</b>	<b>342.43</b>	<b>275.99</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 12:30 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Fuel Gas	<b>Run # :</b> 1 <b>Location :</b> RFCCU <b>Finish time :</b> 12:50 PM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:30 PM	4.11	133.66	331.76	344.28
12:31 PM	4.26	128.53	344.59	342.28
12:32 PM	4.29	125.83	355.69	338.74
12:33 PM	4.13	125.59	368.60	332.99
12:34 PM	4.07	127.64	384.38	334.07
12:35 PM	3.88	129.60	390.07	335.70
12:36 PM	3.52	133.77	395.91	336.79
12:37 PM	3.42	137.50	387.93	341.79
12:38 PM	3.40	139.50	379.53	345.88
12:39 PM	3.28	139.60	377.29	348.30
12:40 PM	3.30	139.73	363.84	347.97
12:41 PM	3.31	139.78	367.09	346.42
12:42 PM	3.41	140.28	357.23	346.59
12:43 PM	3.47	139.11	359.45	345.38
12:44 PM	3.61	138.42	353.22	342.38
12:45 PM	3.79	136.80	352.54	340.67
12:46 PM	3.74	134.26	376.97	335.04
12:47 PM	3.67	136.22	380.40	336.46
12:48 PM	3.55	139.16	370.41	338.71
12:49 PM	3.41	141.16	364.32	338.92
12:50 PM	3.33	146.74	354.42	347.17
<b>Average</b>	3.66	135.85	367.41	341.26

  
 Signature \_\_\_\_\_  
**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 12:51 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Fuel Gas	<b>Run # :</b> 2 <b>Location :</b> RFCCU <b>Finish time :</b> 1:11 PM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:51 PM	3.45	147.08	344.52	351.68
12:52 PM	3.54	144.87	344.28	353.39
12:53 PM	3.60	143.06	350.80	351.68
12:54 PM	3.55	141.24	353.20	353.76
12:55 PM	3.59	140.76	347.95	351.97
12:56 PM	3.62	140.27	351.43	348.26
12:57 PM	3.65	140.17	347.06	347.26
12:58 PM	3.72	139.69	349.22	345.47
12:59 PM	3.77	139.20	355.20	342.63
1:00 PM	3.66	136.93	364.12	340.13
1:01 PM	3.63	135.33	363.58	339.50
1:02 PM	3.68	137.04	371.32	335.84
1:03 PM	3.75	138.86	371.21	337.08
1:04 PM	3.73	139.15	376.62	334.38
1:05 PM	3.62	139.99	383.92	337.75
1:06 PM	3.59	141.74	374.11	340.67
1:07 PM	3.61	141.97	364.70	337.80
1:08 PM	3.75	141.21	363.22	338.54
1:09 PM	3.82	139.93	363.71	335.12
1:10 PM	3.67	138.62	366.44	331.16
1:11 PM	3.64	143.16	345.69	336.99
<b>Average</b>	3.65	140.49	359.63	342.43

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 1:12 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Fuel Gas	<b>Run # :</b> 3 <b>Location :</b> RFCCU <b>Finish time :</b> 1:32 PM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
---	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:12 PM	3.86	145.52	334.44	343.12
1:13 PM	3.97	140.37	350.40	342.75
1:14 PM	4.05	138.61	351.58	340.25
1:15 PM	4.11	138.28	362.27	338.58
1:16 PM	4.09	137.10	369.03	341.29
1:17 PM	4.08	136.86	378.74	336.25
1:18 PM	3.97	137.73	385.42	336.12
1:19 PM	3.77	140.39	395.47	337.66
1:20 PM	3.53	143.06	386.60	340.09
1:21 PM	3.50	144.15	375.86	344.55
1:22 PM	3.53	144.45	370.66	347.09
1:23 PM	3.57	144.74	369.59	346.92
1:24 PM	3.62	144.73	360.14	345.51
1:25 PM	3.58	144.04	360.47	343.86
1:26 PM	3.62	143.54	358.71	343.42
1:27 PM	3.67	143.75	356.31	342.42
1:28 PM	3.54	143.90	363.37	344.51
1:29 PM	3.33	143.95	362.46	346.10
1:30 PM	3.27	144.35	358.64	344.10
1:31 PM	3.31	144.48	357.42	344.60
1:32 PM	3.30	146.06	349.53	348.27
<b>Average</b>	3.68	142.38	364.62	342.74

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist



บริษัท ซีคอต จำกัด :

**SECOT CO., LTD.**

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 22/05/2025 / 00.15-01.15 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: CDU Stack (UTM : 734410E, 1405100N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 63.2	m	Flow Rate <sup>(1)</sup>	: 2,056	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 5.03	%
Temperature	: 185.33	°C	Moisture Content	: 12.99	%
Gas Velocity	: 8.65	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.03%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.33	1.16	60/60	0.046	0.510	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ก-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).





บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 22/05/2025 / 00.15-01.42 p.m.
RECEIVED DATE	: 26/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: CDU Stack (UTM : 734410E, 1405100N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 63.2	m	Flow Rate <sup>(1)</sup>	: 2,056	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 5.03	%
Temperature	: 185.33	°C	Moisture Content	: 12.99	%
Gas Velocity	: 8.65	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.03%O <sub>2</sub>	7%O <sub>2</sub>	5.03%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	1.60	1.40	4.19	3.66	60/60	157/157	0.144	1.820	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	16.00	14.01	30.10	26.36	25/200	47/376	1.032	2.000	US. EPA Method 7E
Carbon Monoxide (CO)	0.90	0.79	1.03	0.90	100/690	115/790	0.035	0.500	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



**The Monitoring Result of Emission Concentration**  
**CDU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 22, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.11	5.04	15.89	15.85	13.89
2	5.18	5.11	16.11	16.07	14.15
3	5.00	4.94	16.11	16.07	14.00
<b>Average</b>	<b>5.10</b>	<b>5.03</b>	<b>16.04</b>	<b>16.00</b>	<b>14.01</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.11	5.04	1.27	1.23	1.08
2	5.18	5.11	1.72	1.68	1.48
3	5.00	4.94	1.93	1.89	1.65
<b>Average</b>	<b>5.10</b>	<b>5.03</b>	<b>1.64</b>	<b>1.60</b>	<b>1.40</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.11	5.04	0.95	0.87	0.76
2	5.18	5.11	0.96	0.88	0.77
3	5.00	4.94	1.02	0.94	0.82
<b>Average</b>	<b>5.10</b>	<b>5.03</b>	<b>0.98</b>	<b>0.90</b>	<b>0.79</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 22 May 2025 <b>Start time:</b> 12:40 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> CDU <b>Finish time :</b> 1:00 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:40 PM	4.86	15.81	1.40	0.94
12:41 PM	4.91	15.86	1.34	0.94
12:42 PM	5.05	15.77	1.38	0.94
12:43 PM	5.05	15.72	1.42	0.94
12:44 PM	5.15	15.92	1.34	0.94
12:45 PM	5.19	15.92	1.30	0.95
12:46 PM	5.12	15.88	1.37	0.95
12:47 PM	5.19	15.82	1.40	0.95
12:48 PM	5.16	15.74	1.42	0.95
12:49 PM	5.18	15.94	1.43	0.95
12:50 PM	5.24	16.06	1.43	0.95
12:51 PM	5.15	16.11	1.42	0.95
12:52 PM	5.19	16.20	1.42	0.95
12:53 PM	5.15	16.17	1.25	0.95
12:54 PM	5.07	16.18	1.15	0.95
12:55 PM	5.05	16.12	1.10	0.95
12:56 PM	5.01	16.04	1.07	0.95
12:57 PM	5.13	15.71	1.03	0.95
12:58 PM	5.08	15.55	1.05	0.96
12:59 PM	5.13	15.64	1.01	0.96
1:00 PM	5.16	15.63	1.00	0.96
<b>Average</b>	5.11	15.89	1.27	0.95

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 22 May 2025 <b>Start time:</b> 1:01 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> CDU <b>Finish time :</b> 1:21 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:01 PM	5.18	15.81	1.08	0.96
1:02 PM	5.29	16.16	1.05	0.96
1:03 PM	5.28	16.34	1.01	0.96
1:04 PM	5.27	16.52	1.62	0.96
1:05 PM	5.19	16.59	1.93	0.96
1:06 PM	5.21	16.38	1.94	0.96
1:07 PM	5.14	16.01	1.97	0.96
1:08 PM	5.13	15.89	1.97	0.96
1:09 PM	5.18	15.80	1.94	0.96
1:10 PM	5.05	15.86	1.83	0.96
1:11 PM	5.17	16.15	1.77	0.96
1:12 PM	5.12	16.15	1.74	0.96
1:13 PM	5.12	15.79	1.73	0.96
1:14 PM	5.10	15.62	1.72	0.96
1:15 PM	5.15	15.91	1.76	0.96
1:16 PM	5.22	16.17	1.85	0.96
1:17 PM	5.24	16.08	1.88	0.97
1:18 PM	5.23	16.07	1.83	0.97
1:19 PM	5.21	16.22	1.79	0.97
1:20 PM	5.14	16.39	1.86	0.97
1:21 PM	5.10	16.47	1.90	0.97
<b>Average</b>	5.18	16.11	1.72	0.96

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 22 May 2025 <b>Start time:</b> 1:22 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> CDU <b>Finish time :</b> 1:42 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:22 PM	5.04	16.39	1.92	0.97
1:23 PM	5.02	16.39	1.90	0.97
1:24 PM	5.04	16.26	1.90	0.97
1:25 PM	5.04	16.12	1.86	0.97
1:26 PM	4.95	16.09	1.76	0.97
1:27 PM	5.02	16.10	1.71	0.97
1:28 PM	5.06	16.17	1.67	0.97
1:29 PM	5.11	16.13	1.64	0.97
1:30 PM	5.10	15.97	1.62	1.01
1:31 PM	5.11	15.95	1.60	1.05
1:32 PM	5.07	16.00	1.59	1.09
1:33 PM	5.00	15.88	1.60	1.02
1:34 PM	4.95	15.80	2.02	0.97
1:35 PM	5.01	16.02	2.17	0.97
1:36 PM	4.99	16.28	2.14	1.00
1:37 PM	4.96	16.26	2.21	1.06
1:38 PM	4.94	16.17	2.27	1.10
1:39 PM	4.92	16.08	2.28	1.06
1:40 PM	4.93	16.09	2.28	1.09
1:41 PM	4.93	16.12	2.28	1.10
1:42 PM	4.89	15.94	2.21	1.10
<b>Average</b>	5.00	16.11	1.93	1.02

Signature 

**Miss Katesarin Vorradetwittaya**

**Environmental Scientist**



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 02.20-03.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: VDU Stack (UTM : 734360E, 1405125N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 54	m	Flow Rate <sup>(1)</sup>	: 919	Ncu.m/min
Diameter	: 2.0	m	Excess Oxygen	: 4.11	%
Temperature	: 181.25	°C	Moisture Content	: 11.15	%
Gas Velocity	: 8.42	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.11%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.29	1.07	60/60	0.020	0.200	US. EPA Method 5

  
(Miss Pornnapa Budthum)

Analyst

REG.NO. 7-239-จ-0018

  
(Miss Narisa Poowasanetch)

Technical Management Team

REG.NO. 7-239-ค-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 02.20-03.32 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: VDU Stack (UTM : 734360E, 1405125N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 54	m	Flow Rate <sup>(1)</sup>	: 919	Ncu.m/min
Diameter	: 2.0	m	Excess Oxygen	: 4.11	%
Temperature	: 181.25	°C	Moisture Content	: 11.15	%
Gas Velocity	: 8.42	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.11%O <sub>2</sub>	7%O <sub>2</sub>	4.11%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	2.52	2.08	6.60	5.44	60/60	157/157	0.101	1.510	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	15.16	12.55	28.52	23.61	25/200	47/376	0.437	0.900	US. EPA Method 7E
Carbon Monoxide (CO)	1.00	0.83	1.15	0.95	100/690	115/790	0.018	0.500	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

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3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**VDU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 19, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.18	4.12	15.33	15.30	12.67
2	4.15	4.10	15.24	15.21	12.58
3	4.16	4.12	15.00	14.96	12.39
<b>Average</b>	<b>4.16</b>	<b>4.11</b>	<b>15.19</b>	<b>15.16</b>	<b>12.55</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.18	4.12	2.70	2.67	2.21
2	4.15	4.10	2.50	2.47	2.04
3	4.16	4.12	2.43	2.41	2.00
<b>Average</b>	<b>4.16</b>	<b>4.11</b>	<b>2.55</b>	<b>2.52</b>	<b>2.08</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.18	4.12	1.06	0.99	0.82
2	4.15	4.10	1.09	1.03	0.85
3	4.16	4.12	1.04	0.99	0.82
<b>Average</b>	<b>4.16</b>	<b>4.11</b>	<b>1.06</b>	<b>1.00</b>	<b>0.83</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 2:30 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> VDU <b>Finish time :</b> 2:50 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 388 <b>Test Operator :</b> Kittipong T.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
2:30 PM	4.25	14.88	2.51	0.95
2:31 PM	4.23	14.95	2.55	0.95
2:32 PM	4.18	15.06	2.56	0.96
2:33 PM	4.13	15.16	2.62	1.06
2:34 PM	4.09	15.12	2.66	1.07
2:35 PM	4.07	15.11	2.66	1.08
2:36 PM	4.10	15.12	2.67	1.08
2:37 PM	4.08	15.15	2.66	1.08
2:38 PM	4.12	15.22	2.65	1.08
2:39 PM	4.15	15.31	2.69	1.08
2:40 PM	4.16	15.40	2.70	1.08
2:41 PM	4.16	15.51	2.67	1.08
2:42 PM	4.17	15.52	2.71	1.08
2:43 PM	4.14	15.48	2.82	1.08
2:44 PM	4.17	15.48	2.80	1.08
2:45 PM	4.21	15.55	2.80	1.08
2:46 PM	4.26	15.62	2.85	1.08
2:47 PM	4.27	15.60	2.88	1.08
2:48 PM	4.25	15.51	2.82	1.08
2:49 PM	4.26	15.52	2.79	1.08
2:50 PM	4.30	15.61	2.68	1.09
<b>Average</b>	4.18	15.33	2.70	1.06

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 2:51 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> VDU <b>Finish time :</b> 3:11 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 388 <b>Test Operator :</b> Kittipong T.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
2:51 PM	4.28	15.73	2.61	1.09
2:52 PM	4.20	15.67	2.61	1.08
2:53 PM	4.20	15.54	2.54	1.09
2:54 PM	4.20	15.43	2.55	1.08
2:55 PM	4.16	15.35	2.52	1.08
2:56 PM	4.15	15.31	2.39	1.09
2:57 PM	4.10	15.25	2.45	1.09
2:58 PM	4.12	15.22	2.45	1.09
2:59 PM	4.17	15.25	2.39	1.09
3:00 PM	4.14	15.23	2.41	1.09
3:01 PM	4.16	15.22	2.48	1.09
3:02 PM	4.13	15.21	2.52	1.09
3:03 PM	4.11	15.12	2.54	1.08
3:04 PM	4.08	15.02	2.51	1.08
3:05 PM	4.13	15.02	2.53	1.08
3:06 PM	4.14	15.12	2.51	1.09
3:07 PM	4.12	15.11	2.56	1.09
3:08 PM	4.11	15.07	2.56	1.09
3:09 PM	4.14	15.01	2.53	1.08
3:10 PM	4.17	15.03	2.46	1.08
3:11 PM	4.14	15.10	2.38	1.09
<b>Average</b>	4.15	15.24	2.50	1.09

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 3:12 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> VDU <b>Finish time :</b> 3:32 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 388 <b>Test Operator :</b> Kittipong T.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:12 PM	4.18	15.13	2.32	1.09
3:13 PM	4.16	15.09	2.29	1.09
3:14 PM	4.13	15.02	2.26	1.09
3:15 PM	4.12	14.97	2.25	1.09
3:16 PM	4.11	14.95	2.24	1.09
3:17 PM	4.08	14.94	2.32	1.09
3:18 PM	4.09	14.88	2.35	1.09
3:19 PM	4.10	14.88	2.28	1.09
3:20 PM	4.13	14.89	2.30	1.09
3:21 PM	4.15	14.93	2.37	1.02
3:22 PM	4.21	15.03	2.39	1.00
3:23 PM	4.24	15.09	2.41	1.07
3:24 PM	4.26	15.16	2.40	0.98
3:25 PM	4.26	15.16	2.44	1.04
3:26 PM	4.21	15.15	2.78	0.98
3:27 PM	4.23	15.11	2.72	1.05
3:28 PM	4.20	15.02	2.63	1.01
3:29 PM	4.19	14.95	2.59	0.97
3:30 PM	4.15	14.88	2.58	0.97
3:31 PM	4.14	14.86	2.58	0.97
3:32 PM	4.09	14.86	2.61	1.00
<b>Average</b>	4.16	15.00	2.43	1.04

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 00.00-01.00 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: NHTU/CCRU (UTM : 734255E, 1405185N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 65	m	Flow Rate <sup>(1)</sup>	: 2,130	Ncu.m/min
Diameter	: 3.1	m	Excess Oxygen	: 4.02	%
Temperature	: 211.17	°C	Moisture Content	: 10.42	%
Gas Velocity	: 8.58	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.02%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.59	1.31	60/60	0.056	0.380	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ก-0010

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  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 19/05/2025 / 11.50 a.m.-01.00 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: NHTU/CCRU (UTM : 734255E, 1405185N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 65	m	Flow Rate <sup>(1)</sup>	: 2,130	Ncu.m/min
Diameter	: 3.1	m	Excess Oxygen	: 4.02	%
Temperature	: 211.17	°C	Moisture Content	: 10.42	%
Gas Velocity	: 8.58	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.02%O <sub>2</sub>	7%O <sub>2</sub>	4.02%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	2.47	2.03	6.47	5.31	60/60	157/157	0.230	1.500	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	34.53	28.43	64.96	53.49	120/200	226/376	2.306	2.830	US. EPA Method 7E
Carbon Monoxide (CO)	0.47	0.39	0.54	0.45	100/690	115/790	0.019	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

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3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**NHTU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 19, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.20	4.13	34.53	34.52	28.61
2	4.04	3.97	34.39	34.38	28.23
3	4.02	3.95	34.70	34.69	28.45
<b>Average</b>	<b>4.09</b>	<b>4.02</b>	<b>34.54</b>	<b>34.53</b>	<b>28.43</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.20	4.13	2.66	2.63	2.18
2	4.04	3.97	2.44	2.41	1.98
3	4.02	3.95	2.40	2.36	1.94
<b>Average</b>	<b>4.09</b>	<b>4.02</b>	<b>2.50</b>	<b>2.47</b>	<b>2.03</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.20	4.13	0.56	0.49	0.41
2	4.04	3.97	0.53	0.46	0.38
3	4.02	3.95	0.55	0.47	0.39
<b>Average</b>	<b>4.09</b>	<b>4.02</b>	<b>0.55</b>	<b>0.47</b>	<b>0.39</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 11:50 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> NHTU <b>Finish time :</b> 12:10 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
11:50 AM	4.06	34.87	2.80	0.56
11:51 AM	4.06	34.81	2.84	0.56
11:52 AM	3.96	35.03	2.89	0.56
11:53 AM	3.99	34.98	2.85	0.56
11:54 AM	4.02	34.96	2.77	0.56
11:55 AM	4.03	35.19	2.71	0.56
11:56 AM	4.31	34.68	2.67	0.56
11:57 AM	4.24	34.49	2.66	0.56
11:58 AM	4.08	34.75	2.69	0.56
11:59 AM	4.03	34.33	2.67	0.56
12:00 PM	4.26	34.74	2.73	0.56
12:01 PM	4.33	34.38	2.67	0.56
12:02 PM	4.29	34.67	2.67	0.56
12:03 PM	4.43	34.83	2.55	0.56
12:04 PM	4.35	34.88	2.56	0.56
12:05 PM	4.13	33.93	2.56	0.56
12:06 PM	4.39	33.86	2.58	0.56
12:07 PM	4.37	33.80	2.49	0.56
12:08 PM	4.31	33.88	2.50	0.56
12:09 PM	4.26	33.96	2.47	0.56
12:10 PM	4.20	34.11	2.58	0.56
<b>Average</b>	4.20	34.53	2.66	0.56

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 12:11 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> NHTU <b>Finish time :</b> 12:31 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:11 PM	4.14	34.31	2.51	0.56
12:12 PM	4.15	34.23	2.55	0.56
12:13 PM	3.95	34.17	2.49	0.56
12:14 PM	3.98	34.17	2.54	0.56
12:15 PM	3.88	34.17	2.52	0.56
12:16 PM	4.04	34.10	2.56	0.56
12:17 PM	4.06	34.13	2.47	0.56
12:18 PM	3.96	34.14	2.52	0.56
12:19 PM	4.04	34.00	2.47	0.45
12:20 PM	4.07	34.06	2.57	0.45
12:21 PM	4.14	34.17	2.52	0.45
12:22 PM	4.09	34.36	2.54	0.45
12:23 PM	3.94	34.41	2.48	0.45
12:24 PM	4.00	34.33	2.49	0.48
12:25 PM	4.07	34.44	2.49	0.55
12:26 PM	3.99	34.51	2.50	0.56
12:27 PM	4.14	34.59	2.46	0.56
12:28 PM	4.25	34.88	2.31	0.56
12:29 PM	4.03	35.07	2.02	0.56
12:30 PM	3.98	34.95	2.05	0.56
12:31 PM	3.96	34.92	2.18	0.56
<b>Average</b>	4.04	34.39	2.44	0.53

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 19 May 2025 <b>Start time:</b> 12:32 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> NHTU <b>Finish time :</b> 12:52 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:32 PM	3.94	34.97	2.22	0.56
12:33 PM	3.97	34.88	2.20	0.56
12:34 PM	4.07	34.73	2.28	0.56
12:35 PM	4.16	34.90	2.36	0.56
12:36 PM	4.12	34.81	2.39	0.56
12:37 PM	4.06	34.52	2.43	0.56
12:38 PM	4.14	34.42	2.36	0.56
12:39 PM	4.20	34.42	2.31	0.56
12:40 PM	4.18	34.53	2.25	0.56
12:41 PM	4.01	34.58	2.23	0.56
12:42 PM	3.98	34.53	2.20	0.56
12:43 PM	3.90	34.48	2.24	0.56
12:44 PM	3.87	34.54	2.26	0.56
12:45 PM	3.84	34.55	2.30	0.56
12:46 PM	3.92	34.57	2.34	0.56
12:47 PM	3.92	34.72	2.44	0.56
12:48 PM	4.01	34.88	2.71	0.56
12:49 PM	4.12	34.92	2.70	0.56
12:50 PM	4.11	34.93	2.64	0.56
12:51 PM	4.09	34.99	2.70	0.56
12:52 PM	3.86	34.88	2.75	0.36
<b>Average</b>	4.02	34.70	2.40	0.55

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist





บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 10.10-11.10 a.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: DHTU Stack (UTM : 734140E, 1405255N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 36.2	m	Flow Rate <sup>(1)</sup>	: 478	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 4.91	%
Temperature	: 413.50	°C	Moisture Content	: 10.74	%
Gas Velocity	: 10.28	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.91%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.70	1.48	60/60	0.014	0.090	US, EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ก-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 10.10-11.22 a.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: DHTU Stack (UTM : 734140E, 1405255N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 36.2	m	Flow Rate <sup>(1)</sup>	: 478	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 4.91	%
Temperature	: 413.50	°C	Moisture Content	: 10.74	%
Gas Velocity	: 10.28	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.91%O <sub>2</sub>	7%O <sub>2</sub>	4.91%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	2.46	2.14	6.44	5.60	60/60	157/157	0.051	1.000	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	38.32	33.30	72.09	62.65	120/200	226/376	0.574	0.920	US. EPA Method 7E
Carbon Monoxide (CO)	0.72	0.62	0.82	0.71	100/690	115/790	0.007	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

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3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**DHTU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 20, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.99	4.98	38.12	38.12	33.28
2	4.99	4.97	38.54	38.54	33.63
3	4.79	4.77	38.30	38.30	33.00
<b>Average</b>	<b>4.92</b>	<b>4.91</b>	<b>38.32</b>	<b>38.32</b>	<b>33.30</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.99	4.98	2.44	2.40	2.10
2	4.99	4.97	2.48	2.43	2.12
3	4.79	4.77	2.60	2.54	2.19
<b>Average</b>	<b>4.92</b>	<b>4.91</b>	<b>2.51</b>	<b>2.46</b>	<b>2.14</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.99	4.98	0.76	0.72	0.63
2	4.99	4.97	0.76	0.72	0.63
3	4.79	4.77	0.75	0.71	0.61
<b>Average</b>	<b>4.92</b>	<b>4.91</b>	<b>0.76</b>	<b>0.72</b>	<b>0.62</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 10:20 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> DHTU <b>Finish time :</b> 10:40 AM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
10:20 AM	4.99	37.51	2.23	0.61
10:21 AM	5.01	37.43	2.31	0.64
10:22 AM	4.89	37.40	2.34	0.94
10:23 AM	4.82	37.54	2.41	0.66
10:24 AM	4.94	37.71	2.44	0.65
10:25 AM	4.89	37.61	2.59	0.64
10:26 AM	4.93	37.65	2.66	0.70
10:27 AM	4.99	37.76	2.67	0.76
10:28 AM	4.98	37.95	2.65	0.79
10:29 AM	4.94	38.18	2.78	0.86
10:30 AM	4.88	38.26	2.86	0.94
10:31 AM	4.89	38.29	2.36	0.81
10:32 AM	5.12	38.30	2.32	0.84
10:33 AM	5.10	38.64	2.36	0.79
10:34 AM	5.16	38.83	2.35	0.80
10:35 AM	5.24	38.83	2.35	0.80
10:36 AM	5.09	38.83	2.29	0.76
10:37 AM	5.00	38.53	2.17	0.74
10:38 AM	5.11	38.36	2.17	0.78
10:39 AM	4.94	38.42	2.48	0.73
10:40 AM	4.94	38.48	2.49	0.73
<b>Average</b>	4.99	38.12	2.44	0.76

  
 Signature \_\_\_\_\_  
**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 10:41 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> DHTU <b>Finish time :</b> 11:01 AM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
10:41 AM	5.18	38.62	2.48	0.74
10:42 AM	5.17	38.60	2.48	0.77
10:43 AM	5.17	38.34	2.47	0.72
10:44 AM	4.91	38.14	2.56	0.72
10:45 AM	5.06	38.14	2.48	0.73
10:46 AM	5.09	38.32	2.44	0.75
10:47 AM	5.07	38.50	2.42	0.74
10:48 AM	5.10	38.49	2.50	0.79
10:49 AM	4.93	38.54	2.52	0.72
10:50 AM	5.05	38.60	2.58	0.75
10:51 AM	4.95	38.74	2.63	0.78
10:52 AM	4.95	38.78	2.64	0.79
10:53 AM	4.90	38.78	2.65	0.80
10:54 AM	4.98	38.61	2.57	0.76
10:55 AM	4.97	38.56	2.44	0.79
10:56 AM	5.07	38.72	2.36	0.78
10:57 AM	4.87	38.65	2.32	0.79
10:58 AM	4.81	38.48	2.37	0.81
10:59 AM	4.85	38.60	2.33	0.75
11:00 AM	4.80	38.62	2.37	0.80
11:01 AM	4.82	38.42	2.46	0.76
<b>Average</b>	4.99	38.54	2.48	0.76

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 11:02 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> DHTU <b>Finish time :</b> 11:22 AM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
11:02 AM	4.86	38.39	2.41	0.77
11:03 AM	4.84	38.37	2.34	0.73
11:04 AM	4.80	38.40	2.45	0.71
11:05 AM	4.77	38.43	2.52	0.72
11:06 AM	4.83	38.42	2.53	0.74
11:07 AM	4.80	38.41	2.60	0.78
11:08 AM	4.74	38.43	2.62	0.86
11:09 AM	4.81	38.48	2.83	0.90
11:10 AM	4.86	38.67	2.87	0.79
11:11 AM	4.81	38.66	2.84	0.74
11:12 AM	4.75	38.39	2.79	0.73
11:13 AM	4.70	38.09	2.75	0.74
11:14 AM	4.80	37.97	2.63	0.72
11:15 AM	4.85	38.18	2.58	0.72
11:16 AM	4.68	38.25	2.58	0.72
11:17 AM	4.75	38.15	2.52	0.72
11:18 AM	4.75	38.16	2.49	0.72
11:19 AM	4.80	38.23	2.47	0.72
11:20 AM	4.82	38.18	2.46	0.71
11:21 AM	4.82	38.03	2.61	0.71
11:22 AM	4.75	37.97	2.73	0.71
<b>Average</b>	4.79	38.30	2.60	0.75

  
 Signature \_\_\_\_\_  
**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**



บริษัท ซีคอต จำกัด

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RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: HVGO-HTU (UTM : 734170E, 1405238N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 36.2	m	Flow Rate <sup>(1)</sup>	: 355	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 5.88	%
Temperature	: 380.58	°C	Moisture Content	: 11.27	%
Gas Velocity	: 7.31	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.88%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.30	1.20	60/60	0.008	0.030	US. EPA Method 5

*Pornnapa Budthum*

(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-1-0018

*Narisa Poowasanpetch*

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-1-0010

- Remark :**
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  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
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  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).





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REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: HVGO-HTU (UTM : 734170E, 1405238N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 36.2	m	Flow Rate <sup>(1)</sup>	: 355	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 5.88	%
Temperature	: 380.58	°C	Moisture Content	: 11.27	%
Gas Velocity	: 7.31	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.88%O <sub>2</sub>	7%O <sub>2</sub>	5.88%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	0.13	0.12	0.34	0.31	60/60	157/157	0.002	0.630	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	58.75	54.35	110.53	102.25	120/200	226/376	0.654	0.920	US. EPA Method 7E
Carbon Monoxide (CO)	0.67	0.62	0.77	0.71	100/690	115/790	0.005	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๓-0006

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5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



**The Monitoring Result of Emission Concentration**  
**HVGO**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 20, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.82	5.75	57.50	57.52	52.77
2	6.20	6.13	59.39	59.42	55.92
3	5.81	5.75	59.27	59.30	54.41
<b>Average</b>	<b>5.94</b>	<b>5.88</b>	<b>58.72</b>	<b>58.75</b>	<b>54.35</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.82	5.75	0.19	0.12	0.11
2	6.20	6.13	0.20	0.14	0.13
3	5.81	5.75	0.18	0.13	0.12
<b>Average</b>	<b>5.94</b>	<b>5.88</b>	<b>0.19</b>	<b>0.13</b>	<b>0.12</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.82	5.75	0.68	0.63	0.58
2	6.20	6.13	0.72	0.67	0.63
3	5.81	5.75	0.76	0.70	0.64
<b>Average</b>	<b>5.94</b>	<b>5.88</b>	<b>0.72</b>	<b>0.67</b>	<b>0.62</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 10:20 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> HVGO <b>Finish time :</b> 10:40 AM <b>Serial No.:</b> 161212-13 <b>Serial No.:</b> 314 <b>Serial No.:</b> 058 <b>Serial No.:</b> 78253-388 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
10:20 AM	5.65	55.23	0.18	0.72
10:21 AM	5.57	55.53	0.17	0.68
10:22 AM	5.67	55.60	0.17	0.69
10:23 AM	5.66	55.83	0.26	0.71
10:24 AM	5.71	56.09	0.22	0.76
10:25 AM	5.76	56.50	0.15	0.68
10:26 AM	5.67	56.74	0.16	0.69
10:27 AM	5.63	56.86	0.16	0.69
10:28 AM	5.73	57.26	0.15	0.69
10:29 AM	5.78	57.68	0.16	0.64
10:30 AM	5.77	57.69	0.18	0.65
10:31 AM	5.74	57.99	0.23	0.68
10:32 AM	5.85	58.28	0.19	0.49
10:33 AM	5.83	58.44	0.21	0.57
10:34 AM	5.87	58.67	0.21	0.65
10:35 AM	5.90	58.85	0.20	0.70
10:36 AM	5.95	58.78	0.20	0.73
10:37 AM	5.94	58.80	0.20	0.71
10:38 AM	6.01	58.79	0.20	0.76
10:39 AM	6.27	58.81	0.18	0.73
10:40 AM	6.27	59.03	0.18	0.74
<b>Average</b>	5.82	57.50	0.19	0.68

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 10:41 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> HVGO <b>Finish time :</b> 11:01 AM <b>Serial No.:</b> 161212-13 <b>Serial No.:</b> 314 <b>Serial No.:</b> 058 <b>Serial No.:</b> 78253-388 <b>Test Operator :</b> Song H.
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
10:41 AM	6.21	59.01	0.18	0.74
10:42 AM	6.15	59.29	0.18	0.76
10:43 AM	6.13	60.05	0.19	0.74
10:44 AM	6.18	59.28	0.20	0.74
10:45 AM	6.18	59.29	0.19	0.72
10:46 AM	6.18	58.78	0.18	0.72
10:47 AM	6.07	58.86	0.20	0.70
10:48 AM	6.17	59.55	0.21	0.72
10:49 AM	6.33	59.11	0.20	0.74
10:50 AM	6.22	59.17	0.20	0.75
10:51 AM	6.12	59.78	0.20	0.76
10:52 AM	6.18	59.62	0.20	0.82
10:53 AM	6.21	59.23	0.20	0.84
10:54 AM	6.28	59.10	0.20	0.84
10:55 AM	6.20	59.40	0.20	0.63
10:56 AM	6.18	59.48	0.20	0.62
10:57 AM	6.23	59.73	0.19	0.63
10:58 AM	6.28	59.80	0.20	0.62
10:59 AM	6.30	59.78	0.19	0.64
11:00 AM	6.18	59.94	0.20	0.65
11:01 AM	6.17	58.89	0.20	0.66
<b>Average</b>	6.20	59.39	0.20	0.72

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 11:02 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> HVGO <b>Finish time :</b> 11:22 AM <b>Serial No.:</b> 161212-13 <b>Serial No.:</b> 314 <b>Serial No.:</b> 058 <b>Serial No.:</b> 78253-388 <b>Test Operator :</b> Song H.
---	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
11:02 AM	6.15	58.67	0.20	0.66
11:03 AM	6.13	58.35	0.19	0.71
11:04 AM	6.07	58.69	0.18	0.74
11:05 AM	6.14	58.77	0.18	0.80
11:06 AM	6.07	59.06	0.19	0.83
11:07 AM	5.97	59.28	0.18	0.89
11:08 AM	5.91	59.34	0.19	0.92
11:09 AM	5.87	59.15	0.18	0.94
11:10 AM	5.88	59.21	0.18	0.85
11:11 AM	5.97	59.17	0.18	0.88
11:12 AM	5.85	59.11	0.18	0.80
11:13 AM	5.81	59.29	0.18	0.76
11:14 AM	5.73	59.65	0.18	0.75
11:15 AM	5.68	59.55	0.18	0.74
11:16 AM	5.59	59.93	0.18	0.67
11:17 AM	5.50	59.74	0.18	0.69
11:18 AM	5.62	59.11	0.19	0.65
11:19 AM	5.56	59.46	0.19	0.67
11:20 AM	5.51	59.87	0.18	0.67
11:21 AM	5.50	59.99	0.18	0.66
11:22 AM	5.47	59.37	0.18	0.67
<b>Average</b>	5.81	59.27	0.18	0.76

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 00.45-01.45 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: WCN-HTU (UTM : 734270E, 1405460N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 32.5	m	Flow Rate <sup>(1)</sup>	: 91.7	Ncu.m/min
Diameter	: 0.86	m	Excess Oxygen	: 6.18	%
Temperature	: 280.00	°C	Moisture Content	: 11.16	%
Gas Velocity	: 5.52	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	6.18%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.77	1.67	35/60	0.003	0.080	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ค-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



บริษัท ซีคอต จำกัด

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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 00.45-02.02 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: WCN-HTU (UTM : 734270E, 1405460N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 32.5	m	Flow Rate <sup>(1)</sup>	: 91.7	Ncu.m/min
Diameter	: 0.86	m	Excess Oxygen	: 6.18	%
Temperature	: 280.00	°C	Moisture Content	: 11.16	%
Gas Velocity	: 5.52	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	6.18%O <sub>2</sub>	7%O <sub>2</sub>	6.18%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	2.21	2.08	5.78	5.44	20/60	52/157	0.009	0.100	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	18.52	17.49	34.84	32.91	30/200	56/376	0.053	0.125	US. EPA Method 7E
Carbon Monoxide (CO)	0.88	0.83	1.01	0.95	690/690	790/790	0.002	2.300	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**WCN-HTU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 20, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.15	18.77	18.75	17.67
2	6.17	6.16	18.50	18.48	17.43
3	6.23	6.22	18.37	18.34	17.37
<b>Average</b>	<b>6.19</b>	<b>6.18</b>	<b>18.54</b>	<b>18.52</b>	<b>17.49</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.15	2.20	2.14	2.02
2	6.17	6.16	2.13	2.08	1.96
3	6.23	6.22	2.44	2.40	2.27
<b>Average</b>	<b>6.19</b>	<b>6.18</b>	<b>2.26</b>	<b>2.21</b>	<b>2.08</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.15	0.90	0.86	0.81
2	6.17	6.16	0.96	0.91	0.86
3	6.23	6.22	0.92	0.86	0.81
<b>Average</b>	<b>6.19</b>	<b>6.18</b>	<b>0.93</b>	<b>0.88</b>	<b>0.83</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> <u>20 May 2025</u> <b>Start time:</b> <u>1:00 PM</u> <b>O<sub>2</sub> instrument Model:</b> <u>AMI 70</u> <b>NO<sub>x</sub> instrument Model:</b> <u>TELEDYNE 200 EM</u> <b>SO<sub>2</sub> instrument Model:</b> <u>TELEDYNE 100 EH</u> <b>CO instrument Model:</b> <u>API 300 A</u> <b>Fuel Type :</b> <u>Natural Gas</u>	<b>Run # :</b> <u>1</u> <b>Location :</b> <u>WCN-HTU</u> <b>Finish time :</b> <u>1:20 PM</u> <b>Serial No.:</b> <u>071023-47</u> <b>Serial No.:</b> <u>435</u> <b>Serial No.:</b> <u>186</u> <b>Serial No.:</b> <u>1070</u> <b>Test Operator :</b> <u>Song H.</u>
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Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:00 PM	5.89	18.87	2.09	0.83
1:01 PM	6.07	18.75	2.10	0.83
1:02 PM	6.31	18.72	2.14	0.83
1:03 PM	6.23	18.84	2.21	0.83
1:04 PM	6.24	18.78	2.23	0.83
1:05 PM	6.16	18.83	2.31	0.83
1:06 PM	6.09	18.85	2.30	0.83
1:07 PM	6.10	18.77	2.25	0.87
1:08 PM	6.12	18.78	2.18	0.85
1:09 PM	6.26	18.87	2.10	0.86
1:10 PM	6.17	18.94	2.11	0.95
1:11 PM	5.99	18.81	2.15	0.95
1:12 PM	6.01	18.67	2.20	0.95
1:13 PM	6.26	18.71	2.18	0.93
1:14 PM	6.21	18.86	2.20	0.88
1:15 PM	6.23	18.85	2.24	0.96
1:16 PM	6.09	18.77	2.25	0.96
1:17 PM	6.22	18.72	2.25	0.96
1:18 PM	6.18	18.68	2.25	0.96
1:19 PM	6.22	18.58	2.25	0.96
1:20 PM	6.28	18.49	2.29	0.96
<b>Average</b>	6.16	18.77	2.20	0.90

Signature



**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 1:21 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> WCN-HTU <b>Finish time :</b> 1:41 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:21 PM	6.21	18.61	2.36	0.96
1:22 PM	6.04	18.62	2.34	0.96
1:23 PM	6.05	18.49	2.27	0.96
1:24 PM	6.01	18.45	2.23	0.96
1:25 PM	6.11	18.45	2.12	0.96
1:26 PM	6.27	18.52	2.04	0.96
1:27 PM	6.09	18.59	2.08	0.96
1:28 PM	6.12	18.54	2.07	0.96
1:29 PM	5.99	18.42	2.06	0.93
1:30 PM	6.21	18.30	2.01	0.96
1:31 PM	6.37	18.42	2.02	0.96
1:32 PM	6.22	18.61	2.07	0.96
1:33 PM	6.34	18.61	2.03	0.96
1:34 PM	6.16	18.60	2.09	0.96
1:35 PM	6.18	18.53	2.10	0.96
1:36 PM	6.21	18.33	2.10	0.96
1:37 PM	6.22	18.35	2.12	0.96
1:38 PM	6.15	18.46	2.14	0.96
1:39 PM	6.11	18.47	2.15	0.96
1:40 PM	6.28	18.52	2.14	0.96
1:41 PM	6.25	18.52	2.11	0.96
<b>Average</b>	6.17	18.50	2.13	0.96

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> <u>20 May 2025</u> <b>Start time:</b> <u>1:42 PM</u> <b>O<sub>2</sub> instrument Model:</b> <u>AMI 70</u> <b>NO<sub>x</sub> instrument Model:</b> <u>TELEDYNE 200 EM</u> <b>SO<sub>2</sub> instrument Model:</b> <u>TELEDYNE 100 EH</u> <b>CO instrument Model:</b> <u>API 300 A</u> <b>Fuel Type :</b> <u>Natural Gas</u>	<b>Run # :</b> <u>3</u> <b>Location :</b> <u>WCN-HTU</u> <b>Finish time :</b> <u>2:02 PM</u> <b>Serial No.:</b> <u>071023-47</u> <b>Serial No.:</b> <u>435</u> <b>Serial No.:</b> <u>186</u> <b>Serial No.:</b> <u>1070</u> <b>Test Operator :</b> <u>Song H.</u>
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:42 PM	6.23	18.46	2.39	0.96
1:43 PM	6.12	18.57	2.49	0.96
1:44 PM	6.16	18.56	2.44	0.96
1:45 PM	6.36	18.54	2.41	0.96
1:46 PM	6.38	18.44	2.40	0.96
1:47 PM	6.13	18.44	2.38	0.96
1:48 PM	6.33	18.45	2.42	0.92
1:49 PM	6.20	18.47	2.40	0.84
1:50 PM	6.35	18.42	2.36	0.84
1:51 PM	6.38	18.38	2.39	0.84
1:52 PM	6.13	18.29	2.44	0.86
1:53 PM	6.31	18.14	2.43	0.90
1:54 PM	6.29	18.15	2.47	0.96
1:55 PM	5.98	18.21	2.50	0.96
1:56 PM	6.02	18.23	2.57	0.96
1:57 PM	6.06	18.25	2.58	0.96
1:58 PM	6.14	18.22	2.53	0.96
1:59 PM	6.29	18.26	2.48	0.96
2:00 PM	6.41	18.36	2.41	0.94
2:01 PM	6.38	18.47	2.41	0.85
2:02 PM	6.28	18.42	2.39	0.85
<b>Average</b>	6.23	18.37	2.44	0.92

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 05.20-06.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 70.1	m	Flow Rate <sup>(1)</sup>	: 383.9	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 6.15	%
Temperature	: 498.50	°C	Moisture Content	: 14.64	%
Gas Velocity	: 5.14	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	6.15%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	6.09	5.74	60/-	0.039	0.040	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO. 3-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ก-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
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  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 04.00-06.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23/05/2025
REPORT DATE	: 05/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 70.1	m	Flow Rate <sup>(1)</sup>	: 383.9	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 6.15	%
Temperature	: 498.50	°C	Moisture Content	: 14.64	%
Gas Velocity	: 5.14	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	6.15%O <sub>2</sub>	7%O <sub>2</sub>	6.15%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Hydrogen Sulfide (H <sub>2</sub> S)	ND (<0.3)	ND (<0.3)	ND (<0.4)	ND (<0.4)	60/-	83/-	<0.003	0.040	US. EPA Method 16

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

**Remark :** 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ND (Non-Detectable) means the lowest value that can be detected by the analyzer.



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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 03.00-06.20 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 70.1	m	Flow Rate <sup>(1)</sup>	: 383.9	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 6.15	%
Temperature	: 498.50	°C	Moisture Content	: 14.64	%
Gas Velocity	: 5.14	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.64%O <sub>2</sub>	7%O <sub>2</sub>	14.64%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	225.54	212.55	590.37	556.37	500/500	1,309/1,309	3.777	10.000	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	9.27	8.73	17.44	16.42	60/200	113/376	0.112	0.320	US. EPA Method 7E
Carbon Monoxide (CO)	235.88	222.29	270.13	254.57	350/690	401/790	1.728	2.000	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

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3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**SRU**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 21, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.14	9.22	9.19	8.65
2	6.17	6.15	8.89	8.86	8.35
3	6.18	6.16	9.78	9.75	9.19
<b>Average</b>	<b>6.17</b>	<b>6.15</b>	<b>9.29</b>	<b>9.27</b>	<b>8.73</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.14	221.91	222.12	209.18
2	6.17	6.15	227.69	227.94	214.80
3	6.18	6.16	226.29	226.57	213.66
<b>Average</b>	<b>6.17</b>	<b>6.15</b>	<b>225.30</b>	<b>225.54</b>	<b>212.55</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	6.16	6.14	242.99	243.18	229.01
2	6.17	6.15	234.30	234.48	220.97
3	6.18	6.16	229.80	229.98	216.87
<b>Average</b>	<b>6.17</b>	<b>6.15</b>	<b>235.70</b>	<b>235.88</b>	<b>222.29</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 3:00 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> SRU <b>Finish time :</b> 3:20 PM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
--	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:00 PM	6.17	9.15	223.37	243.72
3:01 PM	6.17	9.25	216.74	242.40
3:02 PM	6.17	9.22	213.66	243.22
3:03 PM	6.16	9.19	217.05	239.72
3:04 PM	6.17	9.12	217.97	240.88
3:05 PM	6.14	9.13	219.43	245.56
3:06 PM	6.13	9.21	219.64	247.56
3:07 PM	6.13	9.20	221.81	245.38
3:08 PM	6.11	9.26	223.83	240.38
3:09 PM	6.12	9.31	224.82	243.39
3:10 PM	6.13	9.33	224.57	247.73
3:11 PM	6.16	9.31	223.60	246.57
3:12 PM	6.15	9.25	222.72	245.39
3:13 PM	6.17	9.22	222.44	241.89
3:14 PM	6.19	9.19	222.10	241.40
3:15 PM	6.20	9.23	224.27	241.74
3:16 PM	6.20	9.20	222.87	239.23
3:17 PM	6.18	9.22	224.10	241.57
3:18 PM	6.18	9.22	224.24	242.25
3:19 PM	6.19	9.13	224.94	242.41
3:20 PM	6.22	9.18	225.84	240.40
<b>Average</b>	6.16	9.22	221.91	242.99

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> <u>21 May 2025</u> <b>Start time:</b> <u>3:21 PM</u> <b>O<sub>2</sub> instrument Model:</b> <u>AMI 70</u> <b>NO<sub>x</sub> instrument Model:</b> <u>API 200 AH</u> <b>SO<sub>2</sub> instrument Model:</b> <u>API 100 AH</u> <b>CO instrument Model:</b> <u>THERMO 48 C</u> <b>Fuel Type :</b> <u>Natural Gas</u>	<b>Run # : 2</b> <b>Location :</b> <u>SRU</u> <b>Finish time :</b> <u>3:41 PM</u> <b>Serial No.:</b> <u>121121-10</u> <b>Serial No.:</b> <u>441</u> <b>Serial No.:</b> <u>060</u> <b>Serial No.:</b> <u>70162-362</u> <b>Test Operator :</b> <u>Pisanu S.</u>
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:21 PM	6.19	9.13	226.03	237.05
3:22 PM	6.18	9.11	226.63	235.55
3:23 PM	6.22	9.04	226.44	237.56
3:24 PM	6.19	9.06	226.00	237.21
3:25 PM	6.19	9.04	226.08	237.22
3:26 PM	6.17	9.01	225.75	235.55
3:27 PM	6.17	9.03	225.95	231.55
3:28 PM	6.17	9.07	226.57	231.05
3:29 PM	6.16	8.92	227.00	231.56
3:30 PM	6.17	8.93	227.19	231.07
3:31 PM	6.17	8.89	227.55	234.06
3:32 PM	6.16	8.85	228.30	233.74
3:33 PM	6.17	8.79	228.89	235.23
3:34 PM	6.16	8.81	230.41	233.58
3:35 PM	6.15	8.88	230.80	233.24
3:36 PM	6.16	8.70	229.32	233.92
3:37 PM	6.17	8.71	230.15	235.08
3:38 PM	6.15	8.70	229.63	230.92
3:39 PM	6.15	8.63	227.99	233.59
3:40 PM	6.15	8.69	228.22	236.91
3:41 PM	6.13	8.60	226.68	234.76
<b>Average</b>	6.17	8.89	227.69	234.30

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 3:42 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> SRU <b>Finish time :</b> 4:02 PM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 060 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
--	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:42 PM	6.10	8.58	225.42	230.25
3:43 PM	6.12	8.50	226.02	228.93
3:44 PM	6.11	8.53	227.05	231.76
3:45 PM	6.15	8.48	226.90	230.42
3:46 PM	6.16	8.56	227.16	234.25
3:47 PM	6.14	9.35	226.91	237.73
3:48 PM	6.09	10.06	226.69	238.58
3:49 PM	6.13	10.06	224.69	238.90
3:50 PM	6.16	10.21	225.39	234.40
3:51 PM	6.17	10.24	225.48	232.57
3:52 PM	6.17	10.21	224.40	231.42
3:53 PM	6.20	10.24	226.16	235.08
3:54 PM	6.23	10.13	224.44	233.26
3:55 PM	6.23	10.09	225.59	230.26
3:56 PM	6.25	10.19	226.18	226.43
3:57 PM	6.24	10.23	226.94	223.93
3:58 PM	6.24	10.31	226.86	221.26
3:59 PM	6.25	10.31	227.89	223.77
4:00 PM	6.24	10.37	228.03	221.93
4:01 PM	6.22	10.35	227.02	219.76
4:02 PM	6.22	10.31	226.79	220.93
<b>Average</b>	6.18	9.78	226.29	229.80

Signature   
 Miss Katesarin Vorradetwittaya  
 Environmental Scientist



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 00.10-01.10 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: Boiler#1 (UTM : 734424E, 1404970N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 32.4	m	Flow Rate <sup>(1)</sup>	: 654.5	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 4.77	%
Temperature	: 160.00	°C	Moisture Content	: 11.13	%
Gas Velocity	: 10.12	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.77%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.83	1.58	60/60	0.020	0.100	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.จ-239-จ-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-ก-0010

- Remark :**
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  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 00.10-01.32 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: Boiler#1 (UTM : 734424E, 1404970N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 32.4	m	Flow Rate <sup>(1)</sup>	: 654.5	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 4.77	%
Temperature	: 160.00	°C	Moisture Content	: 11.13	%
Gas Velocity	: 10.12	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.77%O <sub>2</sub>	7%O <sub>2</sub>	4.77%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	1.51	1.30	3.95	3.40	60/60	157/157	0.043	0.500	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	90.94	78.39	171.09	147.48	120/200	226/376	1.866	2.620	US. EPA Method 7E
Carbon Monoxide (CO)	0.38	0.33	0.44	0.38	100/690	115/790	0.005	0.200	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

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3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**Boiler 1**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 21, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.89	4.82	91.52	91.57	79.16
2	4.83	4.77	90.59	90.64	78.11
3	4.79	4.73	90.56	90.62	77.90
<b>Average</b>	<b>4.84</b>	<b>4.77</b>	<b>90.89</b>	<b>90.94</b>	<b>78.39</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.89	4.82	1.68	1.61	1.39
2	4.83	4.77	1.53	1.46	1.26
3	4.79	4.73	1.54	1.47	1.26
<b>Average</b>	<b>4.84</b>	<b>4.77</b>	<b>1.58</b>	<b>1.51</b>	<b>1.30</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.89	4.82	0.44	0.38	0.33
2	4.83	4.77	0.39	0.33	0.28
3	4.79	4.73	0.50	0.44	0.38
<b>Average</b>	<b>4.84</b>	<b>4.77</b>	<b>0.45</b>	<b>0.38</b>	<b>0.33</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 12:30 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> Boiler 1 <b>Finish time :</b> 12:50 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:30 PM	5.36	89.74	1.80	0.67
12:31 PM	5.13	89.84	1.81	0.31
12:32 PM	4.21	91.03	1.86	0.95
12:33 PM	4.81	91.01	1.79	1.11
12:34 PM	5.24	90.47	1.73	0.01
12:35 PM	4.93	91.20	1.82	0.11
12:36 PM	4.38	92.14	1.84	0.57
12:37 PM	4.77	91.55	1.75	0.90
12:38 PM	5.60	90.38	1.75	0.90
12:39 PM	4.71	91.43	1.86	0.72
12:40 PM	4.73	92.75	1.56	0.11
12:41 PM	5.40	92.57	1.72	0.36
12:42 PM	4.44	93.21	1.72	0.03
12:43 PM	4.57	93.27	1.63	0.30
12:44 PM	5.47	91.78	1.52	0.28
12:45 PM	5.06	91.76	1.51	0.14
12:46 PM	4.80	92.21	1.53	0.34
12:47 PM	4.89	91.71	1.51	0.49
12:48 PM	4.92	91.22	1.51	0.49
12:49 PM	4.90	91.11	1.53	0.44
12:50 PM	4.47	91.63	1.56	0.07
<b>Average</b>	4.89	91.52	1.68	0.44

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 12:51 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> Boiler 1 <b>Finish time :</b> 1:11 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
---	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
12:51 PM	4.46	91.98	1.59	0.26
12:52 PM	4.99	91.32	1.55	0.31
12:53 PM	5.16	90.75	1.53	0.22
12:54 PM	4.25	91.34	1.60	0.52
12:55 PM	4.80	91.21	1.61	0.70
12:56 PM	5.05	90.47	1.59	0.70
12:57 PM	4.74	90.85	1.62	0.56
12:58 PM	4.53	91.40	1.63	0.14
12:59 PM	4.58	91.33	1.57	0.26
1:00 PM	5.43	89.90	1.48	0.26
1:01 PM	5.17	89.37	1.49	0.14
1:02 PM	4.35	90.43	1.51	0.28
1:03 PM	4.94	90.02	1.45	0.43
1:04 PM	5.54	88.87	1.45	0.48
1:05 PM	4.45	89.86	1.50	0.38
1:06 PM	4.56	90.85	1.50	0.18
1:07 PM	5.37	89.88	1.43	0.09
1:08 PM	4.98	90.08	1.45	0.26
1:09 PM	4.53	91.15	1.49	0.55
1:10 PM	4.61	91.06	1.52	0.76
1:11 PM	5.04	90.33	1.66	0.75
<b>Average</b>	4.83	90.59	1.53	0.39

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 1:12 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> TELEDYNE 200 EM <b>SO<sub>2</sub> instrument Model:</b> TELEDYNE 100 EH <b>CO instrument Model:</b> API 300 A <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> Boiler 1 <b>Finish time :</b> 1:32 PM <b>Serial No.:</b> 071023-47 <b>Serial No.:</b> 435 <b>Serial No.:</b> 186 <b>Serial No.:</b> 1070 <b>Test Operator :</b> Song H.
--	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
1:12 PM	5.52	89.61	1.65	0.25
1:13 PM	4.99	90.48	1.74	0.35
1:14 PM	4.63	91.94	1.75	0.49
1:15 PM	4.67	91.90	1.70	0.43
1:16 PM	4.72	91.43	1.62	0.30
1:17 PM	4.60	91.46	1.61	0.21
1:18 PM	4.40	91.62	1.61	0.24
1:19 PM	4.68	91.07	1.54	0.55
1:20 PM	5.18	90.35	1.50	0.43
1:21 PM	4.78	90.78	1.50	0.16
1:22 PM	4.71	91.04	1.48	0.43
1:23 PM	5.37	90.26	1.52	0.61
1:24 PM	4.73	90.83	1.60	0.29
1:25 PM	4.22	92.05	1.47	0.58
1:26 PM	4.85	90.94	1.18	0.90
1:27 PM	5.10	89.17	1.95	1.06
1:28 PM	4.32	89.05	1.78	1.09
1:29 PM	4.47	89.65	1.58	0.79
1:30 PM	5.20	88.91	1.32	0.66
1:31 PM	5.11	88.85	1.13	0.45
1:32 PM	4.33	90.34	1.04	0.32
<b>Average</b>	4.79	90.56	1.54	0.50

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist





บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 02.40-03.40 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: Boiler#3 (UTM : 734400E, 1404932N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 32.4	m	Flow Rate <sup>(1)</sup>	: 567.2	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 5.53	%
Temperature	: 156.50	°C	Moisture Content	: 10.95	%
Gas Velocity	: 8.68	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.53%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	1.60	1.45	20/60	0.015	0.400	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.จ-239-จ-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-ก-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).





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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

### STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 21/05/2025 / 02.40-03.52 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: Boiler#3 (UTM : 734400E, 1404932N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			


Height	: 32.4	m	Flow Rate <sup>(1)</sup>	: 567.2	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 5.53	%
Temperature	: 156.50	°C	Moisture Content	: 10.95	%
Gas Velocity	: 8.68	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.53%O <sub>2</sub>	7%O <sub>2</sub>	5.53%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	0.31	0.28	0.81	0.73	20/60	52/157	0.008	1.000	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	41.97	37.96	78.96	71.42	55/200	103/376	0.746	2.200	US. EPA Method 7E
Carbon Monoxide (CO)	0.34	0.31	0.39	0.36	8/690	115/790	0.004	0.200	US. EPA Method 10

  
(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

  
(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**Boiler 3**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 21, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.42	5.40	42.56	42.56	38.17
2	5.77	5.75	42.21	42.21	38.73
3	5.48	5.45	41.14	41.14	37.01
<b>Average</b>	<b>5.56</b>	<b>5.53</b>	<b>41.97</b>	<b>41.97</b>	<b>37.96</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.42	5.40	0.38	0.31	0.28
2	5.77	5.75	0.38	0.31	0.28
3	5.48	5.45	0.38	0.30	0.27
<b>Average</b>	<b>5.56</b>	<b>5.53</b>	<b>0.38</b>	<b>0.31</b>	<b>0.28</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.42	5.40	0.39	0.35	0.31
2	5.77	5.75	0.32	0.28	0.26
3	5.48	5.45	0.43	0.39	0.35
<b>Average</b>	<b>5.56</b>	<b>5.53</b>	<b>0.38</b>	<b>0.34</b>	<b>0.31</b>

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 2:50 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> Boiler 3 <b>Finish time :</b> 3:10 PM <b>Serial No.:</b> 161212-13 <b>Serial No.:</b> 314 <b>Serial No.:</b> 058 <b>Serial No.:</b> 78253-388 <b>Test Operator :</b> Song H.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
2:50 PM	4.90	42.12	0.38	0.35
2:51 PM	4.82	41.72	0.38	0.24
2:52 PM	4.79	41.60	0.38	0.24
2:53 PM	4.73	41.84	0.38	0.24
2:54 PM	4.71	42.27	0.38	0.24
2:55 PM	4.74	43.04	0.38	0.35
2:56 PM	4.86	43.10	0.38	0.44
2:57 PM	4.87	43.08	0.38	0.44
2:58 PM	5.28	43.12	0.38	0.44
2:59 PM	5.88	42.92	0.38	0.44
3:00 PM	5.82	42.43	0.38	0.44
3:01 PM	5.83	42.22	0.38	0.44
3:02 PM	5.85	42.14	0.38	0.44
3:03 PM	5.90	41.92	0.38	0.44
3:04 PM	5.91	42.38	0.38	0.44
3:05 PM	5.94	42.63	0.38	0.44
3:06 PM	5.93	42.61	0.38	0.44
3:07 PM	5.76	42.91	0.38	0.44
3:08 PM	5.76	43.28	0.38	0.44
3:09 PM	5.78	43.27	0.38	0.44
3:10 PM	5.78	43.09	0.38	0.44
<b>Average</b>	5.42	42.56	0.38	0.39

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 21 May 2025 <b>Start time:</b> 3:11 PM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 2 <b>Location :</b> Boiler 3 <b>Finish time :</b> 3:31 PM <b>Serial No.:</b> 161212-13 <b>Serial No.:</b> 314 <b>Serial No.:</b> 058 <b>Serial No.:</b> 78253-388 <b>Test Operator :</b> Song H.
--	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:11 PM	5.80	43.33	0.38	0.44
3:12 PM	5.69	43.18	0.38	0.37
3:13 PM	5.66	43.22	0.38	0.30
3:14 PM	5.62	43.27	0.38	0.24
3:15 PM	5.69	43.37	0.38	0.37
3:16 PM	5.65	43.04	0.38	0.27
3:17 PM	5.64	42.95	0.38	0.24
3:18 PM	5.73	42.90	0.38	0.24
3:19 PM	5.86	42.57	0.38	0.24
3:20 PM	5.84	42.01	0.38	0.31
3:21 PM	5.86	43.83	0.38	0.24
3:22 PM	5.83	42.61	0.38	0.24
3:23 PM	5.89	42.13	0.38	0.24
3:24 PM	5.80	41.28	0.38	0.24
3:25 PM	5.84	39.84	0.38	0.23
3:26 PM	5.91	40.77	0.38	0.37
3:27 PM	5.84	40.74	0.38	0.44
3:28 PM	5.79	40.92	0.38	0.44
3:29 PM	5.80	41.22	0.38	0.44
3:30 PM	5.77	41.69	0.38	0.44
3:31 PM	5.72	41.59	0.38	0.44
<b>Average</b>	5.77	42.21	0.38	0.32

  
 Signature \_\_\_\_\_  
**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> <u>21 May 2025</u> <b>Start time:</b> <u>3:32 PM</u> <b>O<sub>2</sub> instrument Model:</b> <u>AMI 70</u> <b>NO<sub>x</sub> instrument Model:</b> <u>API 200 AH</u> <b>SO<sub>2</sub> instrument Model:</b> <u>API 100 AH</u> <b>CO instrument Model:</b> <u>THERMO 48 C</u> <b>Fuel Type :</b> <u>Natural Gas</u>	<b>Run # :</b> <u>3</u> <b>Location :</b> <u>Boiler 3</u> <b>Finish time :</b> <u>3:52 PM</u> <b>Serial No.:</b> <u>161212-13</u> <b>Serial No.:</b> <u>314</u> <b>Serial No.:</b> <u>058</u> <b>Serial No.:</b> <u>78253-388</u> <b>Test Operator :</b> <u>Song H.</u>
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
3:32 PM	5.61	41.61	0.38	0.44
3:33 PM	5.52	41.65	0.38	0.44
3:34 PM	5.48	41.37	0.38	0.44
3:35 PM	5.49	41.23	0.38	0.44
3:36 PM	5.41	41.19	0.38	0.44
3:37 PM	5.38	41.17	0.38	0.44
3:38 PM	5.50	41.00	0.38	0.44
3:39 PM	5.46	40.74	0.38	0.44
3:40 PM	5.51	40.89	0.38	0.44
3:41 PM	5.68	41.09	0.38	0.44
3:42 PM	5.76	41.35	0.38	0.44
3:43 PM	5.70	41.52	0.38	0.44
3:44 PM	5.61	41.53	0.38	0.44
3:45 PM	5.59	41.33	0.38	0.44
3:46 PM	5.53	41.29	0.38	0.44
3:47 PM	5.43	41.74	0.38	0.44
3:48 PM	5.29	42.27	0.38	0.44
3:49 PM	5.35	41.27	0.38	0.44
3:50 PM	5.34	40.26	0.38	0.44
3:51 PM	5.28	39.77	0.38	0.34
3:52 PM	5.23	39.72	0.38	0.24
<b>Average</b>	5.48	41.14	0.38	0.43

Signature   
**Miss Katesarin Vorradetwittaya**  
**Environmental Scientist**



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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 11.20 a.m.-00.20 p.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 23-27/05/2025
REPORT DATE	: 02/06/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: HRSG#1 (UTM : 734515E, 1404960N)	OPERATOR	: Mr. Song Hengchwankun

### STACK DESCRIPTION

Height	: 21.7	m	Flow Rate <sup>(1)</sup>	: 3,944	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 14.19	%
Temperature	: 202.75	°C	Moisture Content	: 13.25	%
Gas Velocity	: 17.23	m/s			

PARAMETER	RESULTS <sup>(1)</sup>		EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	14.19%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Particulate Matter (PM)	2.58	5.34	60/60	0.170	0.330	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.จ-239-จ-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-ท-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
  4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).
  5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 20/05/2025 / 09.30 a.m.-00.20 p.m.
RECEIVED DATE	: 19/05/2025	ANALYTICAL DATE	: 27/05/2025-16/06/2025
REPORT DATE	: 16/05/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK LOCATION	: HRSG#1 (UTM : 734515E, 1404960N)	OPERATOR	: Mr. Song Hengchwankun
STACK DESCRIPTION			

Height	: 21.7	m	Flow Rate <sup>(1)</sup>	: 3,944	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 14.19	%
Temperature	: 202.75	°C	Moisture Content	: 13.25	%
Gas Velocity	: 17.23	m/s			

PARAMETER	RESULT <sup>(1)</sup>				EIA <sup>(2)</sup> / STANDARD <sup>(3)</sup>		EMISSION RATE		REFERENCE  METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.19%O <sub>2</sub>	7%O <sub>2</sub>	14.19%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	7%O <sub>2</sub>	RESULT	EIA <sup>(2)</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	0.77	1.60	2.02	4.19	10/60	26/157	0.132	0.200	US. EPA Method 6C
Oxide of Nitrogen (NO <sub>x</sub> )	44.44	92.10	83.61	173.28	160/200	301/376	5.496	5.750	US. EPA Method 7E
Carbon Monoxide (CO)	1.55	3.21	1.78	3.68	100/690	115/790	0.117	1.000	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๖-239-๖-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๖-239-๖-0006

**Remark :** 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. <sup>(2)</sup> Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration**  
**HRSG 1**  
**STAR PETROLEUM REFINING PUBLIC CO.,LTD.**  
**May 20, 2025**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.15	14.13	40.89	40.89	83.95
2	14.25	14.22	46.04	46.05	95.82
3	14.26	14.23	46.36	46.37	96.63
<b>Average</b>	<b>14.22</b>	<b>14.19</b>	<b>44.43</b>	<b>44.44</b>	<b>92.10</b>

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.15	14.13	0.92	0.88	1.81
2	14.25	14.22	0.76	0.73	1.52
3	14.26	14.23	0.73	0.70	1.46
<b>Average</b>	<b>14.22</b>	<b>14.19</b>	<b>0.81</b>	<b>0.77</b>	<b>1.60</b>

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	14.15	14.13	1.74	1.68	3.45
2	14.25	14.22	1.56	1.50	3.12
3	14.26	14.23	1.51	1.46	3.04
<b>Average</b>	<b>14.22</b>	<b>14.19</b>	<b>1.60</b>	<b>1.55</b>	<b>3.21</b>



# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 9:30 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 1 <b>Location :</b> HRSG 1 <b>Finish time :</b> 9:50 AM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 0.06 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
--	---

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
9:30 AM	14.16	41.03	1.12	1.94
9:31 AM	14.18	39.98	1.08	1.95
9:32 AM	14.18	39.56	1.05	1.94
9:33 AM	14.18	39.49	1.01	1.93
9:34 AM	14.15	38.83	1.00	1.85
9:35 AM	14.11	38.02	1.00	1.85
9:36 AM	14.07	38.08	1.00	1.75
9:37 AM	14.04	38.39	0.94	1.68
9:38 AM	14.09	39.43	0.95	1.65
9:39 AM	14.10	39.80	0.94	1.69
9:40 AM	14.08	39.47	0.91	1.74
9:41 AM	14.06	40.21	0.90	1.74
9:42 AM	14.09	41.67	0.92	1.65
9:43 AM	14.13	42.98	0.84	1.65
9:44 AM	14.14	43.52	0.85	1.65
9:45 AM	14.21	43.22	0.85	1.64
9:46 AM	14.25	42.91	0.82	1.64
9:47 AM	14.23	42.47	0.81	1.64
9:48 AM	14.21	42.15	0.78	1.61
9:49 AM	14.20	43.08	0.80	1.65
9:50 AM	14.21	44.44	0.80	1.61
<b>Average</b>	14.15	40.89	0.92	1.74

Signature 

**Miss Katesarin Vorradetwittaya**

**Environmental Scientist**

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> <u>20 May 2025</u> <b>Start time:</b> <u>9:51 AM</u> <b>O<sub>2</sub> instrument Model:</b> <u>AMI 70</u> <b>NO<sub>x</sub> instrument Model:</b> <u>API 200 AH</u> <b>SO<sub>2</sub> instrument Model:</b> <u>API 100 AH</u> <b>CO instrument Model:</b> <u>THERMO 48 C</u> <b>Fuel Type :</b> <u>Natural Gas</u>	<b>Run # :</b> <u>2</u> <b>Location :</b> <u>HRSG 1</u> <b>Finish time :</b> <u>10:11 AM</u> <b>Serial No.:</b> <u>121121-10</u> <b>Serial No.:</b> <u>441</u> <b>Serial No.:</b> <u>0.06</u> <b>Serial No.:</b> <u>70162-362</u> <b>Test Operator :</b> <u>Pisanu S.</u>
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
9:51 AM	14.23	45.25	0.78	1.54
9:52 AM	14.23	45.67	0.82	1.54
9:53 AM	14.24	46.10	0.78	1.56
9:54 AM	14.26	46.16	0.80	1.56
9:55 AM	14.22	45.34	0.78	1.54
9:56 AM	14.25	45.85	0.76	1.61
9:57 AM	14.25	46.24	0.79	1.64
9:58 AM	14.26	45.85	0.78	1.58
9:59 AM	14.24	45.73	0.76	1.59
10:00 AM	14.26	45.77	0.78	1.65
10:01 AM	14.26	46.17	0.76	1.54
10:02 AM	14.27	46.58	0.76	1.54
10:03 AM	14.27	46.62	0.79	1.54
10:04 AM	14.27	46.95	0.76	1.55
10:05 AM	14.27	46.65	0.76	1.50
10:06 AM	14.27	46.61	0.74	1.55
10:07 AM	14.26	46.66	0.74	1.46
10:08 AM	14.26	46.23	0.71	1.53
10:09 AM	14.25	45.66	0.71	1.55
10:10 AM	14.24	45.11	0.73	1.55
10:11 AM	14.25	45.60	0.76	1.55
<b>Average</b>	14.25	46.04	0.76	1.56

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

# STAR PETROLEUM REFINING PUBLIC CO.,LTD.

## EMISSION TEST RESULT

<b>Date:</b> 20 May 2025 <b>Start time:</b> 10:12 AM <b>O<sub>2</sub> instrument Model:</b> AMI 70 <b>NO<sub>x</sub> instrument Model:</b> API 200 AH <b>SO<sub>2</sub> instrument Model:</b> API 100 AH <b>CO instrument Model:</b> THERMO 48 C <b>Fuel Type :</b> Natural Gas	<b>Run # :</b> 3 <b>Location :</b> HRSG 1 <b>Finish time :</b> 10:32 AM <b>Serial No.:</b> 121121-10 <b>Serial No.:</b> 441 <b>Serial No.:</b> 0.06 <b>Serial No.:</b> 70162-362 <b>Test Operator :</b> Pisanu S.
---	--

Time, min	O <sub>2</sub> (%)	NO <sub>x</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)
10:12 AM	14.23	45.61	0.75	1.63
10:13 AM	14.23	45.89	0.75	1.58
10:14 AM	14.27	46.31	0.73	1.55
10:15 AM	14.26	46.09	0.76	1.61
10:16 AM	14.27	46.14	0.73	1.53
10:17 AM	14.25	45.74	0.74	1.51
10:18 AM	14.26	45.91	0.75	1.46
10:19 AM	14.25	45.89	0.71	1.45
10:20 AM	14.26	45.89	0.71	1.45
10:21 AM	14.26	46.09	0.71	1.45
10:22 AM	14.25	46.16	0.71	1.45
10:23 AM	14.24	46.14	0.70	1.45
10:24 AM	14.25	46.53	0.71	1.45
10:25 AM	14.27	46.40	0.76	1.50
10:26 AM	14.26	46.91	0.70	1.51
10:27 AM	14.27	47.63	0.71	1.53
10:28 AM	14.28	47.83	0.71	1.55
10:29 AM	14.26	46.99	0.73	1.55
10:30 AM	14.27	47.16	0.75	1.53
10:31 AM	14.26	46.77	0.75	1.45
10:32 AM	14.24	45.38	0.73	1.45
<b>Average</b>	14.26	46.36	0.73	1.51

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REF. NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 22/05/2025 / 09.30-10.30 a.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 28/05/2025
REPORT DATE	: 05/06/2025	SAMPLE CONDITION	: Normal
STACK LOCATION	: VRU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Process	FUEL TYPE	: -

### STACK DESCRIPTION

Height	: 10.0	m.	Velocity <sup>(1)</sup>	: 3.29	m/s
Diameter	: 0.25	m.	Flow Rate <sup>(1)</sup>	: 8.95	Nm <sup>3</sup> /min
Temperature <sup>(1)</sup>	: 35.0	°C	Excess Oxygen <sup>(1)</sup>	: 20.60	%

PARAMETER	UNIT	RESULTS		EIA <sup>(2)</sup>	STANDARD	REFERENCE METHODS
		INLET	OUTLET			
Benzene	ppm	75.45	ND (<0.06)	-	-	US. EPA Method 18
	mg/Ncu.m.	241	ND (<0.2)	-	-	
	mg/l	0.24	ND (<0.0002)	0.21	-	
	g/s	-	<0.00003	0.017	-	

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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2. This report shall not be reproduced, except in full, without official approval.

3. <sup>(1)</sup> The data from VRU Outlet.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. ND (Non-Detectable) means the lowest value that can be detected by the analyzer.



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## STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REF. NO.	: 225003-STK-2505-0166
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE/TIME	: 22/05/2025 / 09.30-10.30 a.m.
RECEIVED DATE	: 23/05/2025	ANALYTICAL DATE	: 26/05/2025
REPORT DATE	: 05/06/2025	SAMPLE CONDITION	: Normal
STACK LOCATION	: VRU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Process	FUEL TYPE	: -
STACK DESCRIPTION			

Height	: 10.0	m.	Velocity <sup>(1)</sup>	: 3.29	m/s
Diameter	: 0.25	m.	Flow Rate <sup>(1)</sup>	: 8.95	Nm <sup>3</sup> /min
Temperature <sup>(1)</sup>	: 35.0	°C	Excess Oxygen <sup>(1)</sup>	: 20.60	%

PARAMETER	UNIT	RESULTS		EIA <sup>(2)</sup>	STANDARD <sup>(3)</sup>	REFERENCE METHODS
		INLET	OUTLET			
TVOCs	ppm	22,542	298	-	-	US. EPA Method 25A
	mg/Ncu.m.	40,566	536	-	-	
	mg/l	40.57	0.54	15	17	
	g/s	-	0.080	1.212	-	

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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3. <sup>(1)</sup> The data from VRU Outlet.

4. <sup>(2)</sup> Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. <sup>(3)</sup> Notification of the Ministry of Natural Resources and Environment B.E.2553 (2010).

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0006/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/01/2025	SAMPLING TIME	: 14:07
RECEIVED DATE	: 03/01/2025	ANALYTICAL DATE	: 03-08/01/2025
REPORT DATE	: 09/01/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_January

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	28.6	≤ 40
pH	-	4500-H <sup>+</sup> B	< 0.10	7.82	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,714	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	< 2.5	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.11	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA,APHA, WEF)



(Miss Khemchuda Insorn)

Analyst

REG. NO. ว-239-ก-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ก-0004

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  3. <sup>1/</sup> Notification of the Ministry of Industry, B.E.2560 (2017).
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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0201/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/02/2025	SAMPLING TIME	: 09:51
RECEIVED DATE	: 07/02/2025	ANALYTICAL DATE	: 07-17/02025
REPORT DATE	: 17/02/2025	SITE OPERATOR	: Miss Salisa Ainree
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_February

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	30.4	≤ 40
pH	-	4500-H <sup>+</sup> B	< 0.10	7.18	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,546	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	2.7	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.18	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.2	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ว-239-ค-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ค-0004

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0411/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/03/2025	SAMPLING TIME	: 09:12
RECEIVED DATE	: 07/03/2025	ANALYTICAL DATE	: 07-14/03/2025
REPORT DATE	: 14/03/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	32.7	≤ 40
pH	-	4500-H <sup>+</sup> B	< 0.10	8.56	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,610	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	26	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.21	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l*	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-ค-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ๖-239-ค-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0611/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 03/04/2025	SAMPLING TIME	: 09:15
RECEIVED DATE	: 04/04/2025	ANALYTICAL DATE	: 04-11/04/2025
REPORT DATE	: 11/04/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_April

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	31.2	≤ 40
pH		4500-H <sup>+</sup> B	< 0.10	7.31	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,384	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	9.2	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.09	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.5	≤ 20
COD	mg/l	5220 D	< 40.00	53.26	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst

REG. NO. ว-239-ก-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ก-0004

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0816/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/05/2025	SAMPLING TIME	: 09:08
RECEIVED DATE	: 09/05/2025	ANALYTICAL DATE	: 09-19/05/2025
REPORT DATE	: 20/05/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_May

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	32.8	≤ 40
pH		4500-H <sup>+</sup> B	< 0.10	7.13	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,184	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	3.2	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.21	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.2	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.006	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst

REG. NO. ว-239-ค-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ค-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1023/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 05/06/2025	SAMPLING TIME	: 08:53
RECEIVED DATE	: 06/06/2025	ANALYTICAL DATE	: 06-13/06/2025
REPORT DATE	: 16/06/2025	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_June

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD <sup>1/</sup>
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	31.2	≤ 40
pH	-	4500-H <sup>+</sup> B	< 0.10	8.82	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	890	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	3.6	≤ 50
Ammonia Nitrogen*	mg/l	Method 350.2	< 0.02	0.93	-
Sulfide	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.002	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ว-239-ค-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ค-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0005/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/01/2025	SAMPLING TIME	: 11:11, 10:36
RECEIVED DATE	: 03/01/2025	ANALYTICAL DATE	: 03-08/01/2025
REPORT DATE	: 09/01/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_January
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	29.7	29.2	-
pH	-	4500-H <sup>+</sup> B	< 0.10	8.24	8.15	-
Total Dissolved Solids	mg/l	2540 C	< 25	4,032	4,024	-
Suspended Solids	mg/l	2540 D	< 2.5	6	7	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	3.6	2.9	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.7	1.7	-
COD	mg/l	5220 D	< 40.00	40.53	<40.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



( Mrs. Araya Tipparuk )

Technical Management Team

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0200/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/02/2025	SAMPLING TIME	: 12:12 - 12:31
RECEIVED DATE	: 07/02/2025	ANALYTICAL DATE	: 07-17/02/2025
REPORT DATE	: 18/02/2025	SITE OPERATOR	: Miss Salisa Ainree
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_February
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	32.3	31.6	-
pH	-	4500-H <sup>+</sup> B	< 0.10	8.21	8.33	-
Total Dissolved Solids	mg/l	2540 C	< 25	5,580	3,784	-
Suspended Solids	mg/l	2540 D	< 2.5	20	16	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	2.3	1.7	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	2.5	2.2	-
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.009	0.008	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



( Mrs. Araya Tipparuk )

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0412/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/03/2025	SAMPLING TIME	: 10:18, 11:04
RECEIVED DATE	: 07/03/2025	ANALYTICAL DATE	: 07-14/03/2025
REPORT DATE	: 14/03/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_March
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	32.9	33.4	-
pH	-	4500-H <sup>+</sup> B	< 0.10	8.67	8.68	-
Total Dissolved Solids	mg/l	2540 C	< 25	6,312	5,404	-
Suspended Solids	mg/l	2540 D	< 2.5	89	29	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	2.5	1.8	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	2.6	1.5	-
COD	mg/l	5220 D	< 40.00	43.43	< 40.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.004	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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  5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0612/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 03/04/2025	SAMPLING TIME	: 10:52, 10:32
RECEIVED DATE	: 04/04/2025	ANALYTICAL DATE	: 04-11/04/2025
REPORT DATE	: 11/04/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_April
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	32.8	32.5	-
pH	-	4500-H <sup>+</sup> B	< 0.10	8.58	8.24	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,512	2,680	-
Suspended Solids	mg/l	2540 D	< 2.5	76	34	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	3.8	3.6	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	3.3	2.5	-
COD	mg/l	5220 D	< 40.00	52.17	50.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.007	0.004	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



( Mrs. Araya Tipparuk )

Technical Management Team

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0817/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/05/2025	SAMPLING TIME	: 10:32 - 11:42
RECEIVED DATE	: 09/05/2025	ANALYTICAL DATE	: 09-19/05/2025
REPORT DATE	: 20/05/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_May
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	33.2	32.8	-
pH	-	4500-H <sup>+</sup> B	< 0.10	7.73	8.10	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,372	1,980	-
Suspended Solids	mg/l	2540 D	< 2.5	54	28	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	2.1	1.3	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	3.4	3.2	-
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.010	0.006	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

( Mrs. Araya Tipparuk )

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1024/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 05/06/2025	SAMPLING TIME	: 10:23 - 11:43
RECEIVED DATE	: 06/06/2025	ANALYTICAL DATE	: 06-13/06/2025
REPORT DATE	: 16/06/2025	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_June
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				1	2	
Temperature	°C	2550 B	< 0.5	33.2	32.2	-
pH		4500-H <sup>+</sup> B	< 0.10	8.47	8.07	-
Total Dissolved Solids	mg/l	2540 C	< 25	2,916	2,412	-
Suspended Solids	mg/l	2540 D	< 2.5	25	20	-
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C	< 0.02	1.9	1.7	-
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	-
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.5	1.9	-
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.010	0.002	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

*Khernchuda Insorn*

(Miss Khernchuda Insorn)

Analyst

*Araya Tipparuk*

( Mrs. Araya Tipparuk )

Technical Management Team

- Remark :**
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  3. <sup>1/</sup> Notification of the National Environment Board No.8 B.E.2537 (1994) for Surface Water Class 5.
  4. n<sup>1</sup> means naturally but changing by no more than 3°C.
  5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0006/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/01/2025	SAMPLING TIME	: 09.12-09:52
RECEIVED DATE	: 03/01/2025	ANALYTICAL DATE	: 03-08/01/2025
REPORT DATE	: 09/01/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_January
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	32.0	33.1	33.3	31.7
pH	-	4500-H <sup>+</sup> B	< 0.10	7.05	7.08	9.54	7.34
Total Dissolved Solids	mg/l	2540 C	< 25	1,188	1,224	1,636	1,664
Suspended Solids	mg/l	2540 D	< 2.5	26	10	31	7
Fat Oil & Grease	mg/l	5520 B	< 2.0	7.5	ND	7.8	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.90	0.89	2.7	ND*
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	0.78	7.94	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	30	12.9	52.8	< 1.0
COD	mg/l	5220 D	< 40.00	217	297	360	<40.00
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	4.1	4.1	5.3	0.10
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	ND	ND	ND
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0045	ND	0.0021	0.0006

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US.EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.

( Miss Khemchuda Insorn )

Analyst

REG. NO. ๖-239-๓-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ๖-239-๓-0004

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## WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0201/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/02/2025	SAMPLING TIME	: 10.12-10:36
RECEIVED DATE	: 07/02/2025	ANALYTICAL DATE	: 07-21/02/2025
REPORT DATE	: 21/02/2025	SITE OPERATOR	: Miss Salisa Ainree
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_February
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	31.0	29.9	31.7	31.6
pH	-	4500-H <sup>+</sup> B	< 0.10	7.66	7.69	8.86	6.75
Total Dissolved Solids	mg/l	2540 C	< 25	1,558	292	1,376	1,402
Suspended Solids	mg/l	2540 D	< 2.5	17	< 2.5	23	< 2.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	5.0	ND	2.3	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.60	ND*	0.96	ND*
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	ND	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	24	1.6	23.3	< 1.0
COD	mg/l	5220 D	< 40.00	300	143	260	40.51
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	3.1	0.18	3.0	0.10
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.001	ND	0.002	ND
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0018	0.0017	ND	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED, 2017 (AWWA, APHA, WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.



( Miss Khemchuda Insorn )

Analyst

REG. NO. ว-239-ท-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ท-0004

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## WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0411/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/03/2025	SAMPLING TIME	: 09:23-09:49
RECEIVED DATE	: 07/03/2025	ANALYTICAL DATE	: 07-14/03/2025
REPORT DATE	: 14/03/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_March
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	35.9	34.1	35.9	33.4
pH		4500-H <sup>+</sup> B	< 0.10	7.40	7.47	10.57	7.62
Total Dissolved Solids	mg/l	2540 C	< 25	1,082	302	1,404	1,534
Suspended Solids	mg/l	2540 D	< 2.5	17	35	41	5.2
Fat Oil & Grease	mg/l	5520 B	< 2.0	32.7	ND	6.3	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.71	ND	0.89	ND
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	1.2	ND	6.5	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	44.5	2.8	64.2	< 1.0
COD	mg/l	5220 D	< 40.00	268	< 40.00	230	< 40.00
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	3.5	0.18	7.8	0.13
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	ND	ND	ND	ND
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0054	ND	ND	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

REFERENCE : USEPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.

( Miss Khemchuda Insorn )

Analyst

REG. NO. ๖-239-ก-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ๖-239-ก-0004

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## WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0611/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 03/04/2025	SAMPLING TIME	: 09:26-10:20
RECEIVED DATE	: 04/04/2025	ANALYTICAL DATE	: 04-10/04/2025
REPORT DATE	: 11/04/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_April
SAMPLE DESCRIPTION	: 1 = API Separator Effluent 2 = IAF Unit Effluent	3 = Equalization Tank Effluent 4 = Biological Treatment Effluent	

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	38.9	38.5	34.2	33.6
pH	-	4500-H <sup>+</sup> B	< 0.10	6.89	7.08	10.16	7.40
Total Dissolved Solids	mg/l	2540 C	< 25	1,204	284	1,510	1,716
Suspended Solids	mg/l	2540 D	< 2.5	26	< 2.5	26	3.2
Fat Oil & Grease	mg/l	5520 B	< 2.0	16.3	ND	2.7	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	ND	ND	0.97	ND
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	0.52	ND	6.7	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	54.1	20.2	73.9	< 1.0
COD	mg/l	5220 D	< 40.00	259	103	314	52.17
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	0.08	3.4	6.6	0.11
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.003	ND	0.004	0.002
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0059	ND	0.0023	0.0007

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA APHA WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.



( Miss Khemchuda Insorn )

Analyst

REG. NO. ว-239-ท-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ท-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0816/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/05/2025	SAMPLING TIME	: 09:24-09:46
RECEIVED DATE	: 09/05/2025	ANALYTICAL DATE	: 09-19/05/2025
REPORT DATE	: 20/05/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_May
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	34.5	33.9	34.1	33.0
pH	-	4500-H <sup>+</sup> B	< 0.10	7.74	7.58	9.99	7.45
Total Dissolved Solids	mg/l	2540 C	< 25	1,152	1,198	1,376	1,402
Suspended Solids	mg/l	2540 D	< 2.5	34	38	16	< 2.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	5.5	ND	ND	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.37	0.36	2.3	ND*
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	ND	ND	5.8	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	29.7	24.4	60.1	< 1.0
COD	mg/l	5220 D	< 40.00	233	108	240	< 40.00
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	4.3	4.4	4.8	0.10*
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.004	0.004	0.006	0.005
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0029	ND	ND	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US.EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.

( Miss Khemchuda Insorn )

Analyst

REG. NO. ว-239-ค-0005

( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ค-0004

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1023/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 05/06/2025	SAMPLING TIME	: 09:10-09:48
RECEIVED DATE	: 06/06/2025	ANALYTICAL DATE	: 06-13/06/2025
REPORT DATE	: 16/06/2025	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_WW_June
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	33.8	34.7	33.6	33.7
pH	-	4500-H <sup>+</sup> B	< 0.10	6.95	7.11	10.49	7.66
Total Dissolved Solids	mg/l	2540 C	< 25	452	504	1,014	922
Suspended Solids	mg/l	2540 D	< 2.5	37	6.8	6.5	4.0
Fat Oil & Grease	mg/l	5520 B	< 2.0	7.5	ND	2.4	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.97	0.84	1.7	ND*
Sulfide as H <sub>2</sub> S	mg/l	4500-S <sup>2-</sup> F	< 0.20	1.8	1.4	7.6	ND
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	50.7	17.1	68.6	< 1.0
COD	mg/l	5220 D	< 40.00	210	103	205	< 40.00
Ammonia Nitrogen	mg/l	4500-NH <sub>3</sub> B,C/Method 350.2*	< 0.02	8.3	8.5	9.4	0.07*
Chromium Trivalent (Cr <sup>3+</sup> )	mg/l	3113 B/Calculation	< 0.001	0.002	ND	ND	ND
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0044	ND	0.0014	0.0008

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

REFERENCE : U.S.EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2.



( Miss Khemchuda Insorn )

Analyst

REG. NO. ว-239-ก-0005



( Mrs. Araya Tipparuk )

Technical Management Team

REG. NO. ว-239-ก-0004

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### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0791/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 05/05/2025	SAMPLING TIME	: 10:40
RECEIVED DATE	: 06/05/2025	ANALYTICAL DATE	: 06-14/05/2025
REPORT DATE	: 16/05/2025	SITE OPERATOR	: Mr.Chanapon Oakkharaplon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD <sup>1/</sup>
				Ko Saket	
Depth	m.	Measurement	-	2.0	-
Temperature	°C	2550 B	< 0.5	32.0	$\Delta \leq 2$
pH	-	4500-H <sup>+</sup> B	< 0.10	8.02	7.0-8.5
Transparency	m.	Secchi Disc	-	1.0	$\Delta \leq 10 \%$
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	3.4	<sup>2/</sup>
Ammonia Nitrogen	µg/l	4500-NH <sub>3</sub> F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	$\leq 0.03$
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.19	$\geq 4$
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	34.0	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	$\leq 5$
TOC	mg/l	5310 B	< 0.01	2.09	-
Chromium Trivalent (Cr <sup>3+</sup> )	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr <sup>6+</sup> )	µg/l	3113 B	< 1.00	ND	$\leq 50$
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	$\leq 0.1$

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED, 2017 (AWWA, APHA, WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC), 1981



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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3. <sup>1/</sup> Notification of the National Environmental Board B.E.2564 (2021) (Class 5).

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<sup>2/</sup> The results should not be changed by more than the sum of daily average and the standard deviation.

Daily average was calculated from hourly measurement or at least 5 samples taken at equal time interval within one day.

4. \*TOC analysis was performed by The Office of Public Health and Environmental Technology Services, Faculty of Public Health, Mahidol University.

5. - Not available .



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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

### WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0791/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 05/05/2025	SAMPLING TIME	: 10:55
RECEIVED DATE	: 06/05/2025	ANALYTICAL DATE	: 06-14/05/2025
REPORT DATE	: 16/05/2025	SITE OPERATOR	: Mr.Chanapon Oakkharaplon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD <sup>1/</sup>
				Had Sai Thong Beach	
Depth	m.	Measurement	-	2.6	-
Temperature	°C	2550 B	< 0.5	31.9	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	1.5	$\Delta \leq 10 \%$
pH	-	4500-H <sup>+</sup> B	< 0.10	8.40	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	10	<sup>2/</sup>
Ammonia Nitrogen	µg/l	4500-NH <sub>3</sub> F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	$\leq 0.03$
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.18	$\geq 4$
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	2.3	-
Salinity	ppt	2520 B	< 0.10	28.1	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	0.11	$\leq 5$
TOC <sup>+</sup>	mg/l	5310 B	< 0.01	4.80	-
Chromium Trivalent (Cr <sup>3+</sup> )	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr <sup>6+</sup> )	µg/l	3113 B	< 1.00	ND	$\leq 50$
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	$\leq 0.1$

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC), 1981

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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## WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	0791/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 05/05/2025	SAMPLING TIME	: 10:45
RECEIVED DATE	: 06/05/2025	ANALYTICAL DATE	: 06-14/05/2025
REPORT DATE	: 16/05/2025	SITE OPERATOR	: Mr.Chanapon Oakkharaplon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD <sup>1/</sup>
				Wastewater Discharge Point of Refinery (IEAT)	
Depth	m.	Measurement	-	1.7	-
Temperature	°C	2550 B	< 0.5	32.2	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	0.6	$\Delta \leq 10 \%$
pH	-	4500-H <sup>+</sup> B	< 0.10	8.36	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	14	<sup>2/</sup>
Ammonia Nitrogen	µg/l	4500-NH <sub>3</sub> F	< 10.0	32.1	-
Phenols	mg/l	5530 B-C	< 0.001	ND	$\leq 0.03$
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.54	$\geq 4$
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	2.4	-
Salinity	ppt	2520 B	< 0.10	32.7	$\Delta \leq 10 \%$
Chromium Trivalent (Cr <sup>3+</sup> )	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr <sup>6+</sup> )	µg/l	3113 B	< 1.00	ND	$\leq 50$
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	$\leq 0.1$

REFERENCE - STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

REFERENCE - Intergovernmental Oceanographic Commission of UNESCO (IOC), 1981

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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Daily average was calculated from hourly measurement or at least 5 samples taken at equal time interval within one day.

4. - Not available .



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## WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0791/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 05/05/2025	SAMPLING TIME	: 10:24
RECEIVED DATE	: 06/05/2025	ANALYTICAL DATE	: 06-14/05/2025
REPORT DATE	: 16/05/2025	SITE OPERATOR	: Mr.Chanapon Oakkharaplon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD <sup>1/</sup>
				Open Coastal Water	
Depth	m.	Measurement	-	2.5	-
Temperature	°C	2550 B	< 0.5	32.0	$\Delta \leq 2$
Transparency	m.	Secchi Disc	< 0.10	1.6	$\Delta \leq 10 \%$
pH	-	4500-H <sup>+</sup> B	-	8.16	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	3.0	<sup>2/</sup>
Ammonia Nitrogen	µg/l	4500-NH <sub>3</sub> F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	$\leq 0.03$
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.02	$\geq 4$
BOD <sub>5</sub>	mg/l	5210 B	< 1.0	1.4	-
Salinity	ppt	2520 B	< 0.10	35.5	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	0.33	$\leq 5$
TOC <sup>+</sup>	mg/l	5310 B	< 0.01	2.39	-
Chromium Trivalent (Cr <sup>3+</sup> )	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr <sup>6+</sup> )	µg/l	3113 B	< 1.00	ND	$\leq 50$
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	$\leq 0.1$

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED, 2017 (AWWA, APHA, WEF)

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(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

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5. - Not available .

## ใบรับรองผลการตรวจวัดระดับเสียง



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Main Office Complex

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302737

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 92.7/1.0

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	57.2	57.0	56.3	58.2	58.7	57.2	55.7
12:00 - 13:00	58.7	58.3	58.1	59.3	57.8	58.6	58.3
13:00 - 14:00	58.6	58.4	60.7	66.3	72.1	57.7	58.3
14:00 - 15:00	55.8	56.2	56.0	58.3	55.4	54.3	54.3
15:00 - 16:00	56.2	64.4	57.9	57.3	59.8	56.1	56.9
16:00 - 17:00	57.0	58.0	58.7	58.6	58.4	59.5	58.3
17:00 - 18:00	56.8	57.6	57.2	57.6	57.5	58.9	57.9
18:00 - 19:00	58.7	57.7	58.2	58.7	58.2	59.6	59.1
19:00 - 20:00	56.7	56.8	56.4	57.1	56.4	57.5	58.1
20:00 - 21:00	53.3	52.8	52.2	54.0	54.1	54.6	55.2
21:00 - 22:00	50.8	51.7	49.0	51.0	52.7	51.9	52.3
22:00 - 23:00	50.6	51.0	50.2	51.4	50.0	51.8	53.2
23:00 - 00:00	51.3	48.5	50.0	50.7	49.4	51.0	52.6
00:00 - 01:00	53.7	51.1	50.7	49.3	49.6	52.1	52.6
01:00 - 02:00	51.0	48.7	52.1	49.4	49.1	52.6	52.4
02:00 - 03:00	49.9	48.5	50.4	49.9	48.8	52.1	53.1
03:00 - 04:00	47.4	48.2	48.4	50.1	49.0	48.1	52.4
04:00 - 05:00	48.1	48.9	49.7	51.0	50.9	49.0	51.5
05:00 - 06:00	52.5	53.1	53.5	53.8	55.6	54.8	53.4
06:00 - 07:00	57.0	59.0	58.8	61.9	59.6	59.9	62.0
07:00 - 08:00	57.9	60.3	60.0	61.9	60.0	60.0	64.3
08:00 - 09:00	57.1	61.4	63.5	57.6	72.4	58.9	58.4
09:00 - 10:00	57.7	57.1	70.0	57.3	62.9	60.8	58.7
10:00 - 11:00	58.7	56.5	62.6	79.1	59.8	57.9	57.5
Leq(24)*	55.9	57.2	59.8	66.0	62.7	57.0	57.5
Ldn	59.8	60.5	62.0	67.0	64.1	61.2	62.3
Lmax **	81.9	97.1	82.6	99.2	91.8	84.2	84.4
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 11:00-11:00

\*\* Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Main Office Complex

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302737

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024


SLM Reading / Adjust dB(A) : 92.7/1.0


Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	55.8	55.7	51.6	56.6	53.3	53.5	52.5
12:00 - 13:00	57.3	56.7	55.8	57.9	55.5	55.7	55.8
13:00 - 14:00	56.6	57.1	57.5	59.5	55.6	55.5	56.1
14:00 - 15:00	51.7	54.5	54.1	54.9	48.0	50.6	51.6
15:00 - 16:00	54.5	55.6	56.1	55.5	54.4	54.4	55.0
16:00 - 17:00	55.0	55.6	56.3	55.7	54.7	55.4	55.6
17:00 - 18:00	54.8	55.4	55.2	55.3	54.4	56.0	55.8
18:00 - 19:00	55.6	55.4	54.8	55.6	54.7	56.2	56.2
19:00 - 20:00	54.2	55.1	53.8	55.2	54.0	55.4	55.8
20:00 - 21:00	48.2	49.2	45.3	49.3	48.0	50.0	50.9
21:00 - 22:00	47.1	49.7	44.3	49.0	48.4	50.2	50.4
22:00 - 23:00	47.2	47.3	46.2	48.7	47.5	49.9	51.0
23:00 - 00:00	48.5	46.3	48.0	48.9	48.0	49.3	50.9
00:00 - 01:00	50.3	48.5	48.5	48.2	47.8	50.7	51.0
01:00 - 02:00	49.8	47.8	47.2	48.4	47.9	51.1	50.8
02:00 - 03:00	48.5	47.6	47.2	48.7	47.1	50.6	51.9
03:00 - 04:00	45.6	46.6	47.1	48.8	47.2	46.8	51.1
04:00 - 05:00	46.6	46.6	47.7	49.4	48.3	45.9	48.6
05:00 - 06:00	46.8	49.6	48.6	50.2	49.1	49.2	49.3
06:00 - 07:00	49.8	53.0	53.3	54.3	53.0	54.0	53.0
07:00 - 08:00	54.1	55.6	56.0	56.4	55.9	55.9	57.3
08:00 - 09:00	55.7	55.1	57.2	54.6	55.7	55.1	55.2
09:00 - 10:00	56.2	55.2	58.2	54.9	58.4	55.3	55.0
10:00 - 11:00	57.3	54.4	58.1	55.7	57.3	56.3	56.0
L90(avg)*	53.5	53.6	54.0	54.3	53.4	53.6	53.9

Remark : \* Average time between 11:00-11:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Preeda Somjai)  
 Technical Management Team





## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Central Control Building

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302330

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.2/0.5

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	64.5	63.7	63.7	63.9	64.1	65.8	64.2
16:00 - 17:00	64.3	63.9	63.8	63.8	63.9	64.2	63.8
17:00 - 18:00	64.1	64.2	64.1	63.9	63.7	64.1	63.8
18:00 - 19:00	64.3	64.2	64.0	63.9	63.9	64.2	63.9
19:00 - 20:00	64.3	64.3	63.9	63.8	63.9	64.0	63.9
20:00 - 21:00	64.5	64.2	64.0	63.8	63.9	64.0	64.0
21:00 - 22:00	64.4	64.5	64.0	63.8	64.1	64.0	63.9
22:00 - 23:00	64.5	64.2	64.2	63.9	64.1	63.9	64.1
23:00 - 00:00	64.7	64.1	64.4	64.0	64.3	64.2	64.2
00:00 - 01:00	64.4	64.3	64.4	64.0	64.6	64.2	64.1
01:00 - 02:00	64.4	64.1	64.2	64.1	64.3	64.3	64.1
02:00 - 03:00	64.4	64.1	64.2	63.9	64.7	64.1	64.2
03:00 - 04:00	64.3	64.0	64.3	63.8	65.3	63.9	63.9
04:00 - 05:00	64.2	64.1	64.3	63.9	64.6	64.0	64.0
05:00 - 06:00	64.4	64.2	64.4	64.0	64.4	64.0	64.1
06:00 - 07:00	64.5	64.2	64.4	65.4	64.7	64.1	64.6
07:00 - 08:00	64.3	64.1	65.4	66.7	65.8	66.6	67.4
08:00 - 09:00	63.5	65.8	65.2	65.5	66.2	63.8	64.6
09:00 - 10:00	63.8	64.9	65.8	65.2	67.7	63.9	65.0
10:00 - 11:00	63.7	64.6	65.7	64.5	70.4	63.9	64.5
11:00 - 12:00	63.9	64.3	65.6	64.9	64.6	64.0	64.2
12:00 - 13:00	63.9	64.0	65.3	64.4	65.5	64.0	64.3
13:00 - 14:00	63.6	63.8	65.7	67.1	65.3	64.3	65.6
14:00 - 15:00	63.5	63.5	64.1	63.7	65.5	64.3	64.4
Leq(24)*	64.2	64.2	64.6	64.5	65.3	64.3	64.4
Ldn	70.8	70.6	70.8	70.6	71.2	70.5	70.6
Lmax **	83.6	97.8	79.6	91.6	88.5	91.3	92.0
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 15:00-15:00

\*\* Maximum Sound Pressure Level between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Central Control Building

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302330

Site Operator : Mr. Siwanon Kulawong -

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.2/0.5

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	64.1	63.2	63.2	63.4	63.5	64.1	63.6
16:00 - 17:00	63.9	63.4	63.2	63.3	63.6	63.8	63.3
17:00 - 18:00	63.8	63.8	63.7	63.5	63.4	63.7	63.4
18:00 - 19:00	64.0	63.8	63.6	63.6	63.5	63.8	63.5
19:00 - 20:00	63.9	63.9	63.7	63.5	63.6	63.7	63.5
20:00 - 21:00	64.0	63.9	63.7	63.5	63.6	63.7	63.5
21:00 - 22:00	64.1	64.1	63.8	63.5	63.8	63.7	63.5
22:00 - 23:00	64.2	63.8	63.9	63.6	63.8	63.6	63.6
23:00 - 00:00	64.3	63.7	64.0	63.6	64.0	63.7	63.8
00:00 - 01:00	64.1	64.0	64.1	63.6	64.3	63.8	63.8
01:00 - 02:00	64.1	63.8	63.9	63.8	64.1	63.9	63.7
02:00 - 03:00	64.0	63.8	63.9	63.6	64.2	63.8	63.9
03:00 - 04:00	64.0	63.7	63.9	63.5	64.5	63.6	63.5
04:00 - 05:00	63.8	63.8	63.9	63.5	64.2	63.8	63.7
05:00 - 06:00	64.0	63.9	64.0	63.5	64.0	63.7	63.8
06:00 - 07:00	64.1	63.8	63.9	63.7	64.2	63.7	64.0
07:00 - 08:00	63.9	63.7	64.7	64.2	64.2	63.4	64.4
08:00 - 09:00	63.1	63.8	64.4	64.1	64.6	63.3	64.3
09:00 - 10:00	63.4	64.2	64.7	64.1	65.2	63.5	64.4
10:00 - 11:00	63.3	64.2	64.9	64.0	64.6	63.4	64.0
11:00 - 12:00	63.4	63.9	64.8	64.3	64.1	63.6	63.8
12:00 - 13:00	63.4	63.6	64.6	64.0	64.8	63.6	63.9
13:00 - 14:00	63.1	63.3	64.7	63.6	64.9	63.8	64.1
14:00 - 15:00	63.0	62.9	63.4	63.3	65.0	63.8	63.9
L90(avg)*	63.8	63.8	64.1	63.7	64.2	63.7	63.8

Remark : \* Average time between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 1

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G300832

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	59.2	55.4	60.8	59.6	59.6	59.9	58.6
12:00 - 13:00	58.2	54.8	59.0	58.6	59.4	59.7	59.2
13:00 - 14:00	57.7	56.4	61.4	59.5	58.8	59.7	59.0
14:00 - 15:00	58.3	55.2	56.2	56.1	56.8	57.3	58.0
15:00 - 16:00	56.5	57.1	58.2	56.5	60.4	57.3	58.6
16:00 - 17:00	60.6	60.8	61.9	63.1	64.1	65.0	62.1
17:00 - 18:00	60.0	59.2	59.8	61.0	60.6	62.0	60.5
18:00 - 19:00	62.9	60.1	63.1	63.2	62.3	62.7	62.9
19:00 - 20:00	58.8	57.6	59.9	59.6	59.0	60.4	60.4
20:00 - 21:00	58.4	56.3	58.9	58.5	59.4	59.1	59.2
21:00 - 22:00	52.2	52.3	54.7	53.6	56.0	54.4	53.5
22:00 - 23:00	52.8	51.3	55.1	54.6	52.7	54.5	56.8
23:00 - 00:00	50.6	48.6	50.2	51.7	50.1	52.6	52.6
00:00 - 01:00	56.0	52.3	53.7	49.6	50.6	52.7	53.0
01:00 - 02:00	51.8	48.5	56.1	49.4	48.6	51.9	52.1
02:00 - 03:00	50.5	47.7	54.2	50.3	49.3	51.9	52.4
03:00 - 04:00	50.2	47.9	47.6	51.2	48.8	48.2	52.2
04:00 - 05:00	50.8	50.3	50.5	52.6	53.3	51.3	51.3
05:00 - 06:00	56.6	56.5	57.8	56.8	56.4	58.9	57.0
06:00 - 07:00	63.0	64.8	65.2	65.5	65.9	65.2	65.0
07:00 - 08:00	60.9	65.1	65.3	66.3	64.9	64.7	66.2
08:00 - 09:00	56.7	61.9	62.3	61.3	58.5	66.7	62.0
09:00 - 10:00	54.2	58.6	63.5	59.6	61.0	76.2	63.6
10:00 - 11:00	57.5	58.5	59.1	59.2	60.7	70.5	58.2
Leq(24)*	58.0	58.4	60.1	59.8	59.8	65.1	60.1
Ldn	63.0	63.5	64.9	64.6	64.6	67.2	64.7
Lmax **	90.1	92.5	91.7	88.5	93.7	101.1	95.8
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 11:00-11:00

\*\* Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 1

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G300832

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
11:00 - 12:00	47.9	48.2	49.3	51.3	51.1	51.1	48.1
12:00 - 13:00	48.6	48.6	47.4	51.2	51.8	52.0	48.6
13:00 - 14:00	49.8	48.3	51.2	52.4	48.7	51.5	49.7
14:00 - 15:00	49.7	47.7	49.0	49.3	44.5	49.1	49.9
15:00 - 16:00	49.6	49.4	48.7	49.4	47.1	48.0	50.3
16:00 - 17:00	50.3	51.1	51.1	50.0	48.6	51.1	50.8
17:00 - 18:00	50.3	50.6	51.9	51.1	51.0	52.7	53.1
18:00 - 19:00	51.6	50.2	50.6	51.7	49.3	52.7	53.0
19:00 - 20:00	47.5	49.6	45.5	51.1	47.3	51.4	52.5
20:00 - 21:00	46.6	49.1	44.1	49.8	48.7	53.3	51.8
21:00 - 22:00	45.8	49.0	42.9	49.0	46.9	51.2	50.4
22:00 - 23:00	45.3	45.2	45.0	48.3	46.6	50.1	50.7
23:00 - 00:00	46.8	44.0	47.0	48.8	47.2	50.1	50.8
00:00 - 01:00	48.6	47.8	47.5	47.8	47.2	50.8	50.4
01:00 - 02:00	48.5	46.3	45.6	48.0	46.8	50.8	50.4
02:00 - 03:00	46.0	46.1	45.3	48.3	46.9	50.4	51.2
03:00 - 04:00	45.7	46.2	45.0	48.3	46.8	46.4	50.9
04:00 - 05:00	49.4	45.9	45.8	48.8	47.2	46.0	46.8
05:00 - 06:00	45.0	48.0	46.8	49.8	47.1	47.4	47.7
06:00 - 07:00	49.1	53.5	54.0	55.7	54.0	54.8	55.3
07:00 - 08:00	46.0	54.2	51.8	56.0	53.3	53.8	54.8
08:00 - 09:00	45.6	51.4	50.4	50.5	48.5	49.8	50.0
09:00 - 10:00	46.4	51.1	51.1	50.2	50.0	48.3	48.6
10:00 - 11:00	46.6	49.6	51.7	49.8	51.7	48.7	48.9
L90(avg)*	48.2	49.5	49.2	50.9	49.4	51.0	51.1

Remark : \* Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 2

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G301065

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	54.8	52.7	56.6	53.5	53.6	57.4	58.0
11:00 - 12:00	53.9	52.6	56.2	53.7	54.8	55.0	58.8
12:00 - 13:00	55.1	52.9	55.3	53.2	54.6	56.8	59.0
13:00 - 14:00	56.7	53.0	58.0	54.6	53.6	56.6	58.2
14:00 - 15:00	55.3	53.3	59.5	53.0	55.2	54.6	57.9
15:00 - 16:00	55.5	53.0	57.1	53.2	58.5	56.0	58.1
16:00 - 17:00	56.0	54.6	60.0	53.6	56.7	59.9	58.0
17:00 - 18:00	56.2	53.5	55.1	54.8	54.6	58.8	57.6
18:00 - 19:00	56.7	55.5	54.8	54.8	54.2	57.9	58.6
19:00 - 20:00	52.7	52.6	51.2	51.6	52.6	55.7	57.9
20:00 - 21:00	52.0	52.5	50.1	51.1	51.2	55.8	58.2
21:00 - 22:00	51.9	54.3	50.4	50.9	52.0	55.9	58.6
22:00 - 23:00	52.2	51.9	50.5	54.1	52.0	56.6	58.0
23:00 - 00:00	52.5	52.0	51.4	51.7	52.4	56.8	58.3
00:00 - 01:00	53.5	52.8	51.4	50.5	52.9	56.5	57.0
01:00 - 02:00	53.3	53.6	50.8	50.6	52.2	57.1	57.0
02:00 - 03:00	51.8	53.6	49.8	50.9	50.6	56.1	58.2
03:00 - 04:00	50.5	55.6	49.9	50.5	50.7	55.9	56.6
04:00 - 05:00	50.9	52.5	49.6	51.2	51.7	56.0	56.4
05:00 - 06:00	53.4	55.0	53.0	54.0	53.8	57.5	56.0
06:00 - 07:00	51.8	56.2	54.0	59.1	55.1	58.8	61.9
07:00 - 08:00	53.2	55.8	53.4	59.2	54.4	57.5	62.7
08:00 - 09:00	53.4	60.1	52.8	56.7	53.9	56.8	61.3
09:00 - 10:00	54.0	56.6	53.0	55.7	65.3	56.9	55.7
Leq(24)*	54.0	54.5	54.7	54.2	55.8	57.0	58.6
Ldn	59.2	60.5	58.8	60.2	60.0	63.3	64.6
Lmax **	85.8	92.7	82.1	86.2	84.1	86.5	98.1
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 10:00-10:00

\*\* Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 2

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G301065

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	52.1	50.9	54.5	51.2	50.0	53.7	55.5
11:00 - 12:00	51.7	51.0	54.4	51.3	52.1	52.5	58.0
12:00 - 13:00	51.9	51.3	54.1	51.5	52.6	53.3	57.6
13:00 - 14:00	53.5	51.2	54.9	52.1	50.3	52.0	57.5
14:00 - 15:00	52.7	50.5	52.7	50.3	48.9	51.7	56.7
15:00 - 16:00	52.1	51.5	52.3	50.2	51.5	51.5	56.5
16:00 - 17:00	52.2	52.4	52.4	50.2	51.0	52.7	56.6
17:00 - 18:00	51.7	51.8	51.1	50.4	50.9	54.2	56.7
18:00 - 19:00	52.2	52.1	51.1	50.8	50.6	53.3	57.5
19:00 - 20:00	51.2	51.2	48.6	50.0	49.1	52.5	57.2
20:00 - 21:00	50.5	50.8	47.8	49.3	49.1	52.1	57.7
21:00 - 22:00	50.7	50.9	48.4	49.8	50.1	52.2	57.9
22:00 - 23:00	50.7	49.0	49.2	49.2	49.4	52.4	56.9
23:00 - 00:00	51.2	48.9	50.1	49.6	50.9	52.4	57.2
00:00 - 01:00	52.0	50.0	49.6	49.2	51.6	52.5	51.9
01:00 - 02:00	51.9	51.6	48.6	49.2	50.7	53.0	52.2
02:00 - 03:00	50.0	50.6	48.2	49.5	48.7	52.0	53.1
03:00 - 04:00	49.1	52.9	47.8	49.2	48.7	51.3	52.2
04:00 - 05:00	49.2	49.3	47.6	49.5	49.4	51.2	51.7
05:00 - 06:00	49.2	52.3	49.7	50.3	50.4	54.4	51.7
06:00 - 07:00	49.0	53.1	50.6	52.4	51.3	56.1	52.5
07:00 - 08:00	49.4	53.3	50.1	52.6	50.0	53.9	56.2
08:00 - 09:00	49.8	54.0	50.1	50.9	49.3	52.7	55.3
09:00 - 10:00	51.0	55.0	50.7	52.4	50.6	55.0	52.5
L90(avg)*	51.2	51.7	51.2	50.6	50.4	53.0	55.9

Remark : \* Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team





## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 3

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G301029

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.1/0.6

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	58.1	58.8	58.0	63.3	58.1	59.4	57.1
11:00 - 12:00	58.1	58.5	59.1	63.0	60.2	60.4	57.2
12:00 - 13:00	58.3	66.7	58.4	62.6	61.0	64.0	57.8
13:00 - 14:00	58.7	65.2	60.8	65.8	59.6	63.2	58.3
14:00 - 15:00	59.5	59.3	60.1	62.6	56.9	62.6	58.1
15:00 - 16:00	59.4	57.5	58.8	59.5	58.0	61.4	58.4
16:00 - 17:00	59.3	58.1	59.1	58.8	57.4	59.2	58.8
17:00 - 18:00	59.9	58.8	58.9	59.1	57.8	59.8	59.1
18:00 - 19:00	60.0	60.1	59.8	59.4	58.1	59.7	59.1
19:00 - 20:00	60.2	60.0	59.5	59.4	59.1	59.9	59.4
20:00 - 21:00	59.0	63.5	58.5	59.5	60.3	59.8	59.1
21:00 - 22:00	58.9	66.1	58.7	59.6	60.1	59.9	59.1
22:00 - 23:00	59.6	67.4	60.4	60.4	61.0	59.8	59.4
23:00 - 00:00	63.0	60.0	64.1	65.2	62.1	62.2	59.4
00:00 - 01:00	64.2	57.1	62.2	67.4	63.6	61.7	59.7
01:00 - 02:00	63.3	57.4	64.8	70.7	73.1	61.4	59.4
02:00 - 03:00	72.6	57.4	62.7	72.0	72.9	62.0	59.4
03:00 - 04:00	72.4	58.5	66.0	68.5	70.5	58.2	59.0
04:00 - 05:00	68.1	59.1	66.7	62.1	64.2	63.3	58.2
05:00 - 06:00	56.6	58.9	58.5	60.2	57.6	59.5	57.5
06:00 - 07:00	56.9	65.6	60.6	62.3	58.9	60.0	60.3
07:00 - 08:00	57.2	66.4	63.5	61.7	58.2	58.7	60.2
08:00 - 09:00	57.3	62.7	62.6	59.1	58.2	56.9	59.4
09:00 - 10:00	58.1	58.0	63.3	58.7	62.4	56.0	56.8
Leq(24)*	64.1	62.4	61.9	64.6	64.8	60.8	58.9
Ldn	73.3	68.4	69.7	73.3	74.1	67.5	65.5
Lmax **	84.0	77.5	85.8	86.8	82.2	82.0	85.5
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 10:00-10:00

\*\* Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 3

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G301029

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.1/0.6

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
10:00 - 11:00	55.7	56.1	56.3	60.1	55.1	57.4	54.3
11:00 - 12:00	56.0	56.8	57.1	60.1	58.1	57.4	54.6
12:00 - 13:00	56.3	59.0	56.4	59.8	58.5	60.5	55.5
13:00 - 14:00	56.9	58.2	57.4	61.3	56.3	59.2	56.1
14:00 - 15:00	57.1	56.0	57.2	58.1	54.1	59.1	56.0
15:00 - 16:00	57.3	55.9	56.5	57.2	55.0	56.5	56.3
16:00 - 17:00	57.4	56.1	57.2	56.9	55.0	56.8	56.3
17:00 - 18:00	57.7	56.1	57.0	57.1	54.9	57.5	56.6
18:00 - 19:00	58.2	57.3	57.5	57.6	55.4	57.8	56.8
19:00 - 20:00	56.8	57.1	57.2	57.8	57.0	58.1	57.5
20:00 - 21:00	55.9	57.2	56.4	57.8	57.6	58.0	57.1
21:00 - 22:00	56.4	62.3	56.0	57.7	56.6	58.2	57.2
22:00 - 23:00	56.2	60.7	57.7	57.6	57.3	58.0	57.2
23:00 - 00:00	57.4	56.6	58.7	58.0	57.5	58.1	57.1
00:00 - 01:00	57.7	55.8	58.1	58.1	59.6	58.6	57.3
01:00 - 02:00	57.1	55.8	56.1	60.2	63.7	59.1	57.3
02:00 - 03:00	57.0	55.7	55.0	65.1	68.4	59.1	57.3
03:00 - 04:00	58.3	56.6	55.4	58.3	67.5	55.5	57.0
04:00 - 05:00	55.0	57.1	55.2	57.9	56.9	55.6	55.7
05:00 - 06:00	54.5	57.3	55.4	58.0	55.6	56.6	54.9
06:00 - 07:00	54.8	58.0	56.1	59.1	56.4	57.4	55.5
07:00 - 08:00	54.4	61.0	59.9	56.7	56.1	55.9	57.1
08:00 - 09:00	54.7	57.8	59.6	56.1	55.8	54.1	55.3
09:00 - 10:00	55.8	56.4	59.9	56.3	57.2	53.6	54.2
L90(avg)*	56.6	57.8	57.3	59.0	60.1	57.7	56.4

Remark : \* Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team





## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Eastern Refinery Boundary

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302738

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.1/0.6

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	62.4	65.3	57.7	60.2	60.1	57.5	59.9
16:00 - 17:00	64.2	63.8	60.7	62.9	62.8	60.2	61.0
17:00 - 18:00	66.1	66.1	65.1	64.3	65.5	59.5	54.4
18:00 - 19:00	64.5	66.4	67.4	65.1	62.1	57.5	56.5
19:00 - 20:00	64.9	64.6	64.4	64.2	61.5	54.9	55.4
20:00 - 21:00	63.2	63.0	63.9	62.6	60.5	54.4	57.7
21:00 - 22:00	61.8	61.9	59.0	61.3	57.8	56.4	58.0
22:00 - 23:00	60.5	59.8	62.1	58.7	57.1	56.0	56.6
23:00 - 00:00	56.9	59.9	58.9	56.9	58.5	56.3	53.3
00:00 - 01:00	56.5	57.9	55.6	57.6	58.4	58.2	52.2
01:00 - 02:00	58.4	56.1	58.2	52.1	60.2	60.9	54.9
02:00 - 03:00	60.6	50.5	55.3	56.3	59.0	61.5	55.1
03:00 - 04:00	54.2	57.2	52.7	54.4	59.2	62.0	56.1
04:00 - 05:00	56.4	56.0	55.8	57.4	59.1	61.3	59.7
05:00 - 06:00	58.9	60.2	62.1	58.6	60.2	60.3	62.8
06:00 - 07:00	64.8	66.8	67.0	66.3	59.3	60.0	62.2
07:00 - 08:00	65.2	67.8	67.2	66.6	58.8	57.4	62.1
08:00 - 09:00	61.3	66.1	60.5	64.6	57.5	56.3	60.9
09:00 - 10:00	59.9	62.3	59.5	61.9	56.6	56.2	60.2
10:00 - 11:00	59.9	62.6	57.7	60.1	55.7	58.4	59.9
11:00 - 12:00	61.6	63.3	61.1	62.3	55.6	60.0	59.4
12:00 - 13:00	61.9	63.0	59.6	62.9	54.8	60.8	57.0
13:00 - 14:00	61.8	63.4	59.2	60.6	55.0	59.7	56.6
14:00 - 15:00	64.2	56.7	59.5	61.2	56.1	58.5	56.9
Leq(24)*	62.2	63.3	62.1	62.1	59.6	59.0	58.8
Ldn	66.8	67.6	67.6	66.7	65.6	66.3	65.0
Lmax **	93.5	95.6	93.8	92.4	91.7	84.2	86.9
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 15:00-15:00

\*\* Maximum Sound Pressure Level between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Eastern Refinery Boundary

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302738

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.1/0.6


Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	51.9	48.2	47.4	49.0	49.4	49.1	50.3
16:00 - 17:00	52.9	51.7	51.0	51.1	52.6	52.0	50.3
17:00 - 18:00	53.6	52.2	56.1	53.6	55.0	52.6	48.3
18:00 - 19:00	52.1	51.7	54.9	53.5	51.5	49.1	47.9
19:00 - 20:00	49.9	50.1	51.7	52.7	54.3	47.6	46.9
20:00 - 21:00	45.9	48.6	48.3	49.7	52.3	47.4	48.6
21:00 - 22:00	43.6	45.9	42.7	46.1	50.4	48.4	49.7
22:00 - 23:00	43.9	42.7	42.7	44.4	49.9	48.2	47.2
23:00 - 00:00	42.7	42.7	43.4	44.0	50.2	48.3	45.5
00:00 - 01:00	43.1	44.1	43.2	42.6	51.5	50.8	45.5
01:00 - 02:00	42.6	41.7	41.5	40.9	52.5	55.4	47.0
02:00 - 03:00	41.9	41.5	41.8	42.6	52.0	55.5	47.0
03:00 - 04:00	42.0	40.7	41.6	41.9	52.1	55.0	48.4
04:00 - 05:00	41.7	41.8	43.2	43.6	51.9	53.4	50.4
05:00 - 06:00	43.5	45.2	45.6	45.7	53.0	53.1	55.2
06:00 - 07:00	49.7	53.8	54.8	53.8	51.6	51.5	55.1
07:00 - 08:00	50.0	57.7	55.2	58.4	50.1	49.0	53.6
08:00 - 09:00	45.7	52.3	47.5	51.9	49.8	47.6	52.6
09:00 - 10:00	47.6	50.8	48.0	48.9	47.7	48.0	52.5
10:00 - 11:00	46.1	50.2	48.6	47.0	48.2	46.9	52.1
11:00 - 12:00	48.6	50.4	49.3	51.0	49.2	48.2	50.9
12:00 - 13:00	48.8	50.7	46.9	51.1	48.3	49.4	48.3
13:00 - 14:00	47.9	48.3	47.9	50.1	48.2	49.3	47.7
14:00 - 15:00	46.5	46.9	48.4	49.2	48.2	50.5	49.4
L90(avg)*	48.3	50.1	50.0	50.7	51.3	51.1	50.5

Remark : \* Average time between 15:00-15:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Preeda Somjai)  
 Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary Station 1

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302333

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 94.0/-0.3

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	60.0	59.8	60.4	57.5	60.2	60.0	57.7
16:00 - 17:00	61.5	62.3	62.1	57.8	61.4	62.6	60.0
17:00 - 18:00	63.1	61.6	62.4	59.2	62.0	63.4	63.5
18:00 - 19:00	63.6	61.0	62.4	59.3	61.8	63.7	63.2
19:00 - 20:00	62.5	61.4	63.0	59.8	62.4	63.7	64.1
20:00 - 21:00	60.9	61.9	62.0	60.5	61.4	62.3	62.2
21:00 - 22:00	57.0	58.0	57.2	56.9	59.3	59.2	57.6
22:00 - 23:00	57.9	60.1	57.1	60.2	59.5	59.4	58.5
23:00 - 00:00	57.1	56.4	57.0	57.0	57.0	59.0	57.5
00:00 - 01:00	57.8	56.4	56.8	58.8	59.0	58.6	58.4
01:00 - 02:00	55.1	58.6	54.9	58.4	54.9	57.1	55.6
02:00 - 03:00	53.8	57.1	56.3	56.5	55.0	55.9	56.4
03:00 - 04:00	53.6	54.9	55.9	52.0	56.2	54.2	56.4
04:00 - 05:00	53.9	57.5	55.2	54.3	56.0	55.5	56.1
05:00 - 06:00	56.6	58.8	57.5	55.4	56.9	58.5	57.6
06:00 - 07:00	61.0	62.1	61.2	62.0	61.3	62.2	57.8
07:00 - 08:00	62.3	63.5	62.4	62.0	62.5	62.6	60.8
08:00 - 09:00	61.2	64.3	61.9	61.6	61.8	61.4	59.9
09:00 - 10:00	57.6	60.8	58.8	59.3	60.7	60.8	57.1
10:00 - 11:00	58.7	61.2	59.6	60.4	60.6	60.6	57.1
11:00 - 12:00	59.4	62.3	59.5	61.8	61.6	62.0	56.2
12:00 - 13:00	59.3	60.7	57.9	61.1	60.2	61.1	57.2
13:00 - 14:00	57.8	60.8	58.4	60.1	59.9	59.9	55.9
14:00 - 15:00	59.0	59.3	58.7	59.4	59.5	56.4	55.8
Leq(24)*	59.7	60.6	59.8	59.4	60.2	60.7	59.3
Ldn	64.2	65.5	64.4	64.8	64.9	65.5	64.2
Lmax **	83.5	90.6	81.1	84.8	87.5	81.9	84.2
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 15:00-15:00

\*\* Maximum Sound Pressure Level between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary Station 1

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302333

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 94.0/-0.3

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	53.8	52.0	53.0	52.9	55.3	55.5	53.8
16:00 - 17:00	55.3	55.3	56.6	54.2	56.7	58.0	55.3
17:00 - 18:00	55.8	53.7	56.8	54.5	55.8	58.7	58.4
18:00 - 19:00	56.3	53.9	57.0	55.1	57.6	59.2	58.4
19:00 - 20:00	55.6	53.6	56.3	55.1	56.9	57.9	57.8
20:00 - 21:00	53.4	52.3	52.9	52.6	54.0	54.0	54.7
21:00 - 22:00	52.2	51.3	50.0	49.7	52.6	52.0	51.9
22:00 - 23:00	52.2	51.6	50.3	51.1	52.2	50.8	51.8
23:00 - 00:00	53.4	51.4	52.1	50.3	52.0	51.0	51.8
00:00 - 01:00	53.9	51.1	52.0	51.4	51.0	52.7	53.4
01:00 - 02:00	53.5	52.1	52.0	49.5	52.0	53.0	52.8
02:00 - 03:00	50.9	52.8	50.8	48.9	51.5	52.5	53.3
03:00 - 04:00	51.0	52.4	51.4	48.6	52.1	51.5	53.0
04:00 - 05:00	52.0	55.4	52.2	49.2	52.4	51.0	53.4
05:00 - 06:00	52.7	56.6	53.1	51.3	52.6	53.1	55.1
06:00 - 07:00	55.0	58.7	56.9	57.0	56.8	57.9	55.4
07:00 - 08:00	55.8	59.4	58.2	57.9	58.4	58.3	58.6
08:00 - 09:00	52.1	57.6	55.9	57.0	55.9	55.2	56.0
09:00 - 10:00	49.1	54.5	53.0	54.1	54.7	52.6	53.7
10:00 - 11:00	49.1	54.6	54.8	55.3	55.2	52.9	52.6
11:00 - 12:00	51.1	55.5	54.5	55.3	56.0	54.6	52.1
12:00 - 13:00	51.0	53.7	52.6	55.0	55.4	53.2	52.2
13:00 - 14:00	49.9	54.3	53.7	54.5	55.1	53.7	51.6
14:00 - 15:00	50.1	52.6	53.8	53.7	55.2	52.4	51.8
L90(avg)*	53.2	54.7	54.4	53.9	55.0	55.1	54.8

Remark : \* Average time between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary Station 2

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302740

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 92.8/0.9

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
14:00 - 15:00	63.0	59.1	60.1	60.3	60.5	61.0	61.0
15:00 - 16:00	61.8	59.5	61.8	61.4	61.4	61.5	62.0
16:00 - 17:00	63.6	63.5	63.4	63.6	63.3	63.1	63.6
17:00 - 18:00	64.2	63.3	64.3	64.6	63.5	63.6	64.7
18:00 - 19:00	63.8	61.1	63.8	64.3	63.6	64.1	63.7
19:00 - 20:00	62.4	62.1	63.9	63.2	63.1	64.0	63.4
20:00 - 21:00	61.9	62.2	63.1	62.1	62.4	62.1	63.3
21:00 - 22:00	59.4	58.9	59.4	58.3	60.0	58.6	58.3
22:00 - 23:00	59.7	58.8	59.1	59.2	59.8	58.8	59.0
23:00 - 00:00	59.0	58.3	58.9	57.4	58.7	58.4	57.7
00:00 - 01:00	58.9	58.4	58.8	57.2	60.3	58.5	58.8
01:00 - 02:00	58.1	57.6	57.7	54.6	57.7	56.8	57.2
02:00 - 03:00	57.8	57.9	57.5	54.4	57.8	56.6	58.3
03:00 - 04:00	58.0	57.9	58.4	54.5	57.9	56.6	57.6
04:00 - 05:00	58.4	57.6	58.3	55.6	57.8	57.3	58.1
05:00 - 06:00	59.7	59.5	60.1	58.1	59.2	59.4	60.7
06:00 - 07:00	62.3	63.0	62.6	63.9	62.9	63.1	62.1
07:00 - 08:00	62.6	64.6	63.6	65.0	63.8	63.7	65.0
08:00 - 09:00	62.1	65.3	62.9	63.8	62.9	62.6	63.1
09:00 - 10:00	58.7	62.2	60.5	61.9	61.9	61.6	61.2
10:00 - 11:00	59.3	62.7	60.6	61.2	61.7	61.0	61.0
11:00 - 12:00	60.7	64.0	62.1	62.5	63.2	62.7	62.0
12:00 - 13:00	59.8	61.3	60.8	61.8	61.5	61.8	62.0
13:00 - 14:00	58.7	60.9	60.4	61.6	61.0	60.9	60.5
Leq(24)*	61.1	61.5	61.4	61.5	61.5	61.4	61.6
Ldn	66.2	66.2	66.3	65.7	66.4	66.0	66.2
Lmax **	89.3	95.7	87.1	83.3	88.8	83.0	97.3
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 14:00-14:00

\*\* Maximum Sound Pressure Level between 14:00-14:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary Station 2

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302740

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 92.8/0.9

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
14:00 - 15:00	59.5	53.5	55.8	54.7	57.0	57.5	55.2
15:00 - 16:00	56.3	54.4	55.5	55.4	57.5	57.6	56.2
16:00 - 17:00	57.9	57.1	58.3	58.7	59.3	59.3	58.0
17:00 - 18:00	57.9	56.4	59.7	60.0	58.4	60.4	60.3
18:00 - 19:00	57.3	56.1	59.8	58.5	59.8	59.5	58.7
19:00 - 20:00	57.5	56.0	58.5	57.9	58.4	57.7	57.0
20:00 - 21:00	57.3	55.5	56.6	54.9	56.6	55.8	55.0
21:00 - 22:00	56.8	55.7	55.8	53.4	56.2	54.1	53.9
22:00 - 23:00	56.7	56.7	55.7	53.4	55.8	54.3	54.0
23:00 - 00:00	57.2	56.7	56.2	53.3	56.1	54.6	54.4
00:00 - 01:00	57.0	55.5	56.3	52.6	55.5	55.7	55.9
01:00 - 02:00	56.9	56.3	56.0	52.3	55.7	55.2	55.6
02:00 - 03:00	56.4	56.4	56.2	52.1	55.7	55.1	56.7
03:00 - 04:00	56.7	56.6	56.7	52.1	56.1	55.2	56.3
04:00 - 05:00	57.3	55.9	56.7	52.6	56.4	55.8	56.3
05:00 - 06:00	57.9	56.6	57.1	53.8	57.1	56.7	56.9
06:00 - 07:00	58.5	59.7	59.2	59.5	59.3	60.1	58.9
07:00 - 08:00	58.0	61.1	60.1	61.6	60.7	60.5	61.5
08:00 - 09:00	55.6	58.7	56.6	59.6	57.3	58.3	59.2
09:00 - 10:00	53.5	57.0	55.4	57.3	55.8	56.6	57.0
10:00 - 11:00	53.1	58.2	55.4	56.4	56.4	56.3	55.4
11:00 - 12:00	53.6	57.7	55.9	56.6	57.0	56.6	56.0
12:00 - 13:00	53.3	56.0	54.8	57.0	57.0	56.0	55.3
13:00 - 14:00	53.1	56.2	54.9	57.0	57.3	55.2	54.3
L90(avg)*	56.8	57.0	57.1	56.8	57.4	57.3	57.1

Remark : \* Average time between 14:00-14:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team





## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G300709

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 92.8/0.9

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
16:00 - 17:00	51.4	57.6	50.1	53.1	49.3	49.1	51.0
17:00 - 18:00	54.0	57.8	51.0	53.5	52.3	52.8	52.9
18:00 - 19:00	53.2	58.1	51.7	51.6	49.5	50.6	50.3
19:00 - 20:00	48.1	58.2	46.6	48.1	49.8	52.4	50.6
20:00 - 21:00	50.6	60.5	48.8	48.2	50.4	50.3	47.3
21:00 - 22:00	46.9	59.0	47.2	49.7	53.0	47.5	51.2
22:00 - 23:00	44.8	50.9	45.4	44.6	47.4	53.1	50.0
23:00 - 00:00	45.3	49.9	43.3	50.3	43.5	61.2	51.6
00:00 - 01:00	46.5	48.6	43.4	47.9	42.8	45.2	47.8
01:00 - 02:00	47.1	43.4	43.4	41.0	43.8	46.5	47.9
02:00 - 03:00	44.8	43.7	41.3	41.8	49.1	46.8	56.6
03:00 - 04:00	42.2	43.5	41.5	42.0	43.2	45.2	54.7
04:00 - 05:00	46.6	42.5	41.8	42.1	48.6	50.2	54.5
05:00 - 06:00	52.0	49.3	49.6	49.0	48.5	49.0	58.8
06:00 - 07:00	57.4	51.5	51.1	57.1	51.5	50.8	73.7
07:00 - 08:00	51.4	53.8	52.7	63.5	54.0	53.6	73.5
08:00 - 09:00	53.3	60.4	53.1	64.6	53.0	54.5	61.8
09:00 - 10:00	50.9	58.1	50.8	63.7	71.2	52.1	53.6
10:00 - 11:00	50.0	56.8	49.3	52.4	64.9	52.2	52.7
11:00 - 12:00	49.4	49.7	50.5	50.7	51.3	51.4	49.8
12:00 - 13:00	55.2	48.6	49.5	50.8	56.1	53.1	48.9
13:00 - 14:00	53.9	49.0	54.4	50.3	55.0	50.9	48.3
14:00 - 15:00	57.3	53.0	55.7	50.8	49.7	49.4	47.9
15:00 - 16:00	58.8	49.8	57.1	62.7	48.4	49.4	47.7
Leq(24)*	52.6	55.2	50.8	56.8	59.0	52.4	63.3
Ldn	57.3	57.5	54.1	59.0	59.9	59.6	70.7
Lmax **	83.3	95.2	81.8	84.1	81.4	80.7	81.2
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 16:00-16:00

\*\* Maximum Sound Pressure Level between 16:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team





## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

**Location :** Map Ta Phut New Town  
**SLM Model :** Cirrus CR162B  
**Site Operator :** Mr. Siwanon Kulawong

**Monitor Period :** 17-24 May 2025  
**Serial No :** G300709

**Calibrator Model :** Cirrus CR:515  
**Calibration Ref dB(A) :** 94.0  
**SLM Reading / Adjust dB(A) :** 92.8/0.9  
**Cal Sheet No.:** CR-515-2025-137

**Serial No :** 97097  
**Certified Date :** 02 Oct 2024  
**Expire Date :** 01 Oct 2025

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
16:00 - 17:00	43.9	55.7	44.7	44.5	45.0	43.6	45.9
17:00 - 18:00	44.5	55.9	44.5	45.4	46.6	46.1	46.0
18:00 - 19:00	44.9	56.3	44.5	44.6	45.0	46.4	45.3
19:00 - 20:00	43.9	56.4	43.9	44.1	47.3	47.7	46.0
20:00 - 21:00	43.9	55.3	43.0	43.5	46.4	44.4	44.8
21:00 - 22:00	43.4	46.9	41.9	43.0	44.6	43.0	44.8
22:00 - 23:00	42.8	42.9	41.1	41.8	43.5	43.1	45.0
23:00 - 00:00	43.6	42.5	40.7	41.7	42.1	43.2	45.3
00:00 - 01:00	45.1	41.8	42.2	40.3	41.1	43.6	46.3
01:00 - 02:00	45.3	41.5	40.4	39.7	41.9	45.3	46.2
02:00 - 03:00	41.3	42.3	40.2	39.9	41.2	45.8	49.9
03:00 - 04:00	40.2	41.6	40.4	39.6	40.9	44.0	46.4
04:00 - 05:00	40.2	40.2	40.1	40.4	42.3	41.7	46.9
05:00 - 06:00	41.6	44.2	42.1	41.3	43.3	43.4	45.0
06:00 - 07:00	43.5	46.2	45.5	46.1	45.1	46.1	63.2
07:00 - 08:00	43.0	47.0	45.7	52.3	47.4	46.9	64.6
08:00 - 09:00	43.0	52.2	45.4	55.1	46.3	47.2	57.6
09:00 - 10:00	42.8	54.7	43.9	59.5	47.9	46.5	47.9
10:00 - 11:00	43.8	52.1	43.4	45.8	47.5	44.6	44.8
11:00 - 12:00	42.6	43.6	44.2	45.3	45.6	44.3	43.1
12:00 - 13:00	46.2	42.9	44.0	45.9	48.2	51.1	42.2
13:00 - 14:00	47.9	44.4	44.7	45.3	46.4	46.5	41.9
14:00 - 15:00	52.8	44.8	45.6	45.1	43.8	45.4	42.8
15:00 - 16:00	55.0	43.7	46.1	45.7	43.7	46.2	42.7
<b>L90(avg)*</b>	46.4	50.9	43.7	49.0	45.3	45.8	54.2

Remark : \* Average time between 16:00-16:00

(Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

(Miss Preeda Somjai)  
 Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G300841

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 94.1/-0.4

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	56.5	57.3	57.0	59.1	57.0	53.3	56.6
16:00 - 17:00	56.9	59.2	57.4	57.8	59.5	57.5	57.2
17:00 - 18:00	58.1	61.8	60.5	58.4	59.5	59.8	60.4
18:00 - 19:00	59.6	60.4	58.7	59.0	58.1	59.9	61.9
19:00 - 20:00	57.6	57.6	57.0	57.8	58.2	61.2	58.4
20:00 - 21:00	58.6	56.3	55.5	56.5	58.0	59.1	59.4
21:00 - 22:00	57.0	55.9	56.6	58.5	56.4	57.1	55.6
22:00 - 23:00	67.2	54.6	54.1	54.2	54.2	53.8	51.9
23:00 - 00:00	58.1	54.3	54.7	54.8	52.9	52.7	50.5
00:00 - 01:00	54.9	53.8	52.7	51.4	53.3	51.1	51.3
01:00 - 02:00	53.9	52.4	51.4	50.7	52.0	50.5	50.5
02:00 - 03:00	52.1	51.3	51.3	48.1	47.7	50.9	48.4
03:00 - 04:00	50.2	48.6	49.3	48.2	51.4	47.4	49.0
04:00 - 05:00	48.8	55.8	50.6	47.2	50.8	46.2	50.0
05:00 - 06:00	55.6	59.7	54.2	55.4	59.3	53.9	53.9
06:00 - 07:00	60.3	58.0	58.2	64.2	61.1	59.2	66.1
07:00 - 08:00	60.7	58.1	57.6	61.8	59.4	60.7	68.5
08:00 - 09:00	53.5	58.2	57.8	58.9	57.8	58.3	64.8
09:00 - 10:00	57.3	54.9	58.0	59.2	54.4	54.9	60.0
10:00 - 11:00	57.1	54.5	56.8	54.6	55.9	56.1	56.2
11:00 - 12:00	54.2	59.9	51.6	53.2	53.2	55.0	55.4
12:00 - 13:00	56.8	56.6	54.5	61.6	57.8	54.5	56.6
13:00 - 14:00	56.1	53.8	54.4	54.9	54.4	52.3	55.4
14:00 - 15:00	54.7	53.4	54.1	55.6	60.9	59.8	56.4
Leq(24)*	58.3	57.1	56.0	57.8	57.1	56.8	60.0
Ldn	65.8	62.3	60.8	63.2	62.4	60.9	64.6
Lmax **	91.3	94.5	91.0	96.3	92.4	92.0	97.2
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 15:00-15:00

\*\* Maximum Sound Pressure Level between 15:00-15:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162C

Serial No : G300841

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 94.1/-0.4


Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
15:00 - 16:00	41.7	43.7	39.3	39.1	40.1	41.2	41.3
16:00 - 17:00	42.7	44.3	41.9	40.2	41.8	41.3	43.4
17:00 - 18:00	47.7	48.2	47.4	45.7	45.0	45.8	47.4
18:00 - 19:00	49.3	51.3	49.2	49.1	48.1	49.2	49.7
19:00 - 20:00	54.1	52.4	52.0	52.1	52.7	52.0	50.2
20:00 - 21:00	54.3	52.6	52.5	52.2	52.0	51.4	50.1
21:00 - 22:00	55.1	53.0	52.5	50.7	51.4	50.7	49.5
22:00 - 23:00	55.1	53.1	52.5	50.9	51.9	50.3	48.9
23:00 - 00:00	54.5	52.6	52.2	50.8	51.0	49.5	46.4
00:00 - 01:00	53.5	52.3	51.3	49.9	50.8	48.8	43.3
01:00 - 02:00	52.6	51.3	50.6	48.9	49.3	48.4	43.7
02:00 - 03:00	51.0	49.6	49.3	46.2	46.3	47.0	46.9
03:00 - 04:00	48.1	44.5	48.6	46.9	45.2	45.5	46.3
04:00 - 05:00	47.5	42.9	47.6	45.2	44.3	42.4	44.5
05:00 - 06:00	48.0	46.3	48.5	42.3	47.3	43.3	43.8
06:00 - 07:00	47.1	47.5	47.9	46.3	48.8	47.4	51.3
07:00 - 08:00	46.2	47.4	43.9	49.2	45.3	46.3	63.4
08:00 - 09:00	44.6	48.2	43.8	46.5	42.2	45.0	61.6
09:00 - 10:00	41.3	47.8	42.4	48.0	41.9	42.8	55.8
10:00 - 11:00	40.1	43.4	43.1	42.6	40.9	40.0	49.8
11:00 - 12:00	41.3	39.5	40.4	42.7	40.3	39.6	47.0
12:00 - 13:00	41.8	38.7	39.3	42.5	40.5	38.6	44.4
13:00 - 14:00	43.1	36.3	38.8	42.1	42.5	40.0	44.1
14:00 - 15:00	42.5	37.8	38.5	39.7	42.0	39.5	43.6
L90(avg)*	50.3	49.1	48.6	47.8	47.8	47.1	53.3

Remark : \* Average time between 15:00-15:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Preeda Somjai)  
 Technical Management Team



## Noise Monitoring Result : Community Noise

### MTR-SPRC PLC-Refinery

Location : Wat Sophon Community

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302237

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.3/0.4

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	Equivalent Sound Pressure Level (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
16:00 - 17:00	53.7	54.4	52.1	53.8	63.5	53.5	52.5
17:00 - 18:00	54.6	58.3	54.1	53.5	54.2	53.2	56.2
18:00 - 19:00	60.4	61.6	56.1	59.6	60.0	61.7	61.1
19:00 - 20:00	51.8	54.3	51.9	53.2	51.5	52.4	54.5
20:00 - 21:00	52.6	53.1	52.0	51.6	52.6	52.2	52.0
21:00 - 22:00	52.5	50.0	49.8	52.1	51.7	49.3	50.2
22:00 - 23:00	50.6	49.6	51.3	49.7	49.7	48.7	48.5
23:00 - 00:00	47.9	47.2	48.0	48.9	49.0	47.5	52.7
00:00 - 01:00	48.2	48.6	47.8	48.3	48.1	48.0	48.3
01:00 - 02:00	47.1	44.8	48.8	51.1	49.9	54.3	49.8
02:00 - 03:00	47.1	45.8	47.5	51.3	46.3	46.6	55.1
03:00 - 04:00	47.8	51.4	47.6	47.5	49.7	45.3	53.2
04:00 - 05:00	45.7	46.0	47.5	50.0	48.1	45.5	51.8
05:00 - 06:00	55.1	52.6	56.0	55.9	57.7	56.7	59.7
06:00 - 07:00	53.5	52.9	53.4	63.1	53.6	54.0	71.9
07:00 - 08:00	54.0	54.5	53.6	63.1	54.2	53.5	71.3
08:00 - 09:00	56.5	60.6	52.1	60.5	52.6	53.7	61.3
09:00 - 10:00	54.5	57.6	50.9	61.6	64.1	53.8	53.2
10:00 - 11:00	53.3	58.6	53.1	51.5	62.1	50.8	52.5
11:00 - 12:00	53.9	52.2	51.6	51.5	51.9	51.9	52.5
12:00 - 13:00	52.5	50.3	54.0	52.4	54.3	56.5	51.9
13:00 - 14:00	51.9	50.6	53.7	50.1	56.0	52.9	51.5
14:00 - 15:00	54.5	51.9	51.5	59.9	50.1	52.6	51.6
15:00 - 16:00	56.0	55.5	55.1	61.2	51.0	52.7	52.2
Leq(24)*	53.7	54.9	52.4	57.1	56.6	53.7	61.8
Ldn	57.8	58.0	57.7	62.2	59.9	58.6	69.1
Lmax **	83.2	93.5	88.2	84.9	76.8	90.2	81.7
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : \* Average time between 16:00-16:00

\*\* Maximum Sound Pressure Level between 16:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team



## Noise Monitoring Result : Background Noise

### MTR-SPRC PLC-Refinery

Location : Wat Sophon Community

Monitor Period : 17-24 May 2025

SLM Model : Cirrus CR162B

Serial No : G302237

Site Operator : Mr. Siwanon Kulawong

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : 02 Oct 2024

SLM Reading / Adjust dB(A) : 93.3/0.4

Expire Date : 01 Oct 2025

Cal Sheet No.: CR-515-2025-137

Time	L90 (dB(A))						
	17-18 May 2025	18-19 May 2025	19-20 May 2025	20-21 May 2025	21-22 May 2025	22-23 May 2025	23-24 May 2025
16:00 - 17:00	49.5	49.0	48.8	49.4	48.3	48.8	48.6
17:00 - 18:00	50.2	51.7	48.9	48.9	47.8	48.5	50.1
18:00 - 19:00	50.0	52.1	49.3	49.3	48.3	49.0	50.2
19:00 - 20:00	46.3	49.4	47.6	48.1	46.7	47.8	49.4
20:00 - 21:00	46.6	45.3	47.3	47.5	46.4	46.5	46.5
21:00 - 22:00	45.5	44.8	45.1	46.3	44.5	44.9	45.2
22:00 - 23:00	45.5	43.5	44.6	46.2	44.7	45.1	45.0
23:00 - 00:00	45.7	43.6	44.7	46.4	44.7	44.5	45.5
00:00 - 01:00	46.1	43.3	43.5	45.8	44.5	44.4	45.0
01:00 - 02:00	44.7	42.7	43.2	45.4	44.7	45.4	45.9
02:00 - 03:00	44.3	42.5	43.1	45.3	43.3	44.4	47.8
03:00 - 04:00	42.1	42.2	42.5	45.2	42.8	42.6	45.1
04:00 - 05:00	41.9	41.9	43.2	45.6	43.9	42.7	45.6
05:00 - 06:00	42.9	45.1	44.9	46.4	44.7	45.1	45.7
06:00 - 07:00	48.1	49.2	50.0	50.4	49.1	49.3	60.6
07:00 - 08:00	48.6	49.9	49.6	52.4	49.4	49.6	65.0
08:00 - 09:00	48.9	53.0	48.4	53.8	47.2	47.3	55.3
09:00 - 10:00	48.9	54.3	46.7	56.3	47.6	45.9	50.0
10:00 - 11:00	47.4	52.3	47.0	48.3	49.6	46.2	48.5
11:00 - 12:00	47.0	48.0	48.0	48.4	48.3	47.5	48.6
12:00 - 13:00	46.9	46.5	48.7	48.4	49.0	51.1	47.9
13:00 - 14:00	47.6	45.9	48.2	46.4	49.0	48.4	48.2
14:00 - 15:00	48.7	46.1	47.8	46.0	47.6	47.5	48.5
15:00 - 16:00	48.3	48.2	47.8	47.0	47.8	48.1	48.3
L90(avg)*	47.3	48.7	47.2	49.2	47.1	47.2	53.9

Remark : \* Average time between 16:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

Preeda S.  
(Miss Preeda Somjai)  
Technical Management Team

## ใบรับรองผลการตรวจวัดทรัพยากรทางน้ำ



สถานีวิจัยประมงศรีราชา  
101/12 หมู่ 9 ต.บางพระ  
อ.ศรีราชา จ.ชลบุรี 20110  
โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์  
ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>แพลงก์ตอนพืช</b>				
<b>Division Cyanophyta</b>				
<b>Class Cyanophyceae</b>				
<b>Order Nostocales</b>				
<b>Family Oscillatoriaceae</b>				
<i>Oscillatoria</i> sp.	-	-	103,000	-
<i>Oscillatoria tenuis</i>	88,000	20,000	124,000	105,000
<b>Family Nostocaceae</b>				
<i>Pseudanabaena</i> sp.	114,000	-	52,000	-
<i>Richelia intracellularis</i>	70,000	-	-	26,000
<b>Division Chlorophyta</b>				
<b>Class Chlorophyceae</b>				
<b>Order Chlorococcales</b>				
<b>Family Scenedesmaceae</b>				
<i>Scenedesmus opoliensis</i>	-	121,000	113,000	-
<i>Scenedesmus quadricauda</i>	-	40,000	165,000	-
<b>Order Zygnematales</b>				
<b>Family Desmidiaceae</b>				
<i>Staurastrum gracile</i>	-	-	10,000	-



**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์** (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>Division Chromophyta</b>				
<b>Class Bacillariophyceae</b>				
<b>Order Biddulphales</b>				
<b>Suborder Coscinodiscineae</b>				
<b>Family Thalassiosiraceae</b>				
<i>Cyclotella meneghiniana</i>	9,000	-	10,000	-
<i>Cyclotella striata</i>	-	10,000	-	18,000
<i>Lauderia annulata</i>	827,000	202,000	206,000	350,000
<i>Skeletonema costatum</i>	11,440,000	43,975,000	146,724,000	48,475,000
<i>Thalassiosira eccentrica</i>	9,000	-	-	-
<i>Thalassiosira</i> sp.	141,000	-	185,000	-
<b>Family Melosiraceae</b>				
<i>Meuniera membranacea</i>	616,000	-	-	96,000
<b>Family Coscinodiscaceae</b>				
<i>Coscinodiscus centralis</i>	-	-	-	9,000
<i>Coscinodiscus granii</i>	18,000	-	10,000	-
<i>Coscinodiscus radiatus</i>	9,000	10,000	-	-
<i>Coscinodiscus</i> sp.	9,000	-	21,000	131,000
<b>Family Hemidiscaceae</b>				
<i>Actinopcyclus grundleri</i>	18,000	30,000	52,000	9,000
<b>Suborder Rhizosoleniineae</b>				
<b>Family Rhizosoleniaceae</b>				
<i>Dactyliosolen fragilissimus</i>	440,000	-	-	-
<i>Guinardia flaccida</i>	18,000	-	-	-
<i>Guinardia striata</i>	185,000	-	-	-
<i>Proboscia alata</i>	13,728,000	20,000	10,000	4,200,000

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)**  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Pseudosolenia calcar-avis</i>	26,000	-	-	18,000
<i>Rhizosolenia acuminata</i>	44,000	-	-	9,000
<i>Rhizosolenia setigera</i>	273,000	-	-	18,000
<i>Rhizosolenia</i> sp.	9,000	-	-	-
<i>Rhizosolenia striata</i>	26,000	-	-	-
<i>Rhizosolenia styliformis</i>	44,000	-	-	9,000
<b>Suborder Biddulphiineae</b>				
<b>Family Hemiaulaceae</b>				
<i>Cerataulina pelagica</i>	493,000	-	-	-
<i>Climacodium frauenfeldianum</i>	-	-	-	18,000
<b>Family Chaetoceraceae</b>				
<i>Bacteriastrum delicatulum</i>	9,000	-	10,000	-
<i>Bacteriastrum furcatum</i>	176,000	-	-	280,000
<i>Bacteriastrum</i> sp.	449,000	-	-	201,000
<i>Chaetoceros anastomosans</i>	26,000	-	-	-
<i>Chaetoceros compressus</i>	669,000	-	-	-
<i>Chaetoceros curvisetus</i>	484,000	-	-	35,000
<i>Chaetoceros densus</i>	26,000	-	-	-
<i>Chaetoceros didymus</i>	1,170,000	-	21,000	245,000
<i>Chaetoceros diversus</i>	35,000	-	-	9,000
<i>Chaetoceros furcellatus</i>	-	144,854,000	4,944,000	8,488,000
<i>Chaetoceros laciniosus</i>	924,000	-	-	114,000
<i>Chaetoceros lorenzianus</i>	774,000	-	82,000	18,000
<i>Chaetoceros mitra</i>	35,000	-	-	-
<i>Chaetoceros peruvianus</i>	44,000	-	-	44,000
<i>Chaetoceros pseudocurvisetus</i>	35,000	-	-	-

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์** (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Chaetoceros radicans</i>	18,000	111,000	-	210,000
<i>Chaetoceros</i> sp.	414,000	-	-	-
<b>Family Lithodismaceae</b>				
<i>Ditylum brightwellii</i>	141,000	-	-	18,000
<b>Family Eupodiscaceae</b>				
<i>Odontella sinensis</i>	132,000	-	10,000	61,000
<b>Order Bacillariales</b>				
<b>Suborder Fragilariineae</b>				
<b>Family Fragilariaceae</b>				
<i>Fragilaria capucina</i>	-	-	103,000	-
<b>Family Thalassionemataceae</b>				
<i>Thalassionema frauenfeldii</i>	581,000	-	10,000	140,000
<i>Thalassionema nitzschioides</i>	62,000	-	-	18,000
<i>Thalassionema</i> sp.	-	10,000	-	35,000
<b>Suborder Bacillariineae</b>				
<b>Family Eunotiaceae</b>				
<i>Eunotia pectinalis</i>	9,000	-	-	-
<b>Family Cymbellaceae</b>				
<i>Cymbella pusilla</i>	-	10,000	-	-
<b>Family Naviculaceae</b>				
<i>Amphora exigua</i>	9,000	-	-	-
<i>Amphora ovalis</i>	-	10,000	-	-
<i>Amphora</i> sp.	9,000	-	-	9,000
<i>Diploneis smithii</i>	18,000	-	10,000	9,000
<i>Gyrosigma acuminatum</i>	-	20,000	-	-
<i>Gyrosigma balticum</i>	-	-	-	9,000
<i>Gyrosigma scalpoides</i>	-	20,000	-	18,000

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)**  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Haslea wawrikan</i>	9,000	-	-	-
<i>Navicula lanceolata</i>	-	20,000	10,000	-
<i>Navicula</i> sp.	18,000	-	155,000	9,000
<i>Pinnularia viridis</i>	-	-	10,000	-
<i>Pleurosigma aestuarii</i>	9,000	-	-	-
<i>Pleurosigma angulatum</i>	62,000	40,000	-	-
<i>Pleurosigma elongatum</i>	9,000	-	31,000	-
<i>Pleurosigma normanii</i>	9,000	-	-	-
<i>Pleurosigma</i> sp.	-	10,000	21,000	-
<i>Trachyneis</i> sp.	9,000	20,000	21,000	-
<b>Family Bacillariaceae</b>				
<i>Nitzschia frustulum</i>	9,000	30,000	-	-
<i>Nitzschia lorenziana</i>	26,000	10,000	10,000	-
<i>Nitzschia</i> sp.	-	-	-	9,000
<i>Pseudo-nitzschia heimii</i>	150,000	-	-	-
<i>Pseudo-nitzschia</i> sp.	26,000	-	-	-
<b>Class Dinophyceae</b>				
<b>Order Prorocentrales</b>				
<b>Family Prorocentraceae</b>				
<i>Prorocentrum mexicanum</i>	-	20,000	-	-
<i>Prorocentrum micans</i>	18,000	-	-	-
<i>Prorocentrum sigmoides</i>	141,000	-	-	18,000
<b>Order Gymnodiniales</b>				
<b>Family Gymnodinium</b>				
<i>Gyrodinium spirale</i>	-	-	-	53,000

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)**  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>Order Gonyaulacalea</b>				
<b>Family Ceratiaceae</b>				
<i>Ceratium furca</i>	9,000	-	-	35,000
<i>Ceratium fusus</i>	9,000	-	-	9,000
<i>Ceratium porrectum</i>	-	-	-	9,000
<i>Ceratium trichoceros</i>	9,000	-	-	44,000
<b>Family Gonyaulacaceae</b>				
<i>Gonyaulax</i> sp.	158,000	20,000	-	-
<b>Order Peridiniales</b>				
<b>Family Calciodinellaceae</b>				
<i>Scrippsiella trocoidea</i>	414,000	566,000	185,000	3,150,000
<b>Family Peridiniaceae</b>				
<i>Peridinium quinquecorne</i>	9,000	2,060,000	14,214,000	105,000
<b>Family Protoperidiniaceae</b>				
<i>Protoperidinium angustum</i>	9,000	-	10,000	105,000
<i>Protoperidinium claudicans</i>	-	-	-	9,000
<i>Protoperidinium conicum</i>	18,000	-	10,000	9,000
<i>Protoperidinium curtipes</i>	-	-	10,000	-
<i>Protoperidinium depressum</i>	9,000	-	-	9,000
<i>Protoperidinium latispinum</i>	26,000	-	-	-
<i>Protoperidinium pellucidum</i>	18,000	-	-	-
<i>Protoperidinium</i> sp.	730,000	-	21,000	26,000
<i>Protoperidinium spinulosum</i>	35,000	-	-	18,000

**ตาราง ผลการวิเคราะห์เพลงก่ตอนพืชและเพลงก่ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)**  
(ต่อ)

ชนิดของเพลงก่ตอน	ปริมาณเพลงก่ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>เพลงก่ตอนสัตว์</b>				
<b>Phylum Protozoa</b>				
<b>Subphylum Plasmodroma</b>				
<b>Class Sarcodina</b>				
<b>Subclass Rhizopoda</b>				
<b>Order Testacida</b>				
<b>Family Arcellidae</b>				
<i>Arcella vulgaris</i>	-	-	21,000	-
<b>Family Diffugiidae</b>				
<i>Diffugia lobostoma</i>	-	-	10,000	-
<b>Subphylum Ciliophora</b>				
<b>Class Ciliata</b>				
<b>Subclass Spirotricha</b>				
<b>Order Tintinnida</b>				
<b>Family Tintinnididae</b>				
<i>Leprotintinnus nordquisti</i>	62,000	-	10,000	26,000
<b>Family Codonellidae</b>				
<i>Tintinnopsis parvula</i>	9,000	40,000	134,000	-
<i>Tintinnopsis tocaninensis</i>	9,000	20,000	-	53,000
<b>Family Codonellopsidae</b>				
<i>Codonellopsis ostenfeldi</i>	9,000	-	21,000	-
<b>Family Cyttarocylidae</b>				
<i>Favella panamensis</i>	9,000	-	-	-
<b>Family Petalotrichidae</b>				
<i>Metacylis pithos</i>	53,000	40,000	-	18,000
<b>Family Tintinnidae</b>				
<i>Eutintinnus fraknoi</i>	9,000	-	-	-

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)**

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>Order Hypotrichida</b>				
<i>Aspidisca</i> sp.	-	545,000	-	-
<b>Subclass Peritricha</b>				
<b>Order Peritrichida</b>				
<i>Vorticella</i> sp.	79,000	-	124,000	35,000
<b>Phylum Rotifera</b>				
<b>Class Monogononta</b>				
<b>Order Ploima</b>				
<b>Family Brachionidae</b>				
<i>Anuraeopsis fissa</i>	-	-	10,000	-
<i>Keratella valga</i>	-	-	62,000	9,000
<b>Phylum Annelida</b>				
<b>Class Polychaeta</b>				
Polychaete larvae	9,000	-	31,000	18,000
<b>Phylum Arthropoda</b>				
<b>Class Crustacea</b>				
<b>Subclass Copepoda</b>				
Copepod nuaplius	264,000	71,000	371,000	490,000
<b>Order Calanoida</b>				
Calanoid copepod	26,000	30,000	82,000	18,000
<b>Order Cyclopoida</b>				
Cyclopoid copepod	18,000	30,000	93,000	-
<b>Order Harpacticoida</b>				
Harpacticoid copepod	-	-	21,000	-
<b>Phylum Mollusca</b>				
<b>Class Gastropoda</b>				
Gastropod larvae	-	-	-	18,000

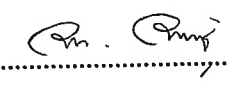


**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์** (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)  
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<b>Class Bivalvia</b>				
Pelecypod larvae	9,000	-	-	18,000
<b>Phylum Chordata</b>				
<b>Subphylum Urochordata</b>				
<b>Class Larvacea</b>				
<b>Family Oikopleuridae</b>				
<i>Oikopleura</i> sp.	26,000	20,000	-	201,000
ชนิดของแพลงก์ตอนพืช	74	26	35	50
ชนิดของแพลงก์ตอนสัตว์	14	8	13	11
ชนิดแพลงก์ตอนรวม	88	34	48	61
ปริมาณแพลงก์ตอนพืช	36,851,000	192,259,000	167,683,000	67,069,000
ปริมาณแพลงก์ตอนสัตว์	591,000	796,000	990,000	904,000
ปริมาณแพลงก์ตอนรวม	37,442,000	193,055,000	168,673,000	67,973,000
ค่าดัชนีความหลากหลายแพลงก์ตอนพืช	2.1522	0.6501	0.5099	1.0749
ค่าดัชนีความหลากหลายแพลงก์ตอนสัตว์	1.9090	1.2078	1.9936	1.4963
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.5000	0.1995	0.1434	0.2748
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.7234	0.5808	0.7772	0.6240

- หมายเหตุ :
1. สถานี S1 : เกาะสะเก็ด
  2. สถานี S2 : หาดทรายทอง
  3. สถานี S3 : จุดระบายน้ำทิ้งของ โรงกลั่นน้ำมันลงทะเล
  4. สถานี S4 : ทะเลเปิด

  
.....  
(นางสาวกนกวรรณ ขาวค่อน)  
ผู้วิเคราะห์

  
.....  
(นายชองกต อินทรชาติ)  
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์สัตว์หน้าดิน

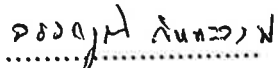
ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
<b>Phylum Annelida</b>				
<b>Class Polychaeta</b>				
<b>Order Capitellida</b>				
<b>Family Capitellidae</b>				
<i>Heteromastus</i> sp. (ไส้เดือนทะเล)	-	75	-	-
<b>Order Eunicida</b>				
<b>Family Onuphidae</b>				
<i>Diopatra</i> sp. (ไส้เดือนทะเล)	-	15	-	-
<b>Order Spionida</b>				
<b>Family Spionidae</b>				
<i>Prionospio</i> sp. (ไส้เดือนทะเล)	-	-	-	15
<b>Order Terebellida</b>				
<b>Family Cirratulidae</b>				
<i>Chaetozone</i> sp. (ไส้เดือนทะเล)	-	30	-	-
<b>Phylum Arthropoda</b>				
<b>Class Malacostraca</b>				
<b>Order Decapoda</b>				
<b>Family Diogenidae</b>				
<i>Diogenes</i> sp. (ปูเสฉวน)	282	-	-	-

**ตาราง ผลการวิเคราะห์สัตว์หน้าดิน** (เก็บตัวอย่างวันที่ 5 พฤษภาคม 2568) (ต่อ)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
<b>Phylum Mollusca</b> <b>Class Gastropoda</b> <b>Order Neogastropoda</b> <b>Family Nassariidae</b> <i>Nassarius</i> sp. (หอยปากกระเจาด) <b>Class Bivalvia</b> <b>Order Cardiida</b> <b>Family Tellinidae</b> <i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	-
<b>Phylum Chordata</b> <b>Class Leptocardii</b> <b>Order Amphioxiformes</b> <b>Family Branchiostomidae</b> <i>Branchiostoma</i> sp. (แอมฟิออกซัส)	45	-	15	267
<b>สกุลสัตว์หน้าดิน</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>
<b>ปริมาณสัตว์หน้าดิน</b>	<b>342</b>	<b>120</b>	<b>30</b>	<b>327</b>
<b>ค่าดัชนีความหลากหลายสัตว์หน้าดิน</b>	<b>0.5631</b>	<b>0.9003</b>	<b>0.6931</b>	<b>0.5798</b>

- หมายเหตุ :
1. สถานี S1 : เกาะสะเก็ด
  2. สถานี S2 : หาดทรายทอง
  3. สถานี S3 : จุกระบายน้ำทิ้งของโรงกลั่นน้ำมันลงทะเล
  4. สถานี S4 : ทะเลเปิด

  
 .....  
 (นายอรรถวุฒิ กันทะวงศ์)  
 ผู้วิเคราะห์

  
 .....  
 (นายอลงกต อินทรชาติ)  
 หัวหน้าสถานีวิจัยประมงศรีราชา

## ใบรับรองผลการตรวจวัดคุณภาพน้ำใต้ดิน



บริษัท ซีคอต จำกัด  
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 10:35-10:51, 14:17-14:33
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-101B	MW-102A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	ND	< 0.01	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๖-0022

Araya Tippiaruk

(Mrs. Araya Tippiaruk)

Technical Management Team

REG. NO. ๖-239-๖-0004

- Remark :**
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 10:35-10:51, 14:17-14:33
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-101B	MW-102A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

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SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-101B	MW-102A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>17</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Sudaporn S.  
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-0004

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CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0574/68
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SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 15:14-15:31, 14:41-14:55
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
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SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-103A	MW-104A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	ND	0.05	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

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Analyst

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GROUND WATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
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REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-103A	MW-104A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

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PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-103A	MW-104A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt; 8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt; 16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED.2017 (AWWA,APHA, WEF)

Sudaporn S.

(Miss Sudaporn Soonthorn)

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RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-105B	MW-106B	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	3.34	6.53	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

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PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-105B	MW-106B	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED.,2017 (AWWA,APHA, WEF)

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PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-105B	MW-106B	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt; 8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt; 16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED.2017 (AWWA,APHA, WEF)

Sudaporn S.  
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Analyst

REG. NO. ๖-239-๓-0001

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SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-107C	MW-108B	
Chromium (Cr)	mg/l	3120 B	< 0.001	< 0.01	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	3.83	0.28	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	< 0.01	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

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REG. NO. ๓-239-๓-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 10:35-10:55, 14:06-14:20
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-107C	MW-108B	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)



( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๖-0022



(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 10:35-10:55, 14:06-14:20
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025-01/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-107C	MW-108B	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt;8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt;16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Sudaporn S.  
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. ๖-239-๖-0001

Araya  
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 28/03/2025	SAMPLING TIME	: 10:00-10:16, 09:20-09:36
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-109A	MW-111A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.56	0.09	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemyuen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. จ-239-จ-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 28/03/2025	SAMPLING TIME	: 10:00-10:16, 09:20-09:36
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-109A	MW-111A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๓-0022

Araya Tippasuk

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Technical Management Team

REG. NO. ๖-239-๓-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 28/03/2025	SAMPLING TIME	: 10:00-10:16, 09:20-09:36
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025-01/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhon
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-109A	MW-111A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt;8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt;16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA,APHA, WEF)

Sudaporn S.  
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. ๖-239-๖-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 11:14-11:30, 09:59-10:14
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-112A	MW-113A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.02	< 0.01	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED., 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

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Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 11:14-11:30, 09:59-10:14
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-112A	MW-113A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA APHA, WEF)

*Jutarat Jaemruen*  
( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๓-0022

*Araya Tipparuk*  
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 11:14-11:30, 09:59-10:14
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025-01/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-112A	MW-113A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt; 8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt; 16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Sudaporn S.  
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 1-239-1-0001

Araya  
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 1-239-1-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27,28/03/2025	SAMPLING TIME	: 10:43-10:59, 14:59-15:20
RECEIVED DATE	: 27,28/03/2025	ANALYTICAL DATE	: 28/03/2025-02/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-114A	MW-115A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.04	0.14	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen  
( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๓-0022

Araya Tipparuk  
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27,28/03/2025	SAMPLING TIME	: 10:43-10:59, 14:59-15:20
RECEIVED DATE	: 27,28/03/2025	ANALYTICAL DATE	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-114A	MW-115A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen  
( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๖-0022

NR  
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-0004

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No	: 0429/67, 0453/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 27,28/03/2025	SAMPLING TIME	: 10:43-10:59, 14:59-15:20
RECEIVED DATE	: 27,28/03/2025	ANALYTICAL DATE	: 31/03/2025-01/04/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Natthachai Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March


PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-114A	MW-115A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>&gt; 8</sub> - C <sub>16</sub> )	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>&gt; 16</sub> - C <sub>35</sub> )	mg/l	3510 C/8015 D	< 0.050	ND	ND	≤ 0.1
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23<sup>rd</sup> ED. 2017 (AWWA, APHA, WEF)

  
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. ๖-239-๓-0001

  
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 25-26/03/2024	SAMPLING TIME	: 09:41-09:53, 10:15-10:27
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27-28/03/2024, 04-06/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-101 B	MW-102 A	
Naphthalene	mg/kg	3540 C / 8270 E	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED., 2020

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. 3-239-ท-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 3-239-ท-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
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RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-101 B	MW-102 A	
<u>Total Petroleum Hydrocarbons</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/kg	3540C/8015 D	< 0.25	1.23	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>16</sub> - C <sub>35</sub> )	mg/kg	3540C/8015 D	< 1.85	4.92	7.80	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED., 2020.

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 7-239-ท-0001

Araya T

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ท-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 26/03/2024	SAMPLING TIME	: 10:34-10:47, 10:55-11:09
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27-28/03/2024, 04-06/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-103 A	MW-104 A	
Naphthalene	mg/kg	3540 C / 8270 E	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED., 2020

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. 1-239-ก-0022

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(Mrs. Araya Tippiaruk)

Technical Management Team

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SOIL SAMPLES ANALYSIS REPORT

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REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003 Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1)</sup>
		METHODS	(non-detectable)	MW-103 A	MW-104 A	
<u>Total Petroleum Hydrocarbons</u>						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane	mg/kg					"
- Benzene	mg/kg					"
- Toluene	mg/kg					"
- m,p-Xylene	mg/kg					"
- o-Xylene	mg/kg					"
- Ethylbenzene	mg/kg					"
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/kg	3540C/8015 D	< 0.25	ND	1.46	≤ 25
- n-Nonane	mg/kg					"
- n-Decane	mg/kg					"
- n-Dodecane	mg/kg					"
- n-Tetradecane	mg/kg					"
- n-Hexadecane	mg/kg					"
- TPH (C <sub>16</sub> - C <sub>35</sub> )	mg/kg	3540C/8015 D	< 1.85	ND	5.32	≤ 8
- n-Octadecane	mg/kg					"
- n-Eicosane	mg/kg					"
- n-Docosane	mg/kg					"
- n-Tetracosane	mg/kg					"
- n-Hexacosane	mg/kg					"
- n-Octacosane	mg/kg					"
- n-Triacontane	mg/kg					"
- n-Dotriacontane	mg/kg					"
- n-Tetratriacontane	mg/kg					"
- Pentatriacontane	mg/kg					"

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED. 2020.

Sudaporn S.

(Miss Sudaporn Soonthom)

Analyst

REG. NO. 7-239-ท-0001

Araya T

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ท-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 26/03/2024	SAMPLING TIME	: 09:10-09:24, 09:31-09:43
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27-28/03/2024, 04-06/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-105 B	MW-106 B	
Naphthalene	mg/kg	3540 C / 8270 E	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3<sup>rd</sup> ED. 2020

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. 2-239-ท-0022

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SOIL SAMPLES ANALYSIS REPORT

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SAMPLING DATE	: 26/03/2024	SAMPLING TIME	: 09:10-09:24, 09:31-09:43
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1)</sup>
		METHODS	(non-detectable)	MW-105 B	MW-106 B	
Total Petroleum Hydrocarbons						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>16</sub> - C <sub>35</sub> )	mg/kg	3540C/8015 D	< 1.85	5.74	ND	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED., 2020.

Sudaporn S.

( Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-จ-0001

Araya T

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ท-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 25-26/03/2024	SAMPLING TIME	: 09:50-10:03, 11:03-11:18
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27-28/03/2024, 04-06/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-108 B	MW-109 A	
Naphthalene	mg/kg	3540 C / 8270 E	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>RD</sup> ED., 2020

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. 2-239-ท-0022

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Technical Management Team

REG. NO. 2-239-ท-0004

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 25-26/03/2024	SAMPLING TIME	: 09:50-10:03. 11:03-11:18
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1)</sup>
		METHODS	(non-detectable)	MW-108 B	MW-109 A	
Total Petroleum Hydrocarbons						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>17</sub> - C <sub>35</sub> )	mg/kg	3540C/8015 D	< 1.85	6.15	17.05	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 1<sup>st</sup> ED. 2020.

Sudaporn S.

( Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-ก-0001

NT

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-0004

- Remark :
1. Reported analysis refers to submitted sample only.
  2. This report shall not be reproduced, except in full, without official approval.
  3. <sup>1)</sup> Notification of the Ministry of Industry, B.E.2559 (2016).
  4. - Not available.



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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 25/03/2024	SAMPLING TIME	: 11:03-11:18, 10:22-10:32
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27-28/03/2024, 04-06/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD <sup>1/</sup>
				MW-112 A	MW-113 A	
Naphthalene	mg/kg	3540 C / 8270 E	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3<sup>rd</sup> ED., 2020

Jutarat Jaemruen

( Miss Jutarat Jaemruen )

Analyst

REG. NO. ๖-239-๖-0022

Araya Tippiaruk

(Mrs. Araya Tippiaruk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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  4. - Not available.



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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0585/67
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 25/03/2024	SAMPLING TIME	: 11:03-11:18, 10:22-10:32
RECEIVED DATE	: 27/03/2024	ANALYTICAL DATE	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003 Soil March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD <sup>1/</sup>
		METHODS	(non-detectable)	MW-112 A	MW-113 A	
Total Petroleum Hydrocarbons						
- TPH (C <sub>5</sub> - C <sub>8</sub> )	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C <sub>9</sub> - C <sub>16</sub> )	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C <sub>17</sub> - C <sub>35</sub> )	mg/kg	3540C/8015 D	< 1.85	7.11	6.93	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentaltriacontane						

REFERENCE : US EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3<sup>rd</sup> ED. 2000

Sudaporn S.  
( Miss Sudaporn Soonthorn)

Analyst

REG. NO. 7-239-0-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-0-0004

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  3. <sup>1/</sup> Notification of the Ministry of Industry, B.E.2559 (2016).
  4. - Not available.

ใบรับรองผลการตรวจวัดระดับเสียงภายในสถานประกอบการ



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : CDU (Near 02GM102A)

Monitor Period : Feb 20, 2025

SLM Model : SCARLET ST-21D

Serial No : 820729

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0


Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-037

Time	Equivalent Sound Pressure Level (dB(A))
	Feb 20, 2025
00:00 - 01:00	
01:00 - 02:00	
02:00 - 03:00	
03:00 - 04:00	
04:00 - 05:00	
05:00 - 06:00	
06:00 - 07:00	
07:00 - 08:00	
08:00 - 09:00	86.1
09:00 - 10:00	86.1
10:00 - 11:00	86.4
11:00 - 12:00	86.1
12:00 - 13:00	86.6
13:00 - 14:00	86.1
14:00 - 15:00	86.0
15:00 - 16:00	85.9
16:00 - 17:00	
17:00 - 18:00	
18:00 - 19:00	
19:00 - 20:00	
20:00 - 21:00	
21:00 - 22:00	
22:00 - 23:00	
23:00 - 24:00	
Leq(8)*	86.2
Lmax **	97.5
Standard-8Hr	90 dB(A)
Standard-Max	140 dB(A)

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Sununta Sirawuttinanon)  
 Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : NHTU (Near 08G102A-B)

Monitor Period : Feb 20, 2025

SLM Model : SCARLET ST-21D

Serial No : 820727

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.7/0.1


Expire Date : Oct 01 2025

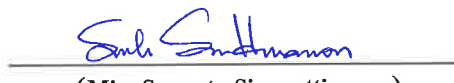
Cal Sheet No.: CR-515-2025-037

Time	Equivalent Sound Pressure Level (dB(A))	
	Feb 20, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00		
09:00 - 10:00	86.5	
10:00 - 11:00	86.7	
11:00 - 12:00	86.8	
12:00 - 13:00	86.9	
13:00 - 14:00	86.7	
14:00 - 15:00	86.5	
15:00 - 16:00	86.5	
16:00 - 17:00	86.4	
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	86.6	
Lmax **	96.6	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 09:00-17:00

\*\* Maximum Sound Pressure Level between 09:00-17:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Sununta Sirawuttinanon)  
 Technical Management Team





## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : Utility (Near 50C101)

Monitor Period : Feb 20, 2025

SLM Model : SCARLET ST-21D

Serial No : 820726

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.7/0.1

Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-037

Time	Equivalent Sound Pressure Level (dB(A))	
	Feb 20, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	89.5	
09:00 - 10:00	89.8	
10:00 - 11:00	89.7	
11:00 - 12:00	89.6	
12:00 - 13:00	89.8	
13:00 - 14:00	89.8	
14:00 - 15:00	89.7	
15:00 - 16:00	89.9	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	89.7	
Lmax **	99.6	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Sununta Sirawuttinanon)  
Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : RFCCU (Near 17GM102A-B)

Monitor Period : Feb 20, 2025

SLM Model : SCARLET ST-21D

Serial No : 820722

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0

Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-037

Time	Equivalent Sound Pressure Level (dB(A))	
	Feb 20, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	86.3	
09:00 - 10:00	86.5	
10:00 - 11:00	86.6	
11:00 - 12:00	86.1	
12:00 - 13:00	86.1	
13:00 - 14:00	85.8	
14:00 - 15:00	85.8	
15:00 - 16:00	85.9	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	86.1	
Lmax **	98.7	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Sununta Sirawuttinanon)  
Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : CDU (Near 02GM102A)

Monitor Period : May 22, 2025

SLM Model : SCARLET ST-21D

Serial No : 820728

Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0

Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-131

Time	Equivalent Sound Pressure Level (dB(A))	
	May 22, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	86.7	
09:00 - 10:00	85.4	
10:00 - 11:00	85.2	
11:00 - 12:00	85.0	
12:00 - 13:00	85.2	
13:00 - 14:00	85.6	
14:00 - 15:00	85.5	
15:00 - 16:00	85.6	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	85.6	
Lmax **	95.6	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Sununta Sirawuttinanon)  
Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : NHTU (Near 08G102A-B)

Monitor Period : May 22, 2025

SLM Model : SCARLET ST-21D

Serial No : 820729

Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0

Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-131

Time	Equivalent Sound Pressure Level (dB(A))	
	May 22, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	87.1	
09:00 - 10:00	87.0	
10:00 - 11:00	87.0	
11:00 - 12:00	87.0	
12:00 - 13:00	87.1	
13:00 - 14:00	87.1	
14:00 - 15:00	87.3	
15:00 - 16:00	87.3	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	87.1	
Lmax **	99.1	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

(Miss Sununta Sirawuttinanon)  
Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : Utility (During 41G103A-B)

Monitor Period : May 28, 2025

SLM Model : SCARLET ST-21D

Serial No : 820726

Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0


Expire Date : Oct 01 2025


Cal Sheet No.: CR-515-2025-141

Time	Equivalent Sound Pressure Level (dB(A))	
	May 28, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	87.7	
09:00 - 10:00	87.6	
10:00 - 11:00	87.5	
11:00 - 12:00	87.6	
12:00 - 13:00	87.5	
13:00 - 14:00	87.4	
14:00 - 15:00	87.1	
15:00 - 16:00	87.0	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	87.4	
Lmax **	93.3	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

  
 (Miss Katesarin Vorradetwittaya)  
 Environmental Scientist

  
 (Miss Sununta Sirawuttinanon)  
 Technical Management Team



## Noise Monitoring Result : Working Noise

### MTR-SPRC PLC-Refinery

Location : RFCCU (Near 17GM102A-B)

Monitor Period : May 28, 2025

SLM Model : SCARLET ST-21D

Serial No : 820729

Site Operator : Miss Salisa Ainree

Calibrator Model : Cirrus CR:515

Serial No : 97097

Calibration Ref dB(A) : 94.0

Certified Date : Oct 02 2024

SLM Reading / Adjust dB(A) : 93.8/0.0

Expire Date : Oct 01 2025

Cal Sheet No.: CR-515-2025-141

Time	Equivalent Sound Pressure Level (dB(A))	
	May 28, 2025	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	85.1	
09:00 - 10:00	85.2	
10:00 - 11:00	85.6	
11:00 - 12:00	85.1	
12:00 - 13:00	85.3	
13:00 - 14:00	85.9	
14:00 - 15:00	85.0	
15:00 - 16:00	85.3	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	85.3	
Lmax **	92.1	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : \* Average time between 08:00-16:00

\*\* Maximum Sound Pressure Level between 08:00-16:00

  
(Miss Katesarin Vorradetwittaya)  
Environmental Scientist

  
(Miss Sununta Sirawuttinanon)  
Technical Management Team



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SECOT CO., LTD.

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### NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: SPRC IH-225005_Ns Dose (Cert)
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 20/02/2025	CALIBRATOR TYPE	: Pulsar 22R
MEASUREMENT LOCATION	: Process area	SERIAL NO.	: 79781
SITE OPERATOR	: Miss Wiraya Patchimboon	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110843	Area 1	07.19-19.00	76.2	82.1	83.0
	(CDU/VDU)				
Operator ID#110902	Area 2	07.19-19.00	49.0	80.2	83.0
	(NHTU, DHTU, WCN, BSU)				
Operator ID#110851	Area 3	07.19-19.00	64.5	81.3	83.0
	(SRU, Utility)				

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

Technical Management Team

- Remark :**
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  2. This report shall not be reproduced, except in full, without official approval.
  3. \*Notification of the Department of Labour Protection and Welfare, B.E.2561 (2018).
  4. TWA means Time Weighted Average.



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SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

### NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: SPRC IH-225005_Ns Dose (Cert)
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 26/03/2025	CALIBRATOR TYPE	: Cirrus RC110A
MEASUREMENT LOCATION	: Process area	SERIAL NO.	: 95167
SITE OPERATOR	: Miss Salisa Ainree	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110904	Area 4	07.06-19.00	69.6	81.7	83.0
	(RFCCU)				

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

Technical Management Team

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  3. \*Notification of the Department of Labour Protection and Welfare, B.E.2561 (2018).
  4. TWA means Time Weighted Average.





บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

### NOISE MEASUREMENT REPORT : NOISE DOSE


CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2506-0204
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 19/06/2025	CALIBRATOR TYPE	: Pulsar 22R
MEASUREMENT LOCATION	: Process Area	SERIAL NO.	: 79781
SITE OPERATOR	: Miss Salisa Ainree	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110789	Area 1	07.02-18.58	53.2	80.5	83.0
	(CDU/VDU)				



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



(Miss Sununta Sirawuttinanon)

Technical Management Team

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th


### NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2505-0098
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 22/05/2025	CALIBRATOR TYPE	: Cirrus RC 110A
MEASUREMENT LOCATION	: Process Area	SERIAL NO.	: 95167
SITE OPERATOR	: Miss Salisa Ainree	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110916	Area 2	07.24-19.00	72.7	81.9	83.0
(NHTU, DHTU, WCN, BSU)					

  
(Miss Katesarin Vorradetwittaya)

Environmental Scientist

  
(Miss Sununta Sirawuttinanon)

Technical Management Team

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th


### NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2506-0204
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 19/06/2025	CALIBRATOR TYPE	: Pulsar 22R
MEASUREMENT LOCATION	: Process Area	SERIAL NO.	: 79781
SITE OPERATOR	: Miss Salisa Ainree	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110905	Area 3	07.02-18.58	121.6	84.1	83.0
	(SRU, Utility)				

  
(Miss Katesarin Vorradetwittaya)

Environmental Scientist

  
(Miss Sununta Sirawuttinanon)

Technical Management Team

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SECOT CO., LTD.

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

### NOISE MEASUREMENT REPORT : NOISE DOSE


CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2505-0098
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 22/05/2025	CALIBRATOR TYPE	: Cirrus RC 110A
MEASUREMENT LOCATION	: Process Area	SERIAL NO.	: 95167
SITE OPERATOR	: Miss Salisa Ainree	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110767	Area 4	07.22-19.00	93.7	83.0	83.0
	(RFCCU)				



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



(Miss Sununta Sirawuttinanon)

Technical Management Team

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ภาคผนวก จ

ข้อมูลการตรวจเทียบเครื่องมือ  
(Calibration Data Sheets)

## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E04NI99E15AC084 Reference Number: 82-401409170-1  
Cylinder Number: EB0102326 Cylinder Volume: 144.4 CF  
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2015 PSIG  
PGVP Number: B52019 Valve Outlet: 660  
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Feb 05, 2019

Expiration Date: Feb 05, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	51.01 PPM	G1	+/- 0.9% NIST Traceable	01/28/2019, 02/05/2019
NITRIC OXIDE	50.00 PPM	50.86 PPM	G1	+/- 0.9% NIST Traceable	01/28/2019, 02/05/2019
SULFUR DIOXIDE	50.00 PPM	50.87 PPM	G1	+/- 1.0% NIST Traceable	01/28/2019, 02/05/2019
CARBON MONOXIDE	0.5000 %	0.5050 %	G1	+/- 0.7% NIST Traceable	01/31/2019
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060205	CC401947	4950 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Feb 15, 2019
PRM	12367	APEX1098237	9.82 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Jun 02, 2017
NTRM	12010724	KAL004497	50.03 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Mar 12, 2024
GMIS	1114201601	CC606710	4.871 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 14, 2019
NTRM	14010327	KAL004376	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 17, 2024

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Siemens Ultramat 6 J3-599 CO/HIGH	NDIR	Jan 18, 2019
Nicolet 6700 APW1100391 NO	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 NO2	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 SO2	FTIR	Jan 10, 2019

Triad Data Available Upon Request

PERMANENT NOTES: PRODUCED IN ACCORDANCE WITH ISO17025 REQUIREMENTS

#### NOTES:

Gross Weight: 27806.3 grams

Net Weight: 4733.2 grams

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



TESTING CERT No. 3082.05

*[Signature]*  
Approved for Release

Reference No: BH-033/01/25



## High Volume TSP&PM-10 Calibration Report

Date: 14-Jan-25

Ta (°C): 24

Pa (mm Hg): 763

### Orifice Transfer Standard Calibration

Equipment: Orifice

Model No: TE-5025A

Serial No: 3674

Manufacturer: TISCH

Slope (m): 2.14057

Intercept (b): -0.07783

### Unit Under Test

Equipment: High-vol pump

Model No: TE-5005X

Serial No: BH-033

### High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	12.7	17.86	60.293	
13	10.13	14.76	53.985	
10	7.77	11.66	47.440	
7	5.03	7.65	38.420	
5	2.98	4.83	29.868	

### Linear Regression

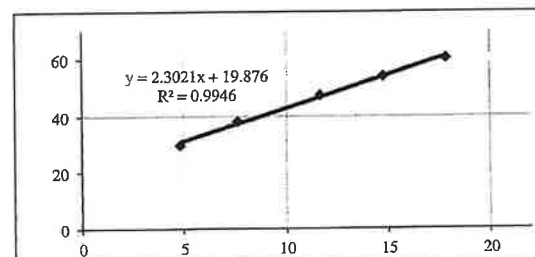
Slope: 2.3021

Intercept: 19.8758

Corr. Coeff: 0.9973

Flow PM-10: 8.7418

Flow TSP: 13.0858



Calibrated by: *[Signature]*

Approved by: *[Signature]*

Reference No: BH-014/01/25



## High Volume TSP&PM-10 Calibration Report

Date: 14-Jan-25

Ta (°C): 27

Pa (mm Hg): 761

### Orifice Transfer Standard Calibration

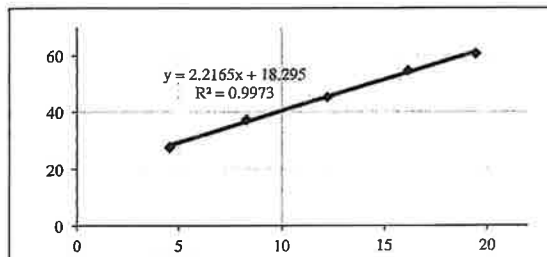
Equipment: Orifice  
 Model No: TE-5025A  
 Serial No: 3674  
 Manufacturer: TISCH  
 Slope (m): 2.14057  
 Intercept (b): -0.07783

### Unit Under Test

Equipment: High-vol pump  
 Model No: TE-5005X  
 Serial No: BH-014

### High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	13.06	19.46	60.745	
13	10.57	16.15	54.778	
10	7.16	12.22	45.311	
7	4.81	8.28	37.370	
5	2.58	4.55	27.713	



### Linear Regression

Slope: 2.2165  
 Intercept: 18.2948  
 Corr. Coeff: 0.9987  
 Flow PM-10: 9.7925  
 Flow TSP: 14.3041

Calibrated by: W. Panyu K.

Approved by: [Signature]

Reference No: BH-003/01/25



## High Volume TSP&PM-10 Calibration Report

Date: 15-Jan-25

Ta (°C): 29

Pa (mm Hg): 760

### Orifice Transfer Standard Calibration

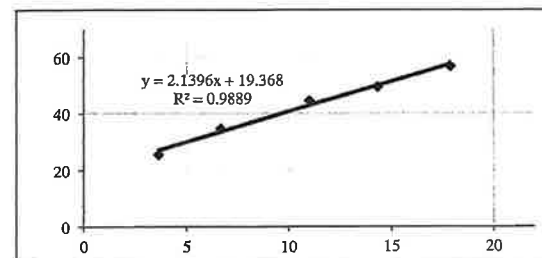
Equipment: Orifice  
 Model No: TE-5025A  
 Serial No: 3674  
 Manufacturer: TISCH  
 Slope (m): 2.14057  
 Intercept (b): -0.07783

### Unit Under Test

Equipment: High-vol pump  
 Model No: TE-5005X  
 Serial No: BH-003

### High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	11.51	17.86	56.884	
13	8.66	14.33	49.512	
10	6.98	11.02	44.582	
7	4.15	6.65	34.670	
5	2.21	3.63	25.647	



### Linear Regression

Slope: 2.1396  
 Intercept: 19.3682  
 Corr. Coeff: 0.9944  
 Flow PM-10: 9.6428  
 Flow TSP: 14.3165

Calibrated by: W. Panyu K.

Approved by: [Signature]

Reference No: BH-005/01/25



## High Volume TSP&PM-10 Calibration Report

Date: 13-Jan-25

 Ta (°C): 19  
 Pa (mm Hg): 763

### Orifice Transfer Standard Calibration

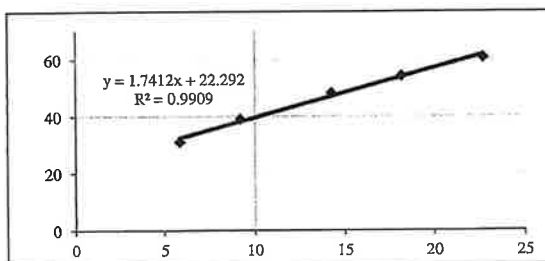
 Equipment: Orifice  
 Model No: TE-5025A  
 Serial No: 3674  
 Manufacturer: TISCH  
 Slope (m): 2.14057  
 Intercept (b): -0.07783

### Unit Under Test

 Equipment: High-vol pump  
 Model No: TE-5005X  
 Serial No: BH-005

### High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	12.7	22.71	60.796	
13	10.1	18.19	54.355	
10	7.91	14.25	48.251	
7	5.14	9.19	39.144	
5	3.18	5.82	31.063	



### Linear Regression

 Slope: 1.7412  
 Intercept: 22.2916  
 Corr. Coeff: 0.9955  
 Flow PM-10: 10.1705  
 Flow TSP: 15.9137

Calibrated by: William Jr.

Approved by: [Signature]

Reference No: BH-007/01/25



## High Volume TSP&PM-10 Calibration Report

Date: 16-Jan-25

 Ta (°C): 30  
 Pa (mm Hg): 760

### Orifice Transfer Standard Calibration

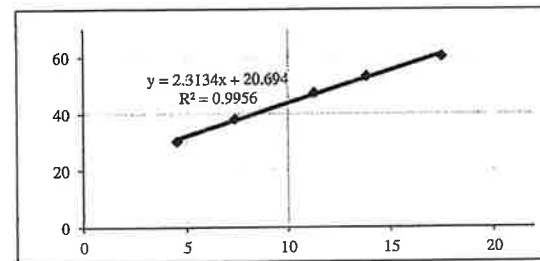
 Equipment: Orifice  
 Model No: TE-5025A  
 Serial No: 3674  
 Manufacturer: TISCH  
 Slope (m): 2.14057  
 Intercept (b): -0.07783

### Unit Under Test

 Equipment: High-vol pump  
 Model No: TE-5005X  
 Serial No: BH-007

### High Volume TSP&PM-10 Calibration Report

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	13.03	17.50	60.344	
13	10.1	13.84	53.281	
10	7.94	11.28	47.387	
7	5.12	7.37	38.305	
5	3.15	4.55	30.323	



### Linear Regression

 Slope: 2.3134  
 Intercept: 20.6942  
 Corr. Coeff: 0.9978  
 Flow PM-10: 8.3453  
 Flow TSP: 12.6680

Calibrated by: William Jr.

Approved by: [Signature]





Reference No: BH-011/01/25

**High Volume TSP&PM-10 Calibration Report**

Date: 15-Jan-25

Ta (°C): 23

Pa (mm Hg): 762

**Orifice Transfer Standard Calibration**

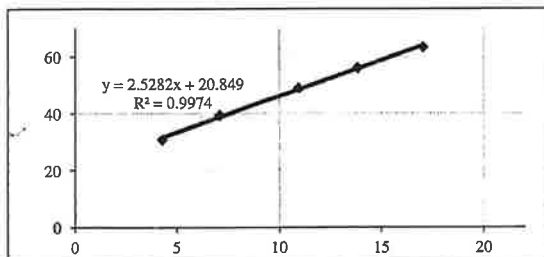
Equipment: Orifice  
 Model No: TE-5025A  
 Serial No: 3674  
 Manufacturer: TISCH  
 Slope (m): 2.14057  
 Intercept (b): -0.07783

**Unit Under Test**

Equipment: High-vol pump  
 Model No: TE-5005X  
 Serial No: BH-011

**High Volume TSP&PM-10 Calibration Report**

Plate	TRUE (in H <sub>2</sub> O)	Indicate (X) (cm H <sub>2</sub> O)	Actual Flow (Y) (cfm)	Remark
18	14.03	17.07	63.370	
13	10.96	13.84	56.158	
10	8.3	10.95	49.037	
7	5.28	7.09	39.371	
5	3.18	4.27	30.842	

**Linear Regression**

Slope: 2.5282  
 Intercept: 20.8489  
 Corr. Coeff: 0.9987  
 Flow PM-10: 7.5750  
 Flow TSP: 11.5303

Calibrated by: *Mitthaya K.*Approved by: *[Signature]*

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 Changwat Pathumthani 12120, Thailand  
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 E-Mail: envserv@secot.co.th



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Sol 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-68/0279

MTC.No.23-68/0279-02

Number of page(s) 2

**CALIBRATION CERTIFICATE****Nomenclature : DRYCAL**

Manufacturer : Mesa Labs

Serial No.: 114069

Model : Defender 520-H

Scale range : 300 ml/min to 30,000 ml/min

Subdivision : ( 0.0001, 0.001 ) L/min

Submitted by : SECOT CO.,LTD.

239, Rimklongprapa Road, Bangsue,

Bangkok 10800, Thailand.

Received date : 13 February 2025 Condition of measured item : Normal

Calibration date : 25 February 2025

Standard :	Standard	Certificate No.	Date due	Traceability
	RTD Thermometer	PSL-T 0811/67	3-Jul-26	TISTR
	Molbox/Pressure Transducer/UpStream	MP-0076-23	2-Apr-25	NIMT
	Primary Flow Calibrator S/N 119216	MW-0035-23	31-May-25	NIMT

Calibrated by : *Terasak Panna*  
 (Mr.Terasak Panna)

Approved by : *[Signature]*  
 (Ms.Kirana Luanghuan)  
 Director  
 Mechanical Engineering Standards Laboratory  
 Ref. 2013268021300656002  
 Issued Date 28 February 2025

The results relate only to the items tested/calibrated or value assigned.  
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FM.BL.MTC.002 Rev.5

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 Fax. (66) 0 2577 9009

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 Changwat Samutprakan 10280, Thailand  
 Tel. (66) 0 2323 1672-80 ext. 115, 116  
 (66) 08 3219 9440  
 E-mail : mtc@tistr.or.th Website : www.tistr.or.th

**Office**

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



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-68/0279

2/2

MTC.No.23-68/0279-02

**Calibration point :** (1.5, 5.0, 10, 15, 25) l/min

**Ambient condition :** Temperature (23 ± 3) °C , Relative humidity (55 ± 15) %

Atmospheric pressure (1010 ± 13) hPa

**Calibration method :** The flowmeter (UUC) was calibrated by comparison method with standard flowmeter according to CP-370.01.

The reported value is the value that converted to value at reference condition within pressure and temperature of the actual gas entering the UUC

**Measurement data :**

UUC Value (L/min)	Standard Value (L/min)	Temperature (°C)	Pressure (hPa)	Deviation (%)	Uncertainty (%)
1.5010	1.4862	24.354	1011.40	+0.99	0.91
5.0202	4.9882	24.364	1013.95	+0.64	0.89
9.9989	9.9228	24.319	1020.22	+0.77	0.89
15.033	14.819	24.342	1030.37	+1.44	0.89
25.136	24.152	24.331	1061.30	+4.08	0.89

The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor  $k=2$ , which provides a level of confidence of approximately 95%.

The end of calibration certificate.

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Tel. (66) 0 2323 1672-80 ext. 115, 116  
(66) 08 3219 9440  
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

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



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-68/0279

MTC.No.23-68/0279-01

Number of page(s) 2

## CALIBRATION CERTIFICATE

**Nomenclature : DRYCAL**

Manufacturer : Mesa Labs

Serial No.: 160100

Model : Defender 520-L

Scale range : 5 ml/min to 500 ml/min

Subdivision : ( 0.001, 0.01) ml/min

**Submitted by : SECOT CO.,LTD.**

239, Rimklongprapa Road, Bangsue,  
Bangkok 10800, Thailand.

**Received date :** 13 February 2025

**Condition of measured item :** Normal

**Calibration date :** 24 February 2025

**Standard :**

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 0811/67	3-Jul-26	TISTR
Molbox/Pressure Transducer/UpStream	MP-0076-23	2-Apr-25	NIMT
Primary Flow Calibrator S/N 117982	MW-0034-23	11-Jun-25	NIMT

**Calibrated by :** Terasak Panna  
(Mr.Terasak Panna)

**Approved by :** Ms. Kirana Luanghirun  
(Ms.Kirana Luanghirun)  
Director  
Mechanical Engineering Standards Laboratory

Ref. 2013268021300656001

Issued Date 28 February 2025

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FM.BL.MTC.002 Rev.5

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Changwat Pathumthani 12120, Thailand  
Tel. (66) 0 2577 9036  
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(66) 08 1889 6827



Sheet No. : CAL-M5008/01/25

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Sol 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-68/0279

2/2

MTC.No.23-68/0279-01

**Calibration point :** (20, 50, 100, 200, 400) ml/min**Ambient condition :** Temperature (  $23 \pm 3$  ) °C , Relative humidity (  $55 \pm 15$  ) %Atmospheric pressure (  $1010 \pm 13$  ) hPa**Calibration method :** The flowmeter (UUC) was calibrated by comparison method with standard flowmeter according to CP-370.01.

The reported value is the value that converted to value at reference condition within pressure and temperature of the actual gas entering the UUC

**Measurement data :**

UUC Value (ml/min)	Standard Value (ml/min)	Temperature (°C)	Pressure (hPa)	Deviation (%)	Uncertainty (%)
20.473*	20.340	24.275	1011.42	+0.65	0.94
49.952	50.732	24.057	1011.52	-1.54	0.95
99.449	99.622	24.102	1011.62	-0.17	0.93
200.34	199.94	24.133	1011.77	+0.20	0.93
401.89	397.98	24.140	1012.07	+0.98	0.93

The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor  $k=2$ , which provides a level of confidence of approximately 95%.

\* : The calibration point is not the scope of accreditation.

The end of calibration certificate.

T<sub>sc</sub>

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

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

**Head Office**35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,  
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(66) 08 3219 9440  
E-mail : mtc@tistr.or.th Website : www.tistr.or.th**Office**196 Phahonyothin Road, Ladyao, Chatuchak,  
Bangkok 10900, Thailand  
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217  
(66) 08 1889 6827**CONTROL UNIT CALIBRATION**  
(Metric units, mm)

Date 8 Jan 25

Initial	Final	Average	
Barometric press, Pb	759	759	759 mmHg

**Dry Gas Meter Data****Reference Dry Gas Meter Data**

Console No. M50-08

Serial No. 358794

Metering System ID

Model S110

DGM Number 975906

Correction factor (Yr) 1.0077

DGM Model ES-110

Last Calibration Date 25 Oct 24

Calibrated by : Montri P.

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V <sub>r</sub> Liters	DGM Volume V <sub>m</sub> Liters	Temperature (°C)				Time ⊙ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T <sub>r</sub>	Dry Gas Meter					
				Inlet T <sub>i</sub>	Outlet T <sub>o</sub>	Avg T <sub>m</sub>			
12.5	100.1	100.6	25	25	24	24.5	8.83	0.9999	44.1498
25.0	100.1	100.6	25	25	24	24.5	6.17	0.9985	43.0855
50.0	100.2	101.0	25	25	24	24.5	4.22	0.9941	40.1536
76.0	100.1	100.9	25	25	24	24.5	3.48	0.9910	41.7921
100.0	100.0	100.5	25	25	24	24.5	3.48	0.9917	40.8171
150.0	100.0	100.3	25	25	24	24.5	2.48	0.9893	41.9313

Average 0.9941 41.9882

Approved by :

SECOT CO., LTD.  
239 Rimkongsapra Rd. Bangrut, Bangkok, 10500, THAILAND  
Tel. (662) 9593600 Fax: (662) 9593535  
E-Mail: enviro@secot.co.th



## CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 9 Jan 25

Initial Final Average  
Barometric press, Pb 758 758 758 mmHg

## Dry Gas Meter Data

Console No. M50-09

Metering System ID

DGM Number 333249

DGM Model ES-110

Calibrated by : Montri P.

## Reference Dry Gas Meter Data

Serial No. 358794


Model S110

Correction factor (Yr) 1.0077

Last Calibration Date 25 Oct 24

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V <sub>r</sub> Liters	DGM Volume V <sub>m</sub> Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T <sub>r</sub>	Dry Gas Meter					
				Inlet T <sub>i</sub>	Outlet T <sub>o</sub>	Avg T <sub>m</sub>			
12.5	100.1	101.3	25	25	24	24.5	8.57	0.9926	41.6238
25.0	100.2	100.4	25	25	24	24.5	6.23	1.0012	44.0131
50.0	100.1	100.5	25	25	24	24.5	4.42	0.9965	44.2732
76.0	100.2	99.7	25	25	24	24.5	3.58	1.0037	44.1905
100.0	100.3	99.6	25	25	24	24.5	3.58	1.0034	45.3098
150.0	100.3	99.2	25	25	24	24.5	2.60	1.0029	45.7895

Average 1.0000 44.2000

Approved by : 

## CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 6 Jan 25

Initial Final Average  
Barometric press, Pb 758 758 758 mmHg

## Dry Gas Meter Data

Console No. M50-06

Metering System ID

DGM Number 917415

DGM Model MST-C2-1

Calibrated by : Montri P.

## Reference Dry Gas Meter Data

Serial No. 358794

Model S110

Correction factor (Yr) 1.0077

Last Calibration Date 25 Oct 24

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V <sub>r</sub> , Liters	DGM Volume V <sub>m</sub> Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T <sub>r</sub>	Dry Gas Meter					
				Inlet T <sub>i</sub>	Outlet T <sub>o</sub>	Avg T <sub>m</sub>			
12.5	100.0	99.8	25	25	24	24.5	8.92	1.0071	45.1453
25.0	100.2	100.4	25	25	24	24.5	6.13	1.0020	42.5581
50.0	100.0	100.9	25	25	24	24.5	4.33	0.9923	42.6407
76.0	100.1	102.5	25	25	24	24.5	3.53	0.9756	43.0400
100.0	100.1	102.2	25	25	24	24.5	3.53	0.9755	43.5926
150.0	100.0	101.5	25	25	24	24.5	2.53	0.9774	43.7294

Average 0.9883 43.4510

Approved by : 



## PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS20-01

Calibrated by : Mr. Montri P.

## A Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

C<sub>P(A),avg</sub> 0.8401

## B Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	0.0065
2	15.0	21.5	0.8269	-0.0033
3	15.0	21.5	0.8269	-0.0033

C<sub>P(B),avg</sub> 0.8302

| CP(A)-CP(B) | = 0.0099

C<sub>P(Avg)</sub> = 0.8351

Approved by :

\*\*\*  $\delta$  must be  $\leq 0.01$  for the test to be acceptable \*\*\*  
 \*\*\* | Cp(A)-Cp(B) | must also be  $< 0.01$  if average of Cp(A) and Cp(B) is to be used \*\*\*



## PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS20-02

Calibrated by : Mr. Montri P.

## A Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(A)
1	15.0	20.5	0.8468	0.0000
2	15.0	20.5	0.8468	0.0000
3	15.0	20.5	0.8468	0.0000

C<sub>P(A),avg</sub> 0.8468

## B Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	-0.0034
2	15.0	21.0	0.8367	-0.0034
3	15.0	20.5	0.8468	0.0068

C<sub>P(B),avg</sub> 0.8401

| CP(A)-CP(B) | = 0.0068

C<sub>P(Avg)</sub> = 0.8435

Approved by :

\*\*\*  $\delta$  must be  $\leq 0.01$  for the test to be acceptable \*\*\*  
 \*\*\* | Cp(A)-Cp(B) | must also be  $< 0.01$  if average of Cp(A) and Cp(B) is to be used \*\*\*



## PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 04-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PV15-03

Calibrated by : Mr. Montri P.

## A Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(A)
1	15.0	21.5	0.8269	-0.0065
2	15.0	21.0	0.8367	0.0033
3	15.0	21.0	0.8367	0.0033

C<sub>P(A),avg</sub> 0.8334

## B Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(B)
1	15.0	21.5	0.8269	-0.0065
2	15.0	21.0	0.8367	0.0033
3	15.0	21.0	0.8367	0.0033

C<sub>P(B),avg</sub> 0.8334

| CP(A)-CP(B) | = 0.0000

C<sub>P(Avg)</sub> = 0.8334

Approved by :

\*\*\*  $\delta$  must be  $\leq 0.01$  for the test to be acceptable \*\*\*  
 \*\*\* | Cp(A)-Cp(B) | must also be  $< 0.01$  if average of Cp(A) and Cp(B) is to be used \*\*\*



## PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date : 03-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No. : Std-02

Coefficient (Cp) : 0.99

Type S Pitot No. : PS10-01

Calibrated by : Mr. Montri P.

## A Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

C<sub>P(A),avg</sub> 0.8401

## B Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(B)
1	15.0	21.0	0.8367	-0.0034
2	15.0	20.5	0.8468	0.0068
3	15.0	21.0	0.8367	-0.0034

C<sub>P(B),avg</sub> 0.8401

| CP(A)-CP(B) | = 0.0000

C<sub>P(Avg)</sub> = 0.8401

Approved by :

\*\*\*  $\delta$  must be  $\leq 0.01$  for the test to be acceptable \*\*\*  
 \*\*\* | Cp(A)-Cp(B) | must also be  $< 0.01$  if average of Cp(A) and Cp(B) is to be used \*\*\*



## PITOT TUBE CALIBRATION REPORT

Calibration Location: SECOT

Calibration Date: 04-01-2025

Calibration Duct No.: CD-0123

Calibration Standard Pitot tube data

Pitot No.: Std-02

Coefficient (Cp): 0.99

Type S Pitot No.: LL10-01

Calibrated by: Mr. Montri P.

## A Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(A)
1	15.0	21.0	0.8367	-0.0068
2	15.0	20.5	0.8468	0.0034
3	15.0	20.5	0.8468	0.0034

C<sub>P(A),avg</sub> 0.8435

## B Side Calibration

Run No.	$\Delta P_{std}$ (mm H <sub>2</sub> O)	$\Delta P_s$ (mm H <sub>2</sub> O)	Cp(s)	Deviation, $\delta$ Cp(s) - Cp(B)
1	15.0	20.5	0.8468	0.0034
2	15.0	21.0	0.8367	-0.0068
3	15.0	20.5	0.8468	0.0034

C<sub>P(B),avg</sub> 0.8435

|CP(A)-CP(B)| = 0.0000

C<sub>P(Avg)</sub> = 0.8435

Approved by:

\*\*\*  $\delta$  must be  $\leq 0.01$  for the test to be acceptable \*\*\*  
 \*\*\* |Cp(A)-Cp(B)| must also be  $< 0.01$  if average of Cp(A) and Cp(B) is to be used \*\*\*

SECOT CO., LTD.  
 239 Rimklongpropa Rd, Bangsue, Bangkok, 10800, THAILAND  
 Tel: (662) 9393690 Fax: (662) 9393535  
 E-Mail: info@secot.co.th

THE LINDE GROUP

Linde

Certificate Of Analysis  
Special Gases Mixture

## Customer Details

Name:

Address:

Customer Tag No.:

Secot Co., Ltd.

239 Rimklongpropa Rd, Bangsue Khet Bangsue  
Bangkok 10800

## Certificate Details

Number: 0484/23

Date of Issue: 22-Feb-2023

Expiry date: 21-Feb-2027

Material Details

Production Order: 90176403

Material Code: 478100-J-62

Cylinder No.: 12360

Gas content:

6.520 M<sup>3</sup> (nominal)

Filling pressure: 145 bar (g)

Valve: CGA 590 BRASS

Cylinder Owner: LINDE

Cylinder Material: STEEL

Cylinder Size: 47 L

## Laboratory Report

Component

Nominal Concentration

Analysis Result<sup>1</sup>Uncertainty<sup>2</sup>Method of Analysis<sup>3</sup>

Oxygen

8.00%

7.94%

± 2% relative

(1) SG-O-01

In Nitrogen

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

## Comments

## Note:

- All results expressed in this report are on mole/mole basis, unless otherwise specified.
- The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
- (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F004  
 Iss:K/2, 15 Oct 2021

บริษัท สิบคี่ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาตประกอบอาชีพ 0101222000186

ชั้น 15 ถนนพหลโยธิน กม. 2/3 หมู่ 14 ถนนพหลโยธิน-ศรีนครินทร์ กม. 6.5 แขวงบางพลี

อ.บางพลี จ.สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โทรสารแบบเคลื่อนที่: 105 หมู่ 5 อ.บางพลี จ.สมุทรปราการ ถนนพหลโยธิน 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

REG. Registration No. 0107537000185

15<sup>th</sup> floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad Km. 6.5 Road, Bangnaeew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323

THE LINDE GROUP

Linde

Certificate Of Analysis  
Special Gases Mixture

## Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

## Certificate Details

Number: 0528/23 Date of Issue: 8-Mar-2023 Expiry date: 8-Mar-2026  
Material Details  
Production Order: 90176406 Material Code: 511600-SK-34 Cylinder No.: A00722SK  
Gas content: 5.20 M<sup>3</sup> Filling pressure: 137.0 bar Valve: CGA 660 SS  
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

## Laboratory Report

## Analytical Result

Component	Normal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Nitric Oxide	40.0 ppm	39.6 ppm	± 1% relative	(6) I-PB-352	1-Mar & 8-Mar-23
Other NOx Impurity		Less than 1.9 ppm			
Carbon Monoxide In Nitrogen	40.0 ppm	41.9 ppm	± 1% relative	(6) I-PB-352	1-Mar-2023

## Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide	133261SG	25.61 ± 0.13 ppm	6-May-2023
Carbon Monoxide In Nitrogen	N052320	25.03 ± 0.13 ppm	7-Oct-2023

## Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	28-Feb-2023
FTIR Spectrometers Nicolet iS50	FTIR-CO	25-Feb-2023

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

## Comments

When reordering, please quote the material number

## Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/S31 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.  
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.  
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonporn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

รายละเอียดการอนุมัติ 010727000785

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนมิตรภาพ-พหลโยธิน กม. 6.5 แขวงบางพลี

เขตบางพลี กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 แขวงบางพลี เขตบางพลี กรุงเทพมหานคร 10540

Linde (Thailand) Public Company Limited Iss:K/2, 15 Oct 2021

P.C. Registration No. 010727000785

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

PB-002/F006

THE LINDE GROUP

Linde

Certificate Of Analysis  
Special Gases Mixture

## Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

## Certificate Details

Number: 0275/22 Date of Issue: 4-Feb-2022 Expiry date: 4-Feb-2026  
Material Details  
Production Order: 90169722 Material Code: 631500-SK-44 Cylinder No.: D636195  
Gas content: 5.52 M<sup>3</sup> Filling pressure: 145.0 bar Valve: CGA 660 SS  
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

## Laboratory Report

## Analytical Result

Component	Normal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Sulphur Dioxide In Nitrogen	20.0 ppm	20.4 ppm	± 1% relative	(6) I-PB-352	28-Jan & 4-Feb-22

## Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide In Nitrogen	1457545G	25.03 ± 0.25 ppm	18-Aug-2022

## Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	27-Jan-2022

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

## Comments

When reordering, please quote the material number

## Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/S31 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.  
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.  
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonporn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

รายละเอียดการอนุมัติ 010727000785

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนมิตรภาพ-พหลโยธิน กม. 6.5 แขวงบางพลี

เขตบางพลี กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 แขวงบางพลี เขตบางพลี กรุงเทพมหานคร 10540

โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

330

Linde (Thailand) Public Company Limited Iss:K/2, 15 Oct 2021

P.C. Registration No. 010727000785

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

PB-002/F006



Making our world more productive



### Certificate Of Analysis Special Gases Mixture

Customer Details						
Name:		Address:		Customer Tag No.:		
Secot Co., Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok				
		10800				
Certificate Details						
Number:		2661/24	Date of Issue:	27-Aug-2024	Expiry date:	27-Aug-2027
Material Details						
Production Order:		90185790	Material Code:	477100-AL-44	Cylinder No.:	D339466
Gas content:		6,900 M <sup>3</sup>	Filling pressure:	145 bar	Valve:	CGA 660 SS
Cylinder Owner:		LINDE	Cylinder Material:	Aluminum	Cylinder Size:	50 L

**Laboratory Report***Analytical Result*

Component	Nominal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Nitric Oxide	800 ppm	799 ppm	± 1% relative	(6) I-PB-352	19-827-Aug-2024
Other Nox impurity in Nitrogen		Less than 39.9 ppm			

*Reference Standard used in Assay*

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide in Nitrogen	15559	528.7 ± 2.6 ppm	1-May-2026

*Analytical Instruments used in Assay*

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-NO	30-Jul-2024

**Recommend usage condition**

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

**Comments**

When reordering, please quote the material number

**Note:**

- All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
- The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
- (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Page 1 of 1

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Sukanya Parinyasontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PG-002/F006

Iss:M/1, 01 December 2023

Linde (Thailand) Public Company Limited

P.C. Registration No. 010/537001735

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaeew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant : 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

P.C. Registration No. 010/537001735

ชั้น 15 อาคารบางนาทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา  
แควใหญ่ อ.บางนาเขต 10540 โทร (66) 2338-6100 โทรสาร (66) 2338-6333  
โรงงานเวลโกรว์ : 105 หมู่ 5 ต.บางสมัก อ.บางปะกง จ.ฉะเชิงเทรา 24180  
โทร (66) 38.570-479-93 โทรสาร (66) 38.570-323

THE LINDE GROUP



### Certificate Of Analysis Special Gases Mixture

Customer Details					
Name:		Address:		Customer Tag No.:	
Secot Co.,Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok			
		10800			
Certificate Details					
Number:	2135/20	Date of Issue:	19-May-2020	Expiry date:	18-May-2028
Material Details					
Production Order:	90160199	Material Code:	477200-AL-44	Cylinder No.:	D595120
Gas content:	6.90 M <sup>3</sup>	Filling pressure:	145.0 bar	Valve:	CGA 660 SS
Cylinder Owner:	LINDE	Cylinder Material:	Aluminum	Cylinder Size:	50 L

**Laboratory Report***Analytical Result*

Component	Nominal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Sulphur Dioxide in Nitrogen	800 ppm	802 ppm	± 1% relative	(6) I-PB-352	12-May & 19-May-20

*Reference Standard used in Assay*

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide in Nitrogen	20583856	514.9 ± 2.4 ppm	18-Dec-2020

*Analytical Instruments used in Assay*

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-SO2	11-May-2020

**Recommend usage condition**

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

**Comments**

When reordering, please quote the material number

**Note:**

- All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
- The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
- (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Page 1 of 1

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Sukanya Parinyasontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PG-002/F006

Linde (Thailand) Public Company Limited

P.C. Registration No. 010/537001735

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaeew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant : 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

P.C. Registration No. 010/537001735

ชั้น 15 อาคารบางนาทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา  
แควใหญ่ อ.บางนาเขต 10540 โทร (66) 2338-6100 โทรสาร (66) 2338-6333  
โรงงานเวลโกรว์ : 105 หมู่ 5 ต.บางสมัก อ.บางปะกง จ.ฉะเชิงเทรา 24180  
โทร (66) 38.570-479-93 โทรสาร (66) 38.570-323

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### Certificate Of Analysis Special Gases Mixture

Customer Details						
Name:		Address:		Customer Tag No.:		
Secot Co.,Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok 10800		-		
Certificate Details						
Number:		1394/24	Date of Issue:	24-May-2024	Expiry date:	24-May-2027
Material Details						
Production Order:		90183672	Material Code:	436700-SK-34	Cylinder No.:	A00896SK
Gas content:		5.230 M³	Filling pressure:	137 bar	Valve:	CGA 660 SS
Cylinder Owner:		LINDE	Cylinder Material:	Spectra seal	Cylinder Size:	40 L

**Laboratory Report***Analytical Result*

Component	Nominal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Nitric Oxide	80.0 ppm	79.6 ppm	± 1% relative	(6) I-PB-352	15/23-May-2024
Other NOx impurity		Less Than 3.9 ppm			
Carbon Monoxide	80.0 ppm	81.7 ppm	± 1% relative	(6) I-PB-352	15/23-May-2024
In Nitrogen					

*Reference Standard used in Assay*

Reference Standard	Cylinder number	Concentration	Expiry date:
Carbon Monoxide	D619725	70.6 ± 0.2 ppm	20-Sep-2026
Nitric Oxide	D619725	70.6 ± 0.2 ppm	20-Sep-2026
In Nitrogen			

*Analytical Instruments used in Assay*

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-CO	7-May-2024
FTIR Spectrometers Nicolet iS50	FTIR-NO	7-May-2024

**Recommend usage condition**

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

**Comments**

When reordering, please quote the material number

**Note:**

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F006  
Iss: M/1, 01 December 2023**บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)**

เลขที่ใบอนุญาตประกอบกิจการ: 01/01/2557

ชั้น 15 อาคารทาวเวอร์ 10 2/3 หมู่ 14 ถนนรามคำแหง-สุขุมวิท กม. 6.5 แขวงคลองเตย  
เขตคลองเตย กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333  
โรงงานผลิตแก๊ส: 105 หมู่ 5 ตำบลวัดใหม่ อำเภอลำลูกกา จังหวัดปทุมธานี 24180  
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

**Linde (Thailand) Public Company Limited**

PLC Registration No. 0107537000765

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

THE LINDE GROUP



### Certificate Of Analysis Special Gases Mixture

Customer Details					
Name:		Address:		Customer Tag No.:	
Secot Co., Ltd.		239 Rimklongpropa Rd. Bangsue Khet Bangsue Bangkok 10800			
Certificate Details					
Number:		0483/23		Date of Issue:	
				22-Feb-2023	
Material Details				Expiry date:	
				21-Feb-2027	
Production Order:		90176403		Material Code:	
				478100-J-62	
Gas content:		6.520 M³ (nominal)		Cylinder No.:	
				51108	
Cylinder Owner:		LINDE		Valve:	
				CGA 590 BRASS	
		Cylinder Material:		Cylinder Size:	
		STEEL		47 L	

**Laboratory Report**

Component	Nominal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>
Oxygen	8.00%	7.93%	± 2% relative	(1) SG-O-01
In Nitrogen				

**Recommend usage condition**

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

**Comments****Note:**

1. All results expressed in this report are on mole/mole basis, unless otherwise specified.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F004

Iss: K/2, 15 Oct 2021

**Linde (Thailand) Public Company Limited**

PLC Registration No. 0107537000765

15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

**บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)**

เลขที่ใบอนุญาตประกอบกิจการ: 01/01/2557

ชั้น 15 อาคารทาวเวอร์ 10 2/3 หมู่ 14 ถนนรามคำแหง-สุขุมวิท กม. 6.5 แขวงคลองเตย  
เขตคลองเตย กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333  
โรงงานผลิตแก๊ส: 105 หมู่ 5 ตำบลวัดใหม่ อำเภอลำลูกกา จังหวัดปทุมธานี 24180  
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

THE LINDE GROUP

Linde

Certificate Of Analysis  
Special Gases Mixture

## Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

## Certificate Details

Number: 0527/23 Date of Issue: 8-Mar-2023 Expiry date: 8-Mar-2026  
Material Details  
Production Order: 90176406 Material Code: 511600-SK-34 Cylinder No.: A00878SK  
Gas content: 5.20 M<sup>3</sup> Filling pressure: 137.0 bar Valve: CGA 660 SS  
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

## Laboratory Report

## Analytical Result

Component	Normal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Nitric Oxide	40.0 ppm	39.8 ppm	± 1% relative	(6) I-PB-352	1-Mar & 8-Mar-23
Other NOx impurity		Less than 1.9 ppm			
Carbon Monoxide in Nitrogen	40.0 ppm	42.0 ppm	± 1% relative	(6) I-PB-352	1-Mar-2023

## Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide	1332615G	25.61 ± 0.13 ppm	6-May-2023
Carbon Monoxide in Nitrogen	ND52320	25.03 ± 0.13 ppm	7-Oct-2023

## Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	28-Feb-2023
FTIR Spectrometers Nicolet iS50	FTIR-CO	25-Feb-2023

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

## Comments

When reordering, please quote the material number

## Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.  
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.  
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasontorn  
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบแจ้งหนี้: 0105337000785

ชั้น 15 อาคารทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลอง

บางพลี เขตอุตสาหกรรม 10540 กรุงเทพมหานคร (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานบางพลี: 105 หมู่ 5 แขวงคลองบางพลีใหญ่ เขตอุตสาหกรรม 24180

โทรสาร (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited Iss:K/2, 15 Oct 2021  
P.O. Box 105337000785  
15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

THE LINDE GROUP

Linde

Certificate Of Analysis  
Special Gases Mixture

## Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

## Certificate Details

Number: 0742/23 Date of Issue: 29-Mar-2023 Expiry date: 29-Mar-2027  
Material Details  
Production Order: 90176408 Material Code: 608400-SK-44 Cylinder No.: A009405K  
Gas content: 5.52 M<sup>3</sup> Filling pressure: 145.0 bar Valve: CGA 660 SS  
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

## Laboratory Report

## Analytical Result

Component	Normal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Sulphur Dioxide in Nitrogen	40.0 ppm	40.2 ppm	± 1% relative	(6) I-PB-352	22-Mar & 29-Mar-23

## Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide in Nitrogen	256240	52.73 ± 0.42 ppm	6-May-2023

## Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	17-Mar-2023

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

## Comments

When reordering, please quote the material number

## Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.  
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.  
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasontorn  
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบแจ้งหนี้: 0105337000785

ชั้น 15 อาคารทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลอง

บางพลี เขตอุตสาหกรรม 10540 กรุงเทพมหานคร (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานบางพลี: 105 หมู่ 5 แขวงคลองบางพลีใหญ่ เขตอุตสาหกรรม 24180

โทรสาร (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited Iss:K/2, 15 Oct 2021  
P.O. Box 105337000785  
15<sup>th</sup> Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew  
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333  
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180  
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

Making our world more productive



### Certificate Of Analysis Special Gases Mixture

Customer Details		Address:		Customer Tag No.:	
Name:		239, Rimklongprapa Rd , Bangsue, Bangkok			
Secot Co.,Ltd.		10800			
Certificate Details					
Number:	1393/24	Date of Issue:	24-May-2024	Expiry date:	24-May-2027
Material Details					
Production Order:	90183672	Material Code:	436700-SK-34	Cylinder No.:	A009875K
Gas content:	6.900 M <sup>3</sup>	Filling pressure:	145 bar	Valve:	CGA 660 SS
Cylinder Owner:	LINDE	Cylinder Material:	Spectra seal	Cylinder Size:	40 L
Laboratory Report					
Analytical Result					
Component	Nominal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Nitric Oxide	80.0 ppm	79.0 ppm	± 1% relative	(6) I-PB-352	15 & 23-May -2024
Other NOx impurity		Less Than 3.9 ppm			
Carbon Monoxide In Nitrogen	80.0 ppm	81.7 ppm	± 1% relative	(6) I-PB-352	15 & 23-May -2024
Reference Standard used in Assay					
Reference Standard	Cylinder number	Concentration	Expiry date:		
Carbon Monoxide	D619725	70.6 ± 0.2 ppm	20-Sep-2026		
Nitric Oxide In Nitrogen	D619725	70.6 ± 0.2 ppm	20-Sep-2026		
Analytical Instruments used in Assay					
Instrument/Make/Model	Analytical Principle		Last Multipoint Calibration		
FTIR Spectrometers Nicolet iS50	FTIR-CO		7-May-2024		
FTIR Spectrometers Nicolet iS50	FTIR-NO		7-May-2024		

#### Recommend usage condition

Minimum utilization: 5% of actual content or before expiry date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

#### Comments

When reordering, please quote the material number

#### Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Page 1 of 1

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Sukanya Parinyasontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F006

Iss:M/1, 01 December 2023

#### บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาตประกอบกิจการ 0107537000183

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลองเตย

เขตคลองเตย กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โทรสารมือถือ: 105 หมู่ 5 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 24180

โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

#### Linde (Thailand) Public Company Limited

ร.ค. เลขที่ใบอนุญาตประกอบกิจการ 0107537000183

15\* Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

THE LINDE GROUP



### Certificate Of Analysis Special Gases Mixture

Customer Details						
Name:		Address:		Customer Tag No.:		
Secot Co.,Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok 10800				
Certificate Details						
Number:		0273/22	Date of Issue:	4-Feb-2022	Expiry date:	4-Feb-2030
Material Details						
Production Order:		90169723	Material Code:	445100-SK-44	Cylinder No.:	D636047
Gas content:		5.52 M <sup>3</sup>	Filling pressure:	145.0 bar	Valve:	CGA 660 SS
Cylinder Owner:		LINDE	Cylinder Material:	Spectra seal	Cylinder Size:	40 L
Laboratory Report						
Analytical Result						
Component		Normal Concentration	Analysis Result <sup>1</sup>	Uncertainty <sup>2</sup>	Method of Analysis <sup>3</sup>	Assay Date
Sulphur Dioxide In Nitrogen		80.0 ppm	81.0 ppm	± 1% relative	(6) I-PB-352	28-Jan & 4-Feb-22
Reference Standard used in Assay						
Reference Standard		Cylinder number	Concentration		Expiry date:	
Sulphur Dioxide In Nitrogen		256240	52.73 ± 0.42 ppm		6-May-2023	
Analytical Instruments used in Assay						
Instrument/Make/Model		Analytical Principle		Last Multipoint Calibration		
FTIR Spectrometers Nicolet iS50		FTIR-SO2		10-Jan-2022		

#### Recommend usage condition

Minimum utilization: 5% of actual content or before expiry date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

#### Comments

When reordering, please quote the material number

#### Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Page 1 of 1

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#### บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาตประกอบกิจการ 0107537000183

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลองเตย

เขตคลองเตย กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โทรสารมือถือ: 105 หมู่ 5 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 24180

โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

#### Linde (Thailand) Public Company Limited

ร.ค. เลขที่ใบอนุญาตประกอบกิจการ 0107537000183

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Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

PB-002/F006

Iss:K/2, 15 Oct 2021



ELECTRICAL AND ELECTRONICS INSTITUTE  
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

Tel: +66 2709 4860 Fax: +66 2324 0917



Certificate No.: CP20240363EA

Operation No.: CP2024090339

## Certificate of Calibration

Equipment: Sound Calibrator

Manufacturer: Cirrus Research Plc

Model/Type: CR:515

Serial No.: 97097

ID No.: -

Customer: SECOT Co.,Ltd.

Address: 239 Rimklongprapa Rd., Bangsue,  
Bangkok 10800 Thailand

Received Date: 30 September 2024

Calibrated Date: 2 October 2024

Issued Date: 4 October 2024

Calibrated by: Ms. Juntaporn Kunhakom

Approved by: \_\_\_\_\_

( Mr. Sittichai Swaksuriyawong )

Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor ( $k$ ) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE  
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240363EA

## Calibration Report

Equipment: Sound Calibrator  
Manufacturer: Cirrus Research Plc  
Model/Type: CR:515  
Serial No.: 97097  
ID No.: -  
Ambient Temperature: ( 23 ± 2 ) °C  
Relative Humidity: ( 50 ± 15 ) %  
Pressure: (101.3 ± 1.5) kPa

Method of Calibration :-

IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1007-24	6 June 2025
2) Waveform Generator	33511B	MY52302264	CK20240047EA	23 June 2025
3) Audio Analyzing DMM	2015-P	000136E	E1U2303776	7 December 2024
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P240022 CD20240180EA	20 March 2025 7 August 2025

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

3. This certification is traceable to the international system of unit maintained at :-

Reference standards instrument for Acoustic function

- National Institute of Metrology (Thailand)

Reference standards instrument for Electrical function

- Electrical and Electronics Institute; NSC Accredited Calibration No.0119

- NA Caltechnologies Co., Ltd.; ANAB Accredited Calibration No.AC-2658.

### Result of Calibration:-

1. Function : Sound pressure level

Normal	Specified Sound	Measured value	Deviated value <sup>[1]</sup>	Acceptance limit <sup>[3]</sup>
Frequency (Hz)	Pressure level (dB)	(dB)	(dB)	(dB)
1000	94	94.09	0.09	±0.25

2. Function : Frequency

Normal Sound	Specified Frequency	Measured value	Deviated value <sup>[2]</sup>	Acceptance limit <sup>[3]</sup>
Pressure level (dB)	(Hz)	(Hz)	(%)	(%)
94	1000	1000.31	0.03	±0.70



ELECTRICAL AND ELECTRONICS INSTITUTE  
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20240363EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure level (dB)	Normal Frequency (Hz)	Measured value <sup>[4]</sup> (%)	Acceptance limit <sup>[5]</sup> (%)
94	1000	0.60	2.50

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.15 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	0.50 %

Note: [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.  
[2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.  
[3] The acceptance limit is for the deviated value.  
[4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.  
[5] The acceptance limit is for the Measured value.

Remarks: 1. Acceptance limit was IEC 60942:2017 Class 1.  
2. Maximum-permitted uncertainty of measurement was IEC 60942:2017 Class 1.  
3. The coverage factor  $k = 2.00$

-- End of Report --

Sheet No. : CR-515-2025-137



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 17, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref. Calibrated (dB)	Eff. Calibrated (dB)
Cirrus	CR:515	97097	1000.00	94.0	93.7

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
14	Cirrus	CR162B	G300709	92.8	0.9
24	Cirrus	CR162C	G300832	93.7	0.0
26	Cirrus	CR162C	G300841	94.1	-0.4
27	Cirrus	CR162C	G301029	93.1	0.6
28	Cirrus	CR162C	G301065	93.7	0.0
40	Cirrus	CR162B	G302740	92.8	0.9
41	Cirrus	CR162B	G302737	92.7	1.0
42	Cirrus	CR162B	G302738	93.1	0.6
48	Cirrus	CR162B	G302237	93.3	0.4
49	Cirrus	CR162B	G302330	93.2	0.5
50	Cirrus	CR162B	G302333	94.0	-0.3

Calibrated by :

Approved by :



## SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Feb 20, 25

## ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref.Calibrated (dB)	Eff.Calibrated (dB)
Cirrus	CR:515	97097	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	SCARLET	ST-21D	820722	93.8	0.0
2	SCARLET	ST-21D	820723	93.8	0.0
4	SCARLET	ST-21D	820725	93.8	0.0
5	SCARLET	ST-21D	820726	93.7	0.1
6	SCARLET	ST-21D	820727	93.7	0.1
7	SCARLET	ST-21D	820728	93.8	0.0
8	SCARLET	ST-21D	820729	93.8	0.0
10	SCARLET	ST-21D	820731	93.7	0.1

Calibrated by :

Approved by :



## SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 22, 25

## ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref.Calibrated (dB)	Eff.Calibrated (dB)
Cirrus	CR:515	97097	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
7	SCARLET	ST-21D	820728	93.8	0.0
8	SCARLET	ST-21D	820729	93.8	0.0

Calibrated by :

Approved by :



## SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 28, 25

## ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref.Calibrated (dB)	Eff.Calibrated (dB)
Cirrus	CR:515	97097	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
2	SCARLET	ST-21D	820723	93.8	0.0
3	SCARLET	ST-21D	820724	93.8	0.0
5	SCARLET	ST-21D	820726	93.8	0.0
6	SCARLET	ST-21D	820727	93.8	0.0
7	SCARLET	ST-21D	820728	93.8	0.0
8	SCARLET	ST-21D	820729	93.8	0.0

Calibrated by :

Approved by :

## CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 29 April 2024

CERTIFICATE NUMBER 213338

NoiseMeters  
Acoustic House  
Bridlington Road  
Hunmanby  
YO14 0PH  
United Kingdom  
www.noisemeters.com

Page 1 of 2

Approved signatory  
N.Smith  
Electronically signed:

## doseBadge Reader : IEC 60942:2003

## Instrument information

Manufacturer: Pulsar Instruments

Notes:

Model: Model 22R

Serial number: 79781

Class: 2

## Test summary

Date of calibration: 29 April 2024

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942\_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or conclusion can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

Notes:

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



# CERTIFICATE OF CALIBRATION

Certificate Number:  
**213338**

Page 2 of 2

## Environmental conditions

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

**Before** Pressure: 100.34 kPa Temperature: 22.4 °C Humidity: 38.5 %  
**After** Pressure: 100.34 kPa Temperature: 22.7 °C Humidity: 36.3 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	0839263
Acoustic Calibrator	Bruel and Kjaer	4231	2610257
Environmental Monitor	Comet	T7510	21962628

## Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.94	113.93	113.94	<b>113.94</b>	-0.06	±0.75	0.11 dB
Distortion (%)	< 4.00	0.49	0.49	0.49	<b>0.49</b>	0.49	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	998.9	998.9	<b>998.9</b>	-1.1	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

## Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	114.01	113.98	113.98	<b>113.99</b>	-0.01	±0.75	0.11 dB
Distortion (%)	< 4.00	0.49	0.49	0.49	<b>0.49</b>	0.49	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	999.0	998.9	<b>998.9</b>	-1.1	±20.0	0.1 Hz

## Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

End of results

# CERTIFICATE OF CALIBRATION

ISSUED BY **Noisemeters**

DATE OF ISSUE **02 April 2025**

CERTIFICATE NUMBER **237347**

**NoiseMeters**  
Acoustic House  
Bridlington Road  
Hunmanby  
YO14 0PH  
United Kingdom  
[www.noisemeters.com](http://www.noisemeters.com)

Page 1 of 2

Approved signatory  
N.Smith  
Electronically signed:



## doseBadge Reader : IEC 60942:2003

### Instrument information

**Manufacturer:** Pulsar Instruments

**Notes:**

**Model:** Model 22R

**Serial number:** 79781

**Class:** 2

### Test summary

**Date of calibration:** 01 April 2025

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942\_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or conclusion can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

**Notes:**

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

# CERTIFICATE OF CALIBRATION

Certificate Number:

237347

Page 2 of 2

## Environmental conditions

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

**Before** Pressure: 102.23 kPa Temperature: 22.3 °C Humidity: 34.7 %  
**After** Pressure: 102.23 kPa Temperature: 22.3 °C Humidity: 35 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	1053426
Environmental Monitor	Comet	T7510	21962628

## Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	114.07	114.07	114.06	<b>114.07</b>	0.07	±0.75	0.11 dB
Distortion (%)	< 4.00	0.50	0.50	0.49	<b>0.50</b>	0.50	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	998.9	998.9	<b>998.9</b>	-1.1	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

## Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.99	113.99	114.00	<b>113.99</b>	-0.01	±0.75	0.11 dB
Distortion (%)	< 4.00	0.49	0.49	0.49	<b>0.49</b>	0.49	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	998.9	998.9	<b>998.9</b>	-1.1	±20.0	0.1 Hz

## Functionality Results

Function	Result
Keypad	<b>Pass</b>
Battery Power	<b>Pass</b>
Display	<b>Pass</b>
Communication	<b>Pass</b>
2 way IR link	<b>Pass</b>
Clock	<b>Pass</b>

End of results

# CERTIFICATE OF CALIBRATION

ISSUED BY **Noisemeters**DATE OF ISSUE **26 February 2025** CERTIFICATE NUMBER **234084****Noisemeters**

NoiseMeters  
Acoustic House  
Bridlington Road  
Hunmanby  
YO14 0PH  
United Kingdom  
www.noisemeters.com

Page 1 of 2

Approved signatory  
N.Smith  
Electronically signed:



## doseBadge Reader : IEC 60942:2003

### Instrument information

Manufacturer: Cirrus Research plc

Notes:

Model: RC:110A

Serial number: 95167

Class: 2

### Test summary

Date of calibration: 21 February 2025

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942\_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or conclusion can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

Notes:

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

# CERTIFICATE OF CALIBRATION

Certificate Number:

234084

Page 2 of 2

## Environmental conditions

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

**Before** Pressure: 99.38 kPa Temperature: 25.0 °C Humidity: 40.4 %  
**After** Pressure: 99.39 kPa Temperature: 25.1 °C Humidity: 37.9 %

## Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	1063074
Environmental Monitor	Comet	T7510	21962628

## Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.79	113.78	113.79	113.79	-0.21	±0.75	0.11 dB
Distortion (%)	< 4.00	1.52	0.51	0.51	0.84	0.84	+4.00	0.13 %
Frequency (Hz)	1000.0	990.4	990.4	990.3	990.4	-9.6	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

## Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.97	113.97	113.97	113.97	-0.03	±0.75	0.11 dB
Distortion (%)	< 4.00	0.51	0.50	0.51	0.51	0.51	+4.00	0.13 %
Frequency (Hz)	1000.0	990.3	990.3	990.3	990.3	-9.7	±20.0	0.1 Hz

## Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

End of results



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Railing 30 Puttamonthon 5 Rd., Sampran, Nakornpatom 73210

Tel. 0-3439-7682-5 Fax: 0-3439-7687

www.thaical.com E-mail : sale@thaicalibration.com, lab@thaicalibration.com



# CALIBRATION CERTIFICATE

Certificate No.S2504634S

page 1 of 2

**Customer :** SECOT CO., LTD.  
239 Rimklongprapa Rd.,  
Bangsue, Bangkok 10800

**Equipment :** Non-automatic weighing instrument (Electronic instrument)  
**Manufacturer :** Mettler Toledo  
**Model :** AB204-S  
**Accuracy class :** -  
**Capacity :** 220 g  
**Resolution :** 0.0001 g  
**Serial No. :** 1123163292  
**ID No. :** -  
**Place of calibration :** LAB

**Order No. :** 68S1723-2  
**Ambient temperature :** (24.7 ± 5.0) °C  
**Relative humidity :** (39.3 ± 10.0) %  
**Received date :** 23-Apr-2025  
**Date of calibration :** 23-Apr-2025  
**Date of issue :** 24-Apr-2025  
**Condition of the balance :** Good working conditions

## Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.

## Condition of reference standard weight

Instrument	Nominal value	Serial No.	Certificate No.	Due-date	Density (kg/m <sup>3</sup> )
1 Standard weight set	1 mg to 2 kg	15885+15849	M2410001S	5-Oct-2025	7950

## Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC accredited no. Calibration 0189.

Calibrated By Teerawat Intanom  
Technician

Approved Signatory :   
Somwang Wongduang

This calibration certificate may not be reproduced other than in full,  
except with the prior written approval of the head of TCS calibration laboratory.

TCS-F-138 Issue 01/Rev.01/12 Jun 2023

NO. 32973



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## CALIBRATION CERTIFICATE

Certificate No.S2504634S

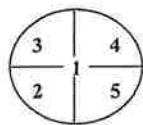
page 2 of 2

### The repeatability of indication

Nominal Value ( g )	Standard Deviation of reading ( g )	Maximum difference between susecutive reading ( g )	n
200	0.00000	0.0000	5

### The effect of eccentric application of a load on the indication (test load : 100 g)

Position	Balance Reading ( g )
Point 1	99.9999
Point 2	100.0000
Point 3	99.9999
Point 4	99.9997
Point 5	99.9998
Eccentric Value	0.0002



### The error of indication

Nominal Value ( g )	Value of Reference Standard Weight ( g )	Balance Reading ( g )	Correction ( g )	Uncertainty (±) ( g )	k
Unload	0.0000	0.0000	0.0000	0.000082	2.00
1	1.0000	1.0000	0.0000	0.000085	2.00
5	5.0000	4.9999	+0.0001	0.000089	2.00
10	10.0000	9.9999	+0.0001	0.000093	2.00
20	20.0000	19.9999	+0.0001	0.00011	2.00
40	39.9999	39.9999	0.0000	0.00015	2.00
60	60.0000	60.0000	0.0000	0.00016	2.00
80	79.9999	79.9999	0.0000	0.00021	2.00
100	100.0000	99.9999	+0.0001	0.00018	2.00
120	120.0000	119.9998	+0.0002	0.00024	2.00
140	140.0000	139.9998	+0.0002	0.00029	2.00
160	160.0000	159.9998	+0.0002	0.00030	2.00
180	180.0000	179.9998	+0.0002	0.00036	2.00
200	200.0002	200.0000	+0.0002	0.00033	2.00

Remark : Adjustment, External weight nominal value 200 g, Standard weight of Lab

### Uncertainty of measurement

The reported expanded uncertainty of measurement 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% (confidence level).

This report will certify of the calibrated equipment only.

--End--



Request Service No. 001/68

Page 1 of 3

## Calibration Certificate

Nomenclature : Brand : Sartorius Type : Top-Loading Electronic Balance

Model : BP 2100 Serial No. : 71003651

Submitted by : Laboratory of SECOT CO., LTD.

Location of Calibration : BAL Room , 6<sup>th</sup> Floor, Secot Co., Ltd.

Calibration range : 0 - 2000 g Scale division : 0.1 g

Calibration date : January 15, 2025

Reference Standard No. M2402083S , M2302167S , M2403062N, M2303005N, 24M850

Traceable to : Technology Promotion Association (Thailand-Japan), Thai Calibration Services Co., Ltd.

Ambient Condition : Temperature 24.31-24.71 °C

Humidity 50.7-53.6 % RH

Calibrated By : *Khemchuda Insorn* Approved By : *Narisa Poowasanpetch*

( Miss Khemchuda Insorn )

(Miss Narisa Poowasanpetch)

Testing Officer

Chief of Technical Management

Date : 16/01/2025

Date : 16/01/2025

Issued Date : Jan 16, 2025

## Measurement Report

Request Service No. 001/68

Page 2 of 3

Description: Brand : Sartorius

Type : Top-Loading Electronic Balance

Model : BP2100

Serial No. : 71003651

Calibration range : 0 – 2000 g

Scale division : 0.1 g

Calibration date : January 15, 2025

Ambient Condition : Temperature 24.31-24.71 °C Relative humidity 50.7-53.6 % RH

Measurement data :

### 1. Repeatability of Reading :

Load (g)	Standard Deviation of Reading (g)	Maximum Difference between Successive Reading (g)
500	0.053	0.10
1000	0.048	0.10
1500	0.048	0.10
2000	0.067	0.20

### 2. Off-Center Loading :

A Mass of 1000.00 g was placed and moved to various position on the pan.

Unit : g

Center	Front	Left	Back	Right	Center	Maximum Difference
999.98	999.98	999.98	999.96	999.92	999.96	0.060

Issued Date : Jan 16, 2025

Request Service No.001/68

Page 3 of 3

### 3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.00	± 0.07
100	0.02	± 0.07
200	0.02	± 0.07
500	0.02	± 0.07
700	0.04	± 0.08
1000	0.02	± 0.07
1200	0.02	± 0.07
1500	0.02	± 0.07
1700	0.04	± 0.08
2000	0.04	± 0.08

Calibrated by : *Khemchuda Insorn*

(Miss Khemchuda Insorn)

Testing Officer

Date : 16/01/2025

Approved By : *Narisa Poowasanpeth*

(Miss Narisa Poowasanpeth)

Chief of Technical Management

Date : 16/01/2025

Issued Date : Jan 16, 2025



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## CALIBRATION CERTIFICATE

Certificate No.S2504633S

page 1 of 2

**Customer :** SECOT CO., LTD.  
239 Rimklongprapa Rd.,  
Bangsue, Bangkok 10800

**Equipment :** Non-automatic weighing instrument (Electronic instrument)

**Manufacturer :** Mettler Toledo **Order No. :** 68S1723-1

**Model :** AG245 **Ambient temperature :** (25.3 ± 5.0) °C

**Accuracy class :** - **Relative humidity :** (39.9 ± 10.0) %

**Capacity :** 41 g / 210 g **Received date :** 23-Apr-2025

**Resolution :** 0.00001 g / 0.0001 g **Date of calibration :** 23-Apr-2025

**Serial No. :** 1117293916 **Date of issue :** 24-Apr-2025

**ID No. :** - **Condition of the balance :** Good working conditions

**Place of calibration :** LAB

### Calibration method

This instrument was calibrated according to the EURAMET Calibration Guide No. 18.

### Condition of reference standard weight

Instrument	Nominal value	Serial No.	Certificate No.	Due-date	Density (kg/m <sup>3</sup> )
1 Standard weight set	1 mg to 2 kg	15885+15849	M2410001S	5-Oct-2025	7950

### Traceability of the reference standard weight

This certificate is traceable to SI unit through Mass Calibration Laboratory Thai Calibration Services Co., Ltd., NSC-ONSC accredited no. Calibration 0189.

Calibrated By Teerawat Intanom  
Technician

Approved Signatory :   
Somwang Wongduang

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except with the prior written approval of the head of TCS calibration laboratory.



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www.thaical.com E-mail : sale@thaicalibration.com, lab@thaicalibration.com



## CALIBRATION CERTIFICATE

Certificate No.S2504633S

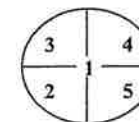
page 2 of 2

### The repeatability of indication

Nominal Value ( g )	Standard Deviation of reading ( g )	Maximum difference between successive reading ( g )	n
40	0.000008	0.00002	5
200	0.00000	0.0000	5

### The effect of eccentric application of a load on the indication (test load : 100 g)

Position	Balance Reading ( g )
Point 1	100.0000
Point 2	100.0000
Point 3	100.0000
Point 4	100.0000
Point 5	99.9997
Eccentric Value	0.0003



### The error of indication

Nominal Value ( g )	Value of Reference Standard Weight ( g )	Balance Reading ( g )	Correction ( g )	Uncertainty (1) ( g )	k
Unload	0.00000	0.00000	0.00000	0.000024	2.52
0.5	0.50000	0.49997	+0.00003	0.000028	2.13
1	1.00000	1.00000	0.00000	0.000030	2.08
10	9.99999	10.00000	-0.00001	0.000050	2.00
20	19.99999	19.99998	+0.00001	0.000068	2.00
40	39.99994	39.99999	-0.00005	0.00014	2.00
60	60.00000	60.00000	0.00000	0.00017	2.00
80	79.99999	80.00000	-0.00001	0.00023	2.00
100	100.00000	100.00000	0.00000	0.00022	2.00
120	120.00000	120.00000	0.00000	0.00028	2.00
140	140.00000	139.99999	+0.00001	0.00034	2.00
160	160.00000	160.00000	0.00000	0.00036	2.00
180	180.00000	179.99999	+0.00001	0.00043	2.00
200	200.00002	200.00000	-0.00002	0.00041	2.00

Remark : Adjustment, External weight nominal value 200 g, Standard weight of Lab

### Uncertainty of measurement

The reported expanded uncertainty of measurement 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% (confidence level).

This report will certify of the calibrated equipment only.

--End--



Request Service No.128/68

Page 1 of 3

### Calibration Certificate

Nomenclature : Brand : Sartorius Type : Top-Loading Electronic Balance

Model : BSA224S-CW Serial No. : 32191636

Submitted by : Laboratory of SECOT CO., LTD.

Location of Calibration : BAL Room , 6<sup>th</sup> Floor, Secot Co., Ltd.

Calibration range : 0 – 200 g Scale division : 0.0001 g (220 g)

Calibration date : May 22,2025

Reference Standard M2402083S,M2502078S,M2403062N,M2502079S

Traceable to : Thai Caribration Services CO., LTD.

Ambient Condition : Temperature 24.42-25.02 °C

Humidity 49.2-51.2 % RH

Calibrated By : *Khemchuda Insorn* Approved By : *Naris Poowasanpetch*

(Miss Khemchuda Insorn)

(Miss Narisa Poowasanpetch)

Testing Officer

Chief of Technical Management

Date : *22/05/2025*

Date : *22/05/2025*

Issued Date : May 23,2025

### Measurement Report

Request Service No.128/68

Page 2 of 3

Description : Brand : Sartorius

Type : Top-Loading Electronic Balance

Model : BSA224S-CW

Serial No. : 32191636

Calibration range : 0 – 200 g

Scale division : 0.0001 g (220 g)

Calibration date : May 22,2025

Ambient Condition : Temperature 24.42-25.02 °C Relative humidity 49.2-51.2 % RH

Measurement data :

1. Repeatability of Reading :

Load (g)	Standard Deviation of Reading (g)	Maximum Difference between Successive Reading (g)
50	0.00007	0.0002
100	0.00005	0.0002
150	0.00005	0.0001
200	0.00005	0.0001

2. Off-Center Loading :

A Mass of 50.0000 g was placed and moved to various position on the pan.

Unit : g

Center	Front	Left	Back	Right	Center	Maximum Difference
49.99990	49.99986	49.99990	49.99984	49.99984	49.99990	0.00006

Issued Date : May 23,2025

Request Service No. 128/68

Page 3 of 3

3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.00000	$\pm 0.00007$
1	+ 0.00003	$\pm 0.00007$
5	+ 0.00010	$\pm 0.00010$
10	+ 0.00004	$\pm 0.00008$
20	+ 0.00009	$\pm 0.00010$
40	+ 0.00002	$\pm 0.00010$
60	+ 0.00010	$\pm 0.00011$
80	+ 0.00013	$\pm 0.00014$
100	+ 0.00018	$\pm 0.00016$
120	+ 0.00019	$\pm 0.00018$
140	+ 0.00018	$\pm 0.00020$
160	+ 0.00017	$\pm 0.00022$
180	+ 0.00015	$\pm 0.00024$
200	+ 0.00019	$\pm 0.00027$

Calibrated by : Khemchuda Insorn

(Miss Khemchuda Insorn)

Testing Officer

Date : 23/05/2025

Approved By : Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Chief of Technical Management

Date : 23/05/2025

Issued Date : May 23,2025



Bangkok High Lab Co.,Ltd.

4/176 Soi Ladplakao 66, Ladplakao Rd., Anusawari, Bangkok, Bangkok 10220

Tel: (662) 971-5800

Fax: (662) 971-5300

Website: www.bangkokhighlab.com

E-mail: info@bangkokhighlab.com



# CERTIFICATE OF CALIBRATION

Certificate No : S2025/025

Page : 1/5

Order No : 010/2025

Customer : SECOT COMPANY LIMITED

Address : 239 Rimklongprapa Road, Bangsue, Bangkok 10800, Thailand

Instrument : UV/VIS spectrophotometer

Manufacture : Thermo Scientific

Model : GENESYS 150

Serial Number : 9A5Y332022

Environment : Temperature (25.4 - 25.3) °C

: Humidity (57 - 52) %RH

Received Date : February 19, 2025

Calibration Date : February 19, 2025

Issued Date : February 26, 2025

Calibrate Status : No Adjustment

Calibration Area : Customer area

Roomname : Laboratory Room of SECOT COMPANY LIMITED

Calibrated By : Pannawat Pungsard

( Mr. Pannawat Pungsard )

Calibration Engineer

Approved By : Wanchai Meesiri

( Mr. Wanchai Meesiri )

Manager

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Certificate No : S2025/025  
Page : 2/5

## 1. Photometric Accuracy

CRMs: Neutral Density Glass Filters

CRMs Serial Number: A404

Traceability: Traceable to NIST, U.S.A. through Neutral density filters NIST SRM 930e & 1930, Double Aperture method through Starna certificate report no. 9119762

Spectral slit width : 2.00 nm

### 1.1 Reading scale at 420.0 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4956	0.494	0.0016	0.0044
0.9626	0.963	-0.0004	0.0038
2.0348	2.038	-0.0032	0.0065

### 1.2 Reading scale at 440.0 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4855	0.484	0.0015	0.0040
0.9425	0.942	0.0005	0.0040
1.9648	1.967	-0.0022	0.0065

### 1.3 Reading scale at 465.0 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4518	0.450	0.0018	0.0036
0.8766	0.876	0.0006	0.0040
1.8406	1.842	-0.0014	0.0060

### 1.4 Reading scale at 546.1 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4698	0.468	0.0018	0.0036
0.9078	0.907	0.0008	0.0036
1.8745	1.873	0.0015	0.0065



Certificate No : S2025/025  
Page : 3/5

### 1.5 Reading scale at 590.0 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4890	0.488	0.0010	0.0036
0.9457	0.944	0.0017	0.0036
1.9004	1.899	0.0014	0.0065

### 1.6 Reading scale at 635.0 nm

Filter STDs (Abs) Certificate	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
0.0000	0.000	0.0000	0.0036
0.4634	0.462	0.0014	0.0036
0.8986	0.898	0.0006	0.0036
1.7803	1.779	0.0013	0.0062

## 2. Photometric Accuracy

CRMs: Potassium Dichromate in Perchloric acid

CRMs Serial Number: 15086

Blank Serial Number: 15178

Traceability: Traceable to NIST, U.S.A. through crystalline potassium dichromate NIST SRM 935a through Starna certificate report no. 127613

Spectral slit width : 2.00 nm

Wavelength (nm)	Certificate (Abs)	Average Measured Value (A)	Correction (A)	Uncertainty ± (A)
235	0.0000	0.000	0.0000	0.0050
	0.7332	0.732	0.0012	0.0056
257	0.0000	0.000	0.0000	0.0050
	0.8510	0.851	0.0000	0.0058
313	0.0000	0.000	0.0000	0.0050
	0.2861	0.286	0.0001	0.0057
350	0.0000	0.000	0.0000	0.0050
	0.6316	0.632	-0.0004	0.0061



Bangkok High Lab Co.,Ltd.  
4/176 Soi Ladplakao 66, Ladplakao Rd., Anusawari, Bangkhen, Bangkok 10220  
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Website: www.bangkokhighlab.com E-mail: info@bangkokhighlab.com



Certificate No : S2025/025  
Page : 4/5

### 3. Wavelength Accuracy

Spectral slit width : 2.00 nm

#### 3.1 CRMs: Holmium Glass Filter

CRMs Serial Number: W184/H

Traceability Traceable to NIST Holmium oxide filter NIST SRM 2034, through Starna certificate report no. 9119741

Filter STDs (nm) Certificate	Average Measured Value (nm)	Correction (nm)	Uncertainty ± (nm)
241.74	241.37	0.37	0.12
279.44	279.47	-0.03	0.12
287.98	287.80	0.18	0.12
334.10	334.10	0.00	0.12
361.00	361.34	-0.34	0.12
418.61	418.89	-0.28	0.12
453.63	453.71	-0.08	0.12
460.05	460.13	-0.08	0.12
536.66	536.40	0.26	0.12
637.98	637.64	0.34	0.12

#### 3.2 CRMs: Didymium Glass Filter

CRMs Serial Number: W184/D

Traceability Traceable to NIST Holmium oxide filter NIST SRM 2034, through Starna certificate report no. 9119742

Filter STDs (nm) Certificate	Average Measured Value (nm)	Correction (nm)	Uncertainty ± (nm)
585.29	585.37	-0.08	0.12
684.49	684.76	-0.27	0.12
740.18	740.40	-0.22	0.12
748.48	748.41	0.07	0.12
807.03	807.43	-0.40	0.12
879.27	879.33	-0.06	0.12



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Certificate No : S2025/025  
Page : 5/5

### 4. \*Stray Light

CRMs: Potassium Chloride aqueous solution

CRMs Serial Number: 5469

Blank Serial Number: 8745

Traceability Traceable to NIST, U.S.A. potassium chloride NIST SRM2032, through Starna certificate report no. 127614

Spectral slit width : 2.00 nm

Wavelength (nm)	Certificate	Average Measured
201.55	>2A	2.091
201.55	<1%T	0.891

### 5. \*Spectral Resolution

CRMs: Toluene in Hexane

CRMs Serial Number: 8697

Blank Serial Number: 8716

Traceability Traceable to toluene in hexane NIST SRM2034, through Starna certificate report no. 127615

Spectral slit width (nm)	Abs Ratio
0.5	#N/A
1.0	#N/A
1.5	#N/A
2.0	1.327
3.0	#N/A

Note : \* "Not TISI Accredited" in this certificate have been included for completeness

#### Remark: Calibrate Method

- 1.1 Photometric and Wavelength accuracy: In-house method W-SER-001 based on ASTM E925-02 and ASTM E275-01
- 1.2 Stray light: Measuring the CRMs in both absorbance and transmittance unit at wavelength 201.23 nm. Base on European Pharmacopoeia V.6.19.3 1984
- 1.3 Spectral resolution: Measuring the CRMs. The maximum absorbance values were read at closest to 268.7nm and the minimum absorbance values were read at closest 267.0 nm. Refer to European Pharmacopoeia V.6.19.3 1984
2. N/A = not available.
3. Uncertainty of Measurement: The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
4. This result of calibration was found accurate as shown on date and place of calibration only.
5. This report will certify of calibrated equipment only.

- End of Report -

## Calibration Certificate

**Certificate No.:** 2503097-001-01  
**Client name:** SECOT CO., LTD.  
**Address:** 239 Rimklongprapa Road,  
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

**Equipment:** CHAMBER (Hot Air Oven)

**Manufacturer:** MEMMERT

**Model:** UF 55

**Serial No.:** B213.0295

**ID No.:** N/A


**Order No.:** 2503097

**Operation No.:** 2503097-001

**Date of Receipt:** 23 May 2025

**Date of Calibration:** 23 May 2025

**Calibrated by** Mr.Manas Somsak  
 Specialist

**Approved by**   
 ( Mr.Pheraphat Tuanjit )  
 Manager, Division of Calibration Laboratory  
 Responsible for the Technical Management Team

**Date of Issue:** 26 May 2025

**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 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 National Food Institute.



## Calibration Report

**Certificate No.:** 2503097-001-01  
**Equipment:** CHAMBER (Hot Air Oven)  
 Model: UF 55 Serial No.: B213.0295  
 Resolution: 0.1 °C ID No.: N/A  
 Manufacturer: MEMMERT

**Date of Calibration:** 23 May 2025

Page 2 of 3

**Location:** Laboratory, SECOT CO., LTD.  
**Environment Condition:** Ambient Temperature ( 30.7 ± 1 ) °C  
 Relative Humidity ( 56.0 ± 3 ) %  
 Line Voltage ( 224.9 ± 1 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.  
 - The temperature scale used was based on ITS - 90.  
 - All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY59002902	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/ RTD#101-109			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

### UUC Description :

Time of Record 1 Hour 9 Minute At 80.0, 104.0 and 180.0 °C  
 Fresh air Damper ☐ Open Position ☐  
☒ Close Fan ☐ 50%  
☐ Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



## Calibration Report

**Certificate No.:** 2503097-001-01  
**Equipment:** CHAMBER (Hot Air Oven)  
**Model:** UF 55 **Serial No.:** B213.0295  
**Resolution:** 0.1 °C **ID No.:** N/A  
**Manufacturer:** MEMMERT

**Date of Calibration:** 23 May 2025  
**Calibration point:** 80.0, 104.0 and 180.0 °C  
**Calibration result:**

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	30.6	52.6	223.5
MAX	30.8	59.4	226.2

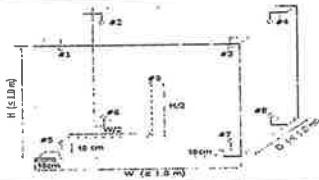


Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
80.0	79.77	79.86	79.92	79.93	79.77	79.78	80.16	80.00	80.06	0.46
104.0	103.70	103.86	103.94	103.93	103.66	103.75	104.30	104.11	104.18	0.53
180.0	179.72	179.97	179.98	180.02	179.61	179.65	180.57	180.36	180.52	0.90

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
80.0	80.0	80.0	80.0	0.041	0.29	0.47
104.0	104.0	104.0	104.0	0.055	0.52	0.73
180.0	180.0	180.0	180.0	0.086	0.92	1.1

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

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.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----



## Calibration Certificate

**Certificate No.:** 2503097-002-01  
**Client name:** SECOT CO., LTD.  
**Address:** 239 Rimklongprapa Road, Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

**Equipment:** CHAMBER (Hot Air Oven)

**Manufacturer:** MEMMERT

**Model:** UM 400

**Serial No.:** B499.1400

**ID No.:** N/A

**Order No.:** 2503097

**Operation No.:** 2503097-002

**Date of Receipt:** 23 May 2025

**Date of Calibration:** 23 May 2025

**Calibrated by** Mr.Manas Somsak  
Specialist

**Approved by** ( Mr.Pheraphat Tuanjit )  
Manager, Division of Calibration Laboratory  
Responsible for the Technical Management Team

**Date of Issue:** 26 May 2025

**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 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 National Food Institute.



## Calibration Report

**Certificate No.:** 2503097-002-01  
**Equipment:** CHAMBER (Hot Air Oven)  
Model: UM 400 Serial No.: B499.1400  
Resolution: 1 °C ID No.: N/A  
Manufacturer: MEMMERT  
**Date of Calibration:** 23 May 2025

Page 2 of 3

**Location:** Laboratory, SECOT CO., LTD.  
**Environment Condition:** Ambient Temperature ( 30.9 ± 1 ) °C  
Relative Humidity ( 56.0 ± 3 ) %  
Line Voltage ( 224.9 ± 1 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.  
- The temperature scale used was based on ITS - 90.  
- All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY59002902	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#201-209/ RTD#201-209			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

### UUC Description :

Time of Record 1 Hour 9 Minute At 150 °C  
Fresh air Damper - Open Position -  
X Close Fan -  
- Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



## Calibration Report

**Certificate No.:** 2503097-002-01  
**Equipment:** CHAMBER (Hot Air Oven)  
Model: UM 400 Serial No.: B499.1400  
Resolution: 1 °C ID No.: N/A  
Manufacturer: MEMMERT  
**Date of Calibration:** 23 May 2025

Page 3 of 3

**Calibration point:** 150 °C

### Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	30.6	52.6	223.5
MAX	31.3	59.4	226.2

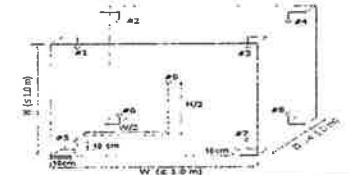


Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
150	150.07	150.68	149.82	150.63	148.76	149.47	149.36	148.79	149.64	1.3

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
As Mark 150	176	176	176	0.89	1.0	3.5

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

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.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----





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



## Certificate of Calibration

Cert.No.: 24CH1275  
Page.: 1 of 3

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : Seven2Go  
Serial No. : C033160713  
ID No. : ID.20  
Condition As-Received: Used Item  
Received Date : 08 October 2024  
Calibration Date : 09 October 2024  
Reference : 2410-0258DN-3  
Submitted by : Secot Co.,Ltd.  
239 Rimklongprapa Road,  
Bangsue, Bangkok 10800

Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In - house method :  
- CP-CH5 by direct measurement with DC voltage  
standard and direct measurement with  
certified reference material (CRM)  
- CP-CH8 by comparison with temperature standard

Calibrated by : Warakorn Lernagatrakul

Approved by :

*Saithip*

Approved Signatory

( ) Unnopphol Harachai  
( ) Ponpan Paipim  
(✓) Saithip Meangmal

Issue Date : 10 October 2024



Cert.No.: 24CH1275  
Page.: 2 of 3

### Condition of this calibration result

#### 1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	24E2759	25 Aug 2025
2) Ref. Standard Thermometer	4982054	110RC044	24I757	14 July 2025

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through Hach Lenge GmbH Ltd.,  
Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00  
: The measurement results are traceable to SI through CPA chem Ltd.,  
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1034203	27 Sep 2026
pH 6.999	Hach Lenge GmbH	C03145	28 Feb 2026
pH 9.997	CPA chem	970853	25 Apr 2025

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

### Calibration Results

#### Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement ( ±mV )	Coverage factor k
	pH	mV	mV	pH		
pH Meter	4.00	177.48	178	4.00	0.58	2.00
S/N.: C033160713	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.00	0.58	2.00

The Uncertainties are for a confidence probability of approximately 95%

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



Cert.No.: 24CH1275  
Page.: 3 of 3

#### Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement ( $\pm$ )	Coverage factor $k$
pH Electrode S/N.: 3234329	4.008	4.01	163	0.0079	2.00
	6.999	7.00	-12	0.0085	2.00
	9.997	10.00	-183	0.0095	2.00

Function : Temperature Measurement

(\*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Go-ISM  
- Serial No. : 3234329

Dimension of probe

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

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement ( $\pm$ °C)	Coverage factor $k$
25.0	25.003	25.1	0.097	0.13	2.00
30.0	30.002	30.1	0.098	0.13	2.00
35.0	35.002	35.2	0.198	0.13	2.00

Remark - UUC\* = Unit Under Calibration

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

## Certificate of Testing

Cert.No.: 24TW211  
Page.: 1 of 2

Equipment : DO Meter  
Manufacturer : Hanna  
Model : HI98193  
Serial No. : 08110066101  
ID No. : ID.9  
Received Date : 08 October 2024  
Test Date : 09 October 2024  
Reference : 2410-0258DN-1  
Submitted by : Secot Co.,Ltd.  
239 Rimklongprapa Road, Bangsue,  
Bangkok 10800  
Laboratory Condition : Temperature (  $25 \pm 5$  ) °C  
Humidity (  $50 \pm 20$  ) %  
Test Procedure : In - house method : CP-CH9  
by Comparison Technique with Azide Modification Method  
Tested by : Walalak Sirithean  
Approved by :   
Approved Signatory  
( ) Unnophol Harachai  
( ) Ponpan Paipim  
(✓) Saithip Meangmai  
Issue Date : 10 October 2024



Cert.No.: 24TW211

Page.: 2 of 2



จุฬาลงกรณ์มหาวิทยาลัยเพื่อการพัฒนาอาหาร  
ศูนย์บริการห้องปฏิบัติการจุฬาลงกรณ์มหาวิทยาลัย

Foundation for Industrial Development National Food Institute  
Food Industrial Laboratory Service Center



## Calibration Certificate

### Condition of this result of calibration

#### 1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

#### 2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

**Result :** Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Probe No.: KC1N2993N

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.16	8.16	0.0071

This report was certified only for the instrument we tested. It is allowable to use for study intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory


-o0o-

**Certificate No.:** 2403705-001-01  
**Client name:** SECOT CO., LTD.  
**Address:** 239 Rimklongprapa Road,  
Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

**Equipment:** CHAMBER (Incubator)  
**Manufacturer:** MEMMERT  
**Model:** ICP 400  
**Serial No.:** K406.0004  
**ID No.:** N/A  
**Order No.:** 2403705  
**Operation No.:** 2403705-001  
**Date of Receipt:** 18 July 2024  
**Date of Calibration:** 18 July 2024

**Calibrated by** Mr.Taveesak Seilee  
Scientist

**Approved by**   
( Mr.Pheraphat Tuanjit )  
Manager, Division of Calibration Laboratory  
Responsible for the Technical Management Team

**Date of Issue:** 24 July 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 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 National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65





## Calibration Report

**Certificate No.:** 2403705-001-01  
**Equipment:** CHAMBER (Incubator)  
 Model: ICP 400 Serial No.: K406.0004  
 Resolution: 0.1 °C ID No.: N/A  
 Manufacturer: MEMMERT  
**Date of Calibration:** 18 July 2024

Page 2 of 3

**Location:** Laboratory, SECOT CO., LTD.  
**Environment Condition:**  
 Ambient Temperature ( 31.0 ± 1 ) °C  
 Relative Humidity ( 58 ± 1 ) %  
 Line Voltage ( 221 ± 1 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.  
 - The temperature scale used was based on ITS - 90.  
 - All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49018263	TE 670368-01	23 March 2025	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/ RTD#101-109			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

### UUC Description :

Time of Record 1 Hour 9 Minute At 20.0 °C  
 Fresh air Damper ☒ Open Position ☒  
☒ Close Fan ☒  
☒ Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



## Calibration Report

**Certificate No.:** 2403705-001-01  
**Equipment:** CHAMBER (Incubator)  
 Model: ICP 400 Serial No.: K406.0004  
 Resolution: 0.1 °C ID No.: N/A  
 Manufacturer: MEMMERT  
**Date of Calibration:** 18 July 2024

Page 3 of 3

**Calibration point:** 20.0 °C

### Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	30.0	57	220.3
MAX	32.0	59	222.1



Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
20.0	20.10	20.18	20.21	20.26	20.28	20.20	20.21	20.13	20.22	0.27

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
20.0	20.0	20.0	20.0	0.13	0.12	0.40

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

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.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----



## Calibration Certificate

**Certificate No.:** 2403705-002-01  
**Client name:** SECOT CO., LTD.  
**Address:** 239 Rimklongprapa Road,  
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

**Equipment:** Water Bath  
**Manufacturer:** MEMMERT  
**Model:** WB 29  
**Serial No.:** I698.0051  
**ID No.:** N/A  
**Order No.:** 2403705  
**Operation No.:** 2403705-002  
**Date of Receipt:** 18 July 2024  
**Date of Calibration:** 18 July 2024

**Calibrated by** Mr.Taveesak Seilee  
 Scientist

**Approved by**

( Mr.Pheraphat Tuanjit )

Manager, Division of Calibration Laboratory

Responsible for the Technical Management Team

**Date of Issue:** 24 July 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 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 National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65



## Calibration Report

**Certificate No.:** 2403705-002-01  
**Equipment:** Water Bath  
 Model: WB 29 Serial No.: I698.0051  
 Resolution: 0.1 °C ID No.: N/A  
 Manufacturer: MEMMERT

**Date of Calibration:** 18 July 2024

Page 2 of 3

**Location:** Laboratory, SECOT CO., LTD.  
**Environment Condition:** Ambient Temperature ( 30 ± 1 ) °C  
 Relative Humidity ( 58 ± 1 ) %  
 Line Voltage ( 221 ± 1 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 5 standard thermometer into its liquid bath and calibration according to W-TE-011 based on ASTM E715-80 (2022): Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.  
 - The temperature scale used is ITS - 90.  
 - All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49018263	TE 670368-01	23-Mar-25	NATIONAL FOOD INSTITUTE
	RTD	RTD#201-205 / CH#201-205			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

### UUC Description:

- Time of Record 1 Hour 9 Minute At 95.0 °C
7. Result of Calibration :
- ☒ Without adjustment  
☐ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65



## Calibration Report

**Certificate No.:** 2403705-002-01  
**Equipment:** Water Bath  
Model: WB 29 Serial No.: 1698.0051  
Resolution: 0.1 °C ID No.: N/A  
Manufacturer: MEMMERT  
**Date of Calibration:** 18 July 2024 Page 3 of 3

**Calibration point:** 95.0 °C

**Calibration result:**

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	29.9	57	220.3
Max	31.3	59	222.1



**Table1 : Reporting of Temperature**

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
95.0	94.93	95.13	94.92	95.09	95.03	0.29

**Table 2 : Reporting of Characterization Result**

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
95.0	94.9	95.1	95.0	0.19	0.11	0.67

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

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.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----

*Handwritten signature*



**SECOT Co.,Ltd.**  
**PTDS23051001**

**OQ**  
**Page 1 of 57**

### Atomic Absorption Spectrometry

**PinAAcle900T**

### Operational Qualification (OQ)

<b>Company Name:</b>	SECOT Co.,Ltd.
<b>Address:</b>	239 Rimkhlong Prapa Rd. Khwang Bang Sue, Khet Bang Sue, Bangkok 10800, Thailand
<b>Location, Room:</b>	SECOT INST.1
<b>Serial Number or System Name:</b>	PTDS23051001
<b>Issue Date:</b>	29-Apr-2025
<b>Date Tested:</b> Valid if tested within 1 year of Issue Date	30-Apr-2025
<b>Recertification Period</b>	Recommended at 12 Months
<b>Recertification Due Date:</b>	30-Apr-2026

### Release History

Part Number	Release	Publication Date	
09350815	G	August 2023	

Any comments about the documentation for this product should be addressed to:  
User Assistance  
PerkinElmer (UK) Ltd  
Chalfont Road  
Seer Green  
Beaconsfield  
Bucks HP9 2FX  
United Kingdom

PerkinElmer Technical Support  
M/S 215  
710 Bridgeport Avenue  
Shelton  
Connecticut 06484-4794  
U.S.A.

Service/  
Support  
**PerkinElmer**  
**Validation Program**  
Engineering

**PinAAcle900T OQ Rev. G**



# PinAAcle 900T Preventive Maintenance Report

Company Name: Secot.co.th  
Instrument Location: Instrument room  
239 Rimkhlong Prapa Road, Bang Sue, Bangkok 10800  
Instrument Serial No.: PTDS23051001  
Date: 01-Oct-2024

PinAAcle 900T Preventive Maintenance (PM)			
Company Name:	Secot.co.th		
Address (Instrument Location):	Instrument room,239 Rimkhlong Prapa Road, Bang Sue, Bangkok 10800		
Serial Number:	PTDS23051001	PM Number:	2 OF 2 W
Customer Name (if applicable):	K.Araya	Telephone Number:	0-2959-3600
Customer Support Engineer Name:	K.Piyawit	Service Order Number:	WO-02939269
Date PM Performed: (DD-MMM-YYYY)	01-Oct-2024	Next PM Due Date: (DD-MMM-YYYY)	01-Apr-2025
Standard Labor Hours to Complete PM :		5 hours	

Part Number	Release	Publication Date	
09370143 Rev.9	A	January 2018	

## Scope

The purpose of this PM is to ensure the continued functionality of the PinAAcle 900T 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
PinAAcle900T	PTDS23051001	Syngistix V.5.1.0

## Parts Lists

Parts Included with the PM		
Part Number (If applicable)	Description	Quantity
B0501696	Fan Filters	N/A
B3002013	THGA Contact Cylinders	N/A
B3141064	Glycerol for THGA Cooling	N/A
N3160156	O-Ring Kits for Sampling Introduction ( Stainless Steels Nebulizer)	N/A
N3160157	O-Ring Kits for Sampling Introduction ( Plastic Nebulizer)	N/A
N9301714	Replacement Acetylene Filter Cartridge	N/A
TH001022	Replacement Air Filter Cartridge	N/A

Additional Reagents and Standards Required for PM				
Part Number (If applicable)	Description	Quality	Batch/Lot #	Expired Date (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	27-39CRY1	30-Apr-2025
N9300244	GFAAS Mixed Standard	AR	60-004CRY1	28-Feb-2025

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (If applicable)	Description	Quantity	Batch/Lot #	Expiration Date (MM/YY)
N/A	DI Water	250 mL	AR	AR
N/A	0.5% HNO <sub>3</sub>	250 mL	AR	AR

Additional Tools Required for PM			
Part Number (if applicable)	Description	Quantity	Serial #
N1013000	0.2A Neutral density filter	1	MG0-672
N1013002	1.0A Neutral density filter	1	MG2-854
B3100652 Or N9307029	Electronic Flow Meter	1	MY2231FC07
B0505495	Test Jig	1	N/A
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	092216-010130
N3050109	Ba Lumina HCL	1	102416-040160
N3050139	K Lumina HCL	1	110716-010060
N3050152	Ni Lumina HCL	1	100516-030190
N3050119	Cr Lumina HCL	1	030621-020190

## Procedure Checklist

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

### 1. 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.

### 2. PC Instrument Software:

- ☒ Instrument Software user files/databases archived, packed, and/or deleted as needed.

### 3. Mechanical:

- ☒ Inspect and clean all fans and filters. Replace filters if necessary
- ☒ Inspect all gas and water lines for leaks and/or wear. Replace if needed. Thoroughly inspect all quick connects. Replace the Y connector, P/N 09921079, if needed.
- ☒ Clean exterior of the instrument.

#### 3.1 Flame Technique

- ☒ 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 slot width. Replace if out of specification
- ☒ 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 igniting the Air-C<sub>2</sub>H<sub>2</sub> and N<sub>2</sub>O-C<sub>2</sub>H<sub>2</sub> flames (if applicable).

#### 3.2 THGA Technique

- ☒ Inspect the pole pieces and clean where the pole pieces contact the furnace. Replace the pole piece p-rings as needed, P/N's B0501018 & B0501250. Grease the O-rings as needed with Apiezon L grease, P/N 09905148
- ☒ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
- ☒ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
- ☒ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
- ☒ Check furnace open/close function.
- ☒ Verify the operation of the GFTV Camera for proper operation and viewing alignment in the furnace camera Tube View window. Align if needed.
- ☒ Check the operation of the Halogen Light ASSY for the GFTV Camera. Replace if needed.
- ☒ Check the water level/quality in the recirculation (if applicable). Add distilled water if necessary.
- ☒ Check the cooling system fluid flow rate with the FCS In-Line Flow Meter for proper levels if needed. Refer to SDB# COSY008.STN

- ☒ Perform Cooling System maintenance if needed per SDB# COSY005.STN.
- ☒ Check auto sampler operation.
- ☒ Perform an auto sampler check valve test as described in the Service Manual.
- ☒ Lubricate the spindles of the auto sampler pumps and all moving parts of the tray mechanics as described in the Service Manual.
- ☒ Inspect the auto sampler sampling capillary as described in the Service Manual. Replace if necessary.

### 4. 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.

### 5. Optics:

- ☒ Inspect and clean the sample compartment windows, if needed.
- ☒ Inspect and clean the furnace windows, if needed.
- ☒ Inspect and clean the GFTV camera lens, if needed.
- ☒ Inspect optics. Clean or replace if necessary,

### 6. 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 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 <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
C <sub>2</sub> H <sub>2</sub> Pressure Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

## 8. After PM Performance tests [Flame]:

### 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.	1.0154	0.9910	Passed
0.2 A ND Filter	± 5% from Cert.	0.1806	0.1955	Passed

### 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	0.0022	Passed

### 8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.001	0.0005	Passed

### 8.4 D<sub>2</sub> Background Compensation with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0005	Passed

### 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	Passed

### 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	0.0005	Passed

### 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.	N/A	Not Applicable
2 mg/L Sensitivity HS Neb (If applicable)	> 0.250 Abs.	0.3155	Passed

## 9. After PM Performance tests [THGA]:

### 9.1 Furnace Gas Flows

Description: Ensures the flow rates are within specification.

Parameter	Specification	Test Results	Pass/Fail
Internal Flow Rate	250 mL/min ± 25 mL/min	250	Passed
External Flow Rate	100 mL/min ± 10 mL/min	99	Passed

### 9.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	≤ 0.005 Abs.	0.0003	Passed
Standard Deviation	≤ 0.005	0.0001	Passed

### 9.3 Chromium Characteristic Mass and Precision

Description: Calculate the characteristic mass using the characteristic mass tool and precision from the integrated absorbance values.

Parameter	Specification	Results	Pass/Fail
Cr m <sub>0</sub> Results	≤ 7.0 pg/0.0044 A-s	4.60	Passed
Precision	≤ 2.0 %	1.30	Passed

#### 9.4 Copper Characteristic Mass and Zeeman Ratio

Description: Calculate the characteristic mass using the characteristic mass tool and check the Zeeman Ratio.

Parameter	Specification	Results	Pass/Fail
Cu m <sub>0</sub> Result	≤ 16.5 pg/0.0044 A·s	14.30	Passed
Zeeman Ratio	0.52 ± 0.04	0.5417	Passed

#### 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.

#### Additional Comments

Additional Comments Regarding the PM	
Zeeman Ratio	$= \frac{\text{Atomic Signal (Peak area)}}{\text{Atomic Signal (Peak area)} + \text{Background Signal (Peak area)}}$ $= \frac{0.1610}{0.1610 + 0.1362}$ $= 0.5417$

#### Review

<i>The preventive maintenance checks and if applicable performance tests for PinAAcle 900T have been completed.</i>	
<i>This PinAAcle 900T Passes <input checked="" type="checkbox"/> Fails <input type="checkbox"/> the preventive maintenance.</i>	
Review of Preventive Maintenance:	
Authorized PerkinElmer Representative:	Date: 01-Oct-2024 (DD-MMM-YYYY)
Authorized Customer Representative:	Date: 01-Oct-2024 (DD-MMM-YYYY)



Certificate of System Qualification

GC-OQ

System ID: CN15343147  
Organization Name: Secot Co.,Ltd. (Head Office)  
Organization Location: 239 Rimklongprapa Rd., Bangsue, Bangkok 10800

Date: April 28, 2025 12:57:27 PM  
EQP Name: AgilentRecommended

EQP Revision: GC.02.55  
Overall Qualification Status: Pass

CDS Logon Verification - GC

Logon: No logon credentials required for customer CDS

System Inspection and Basic Safety and Operation

Name: 7890  
Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name: 7890  
Front SSL

Setpoint Status: Pass  
Pressure: 25.0 psi  
Pressure Change: -0.1 psi /5 minutes  
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147

Inlet Pressure Accuracy

Name: 7890  
Front SSL

Setpoint Status: Pass  
Setpoint Actual  
Inlet Pressure: 25.0 psi 24.9 psi  
Accuracy: 0.1 psi  
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name: 7890  
Back SSL

Setpoint Status: Pass  
Pressure: 25.0 psi  
Pressure Change: -0.2 psi /5 minutes  
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890  
Back SSL

Setpoint Status: Pass  
Setpoint Actual  
Inlet Pressure: 25.0 psi 24.9 psi  
Accuracy: 0.1 psi  
Agilent Recommended: <= 1.2

Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 7890  
Back FID

**Setpoint Status:** Pass

Flow Type: Fuel

Setpoint: 30.0 mL/min Measured Flow: 29.8 mL/min

Accuracy: 0.2 mL/min

Agilent Recommended: <= 10.0 % setpoint ( 3.0 mL/min )

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

**Setpoint Status:** Pass

Flow Type: Oxidizer

Setpoint: 400.0 mL/min Measured Flow: 399.8 mL/min

Accuracy: 0.2 mL/min

Agilent Recommended: <= 10.0 % setpoint ( 40.0 mL/min )

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

**Setpoint Status:** Pass

Flow Type: Makeup

Setpoint: 25.0 mL/min Measured Flow: 24.9 mL/min

Accuracy: 0.1 mL/min

Agilent Recommended: <= 10.0 % setpoint ( 2.5 mL/min )

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 7890  
Front UECD

**Setpoint Status:** Pass

Flow Type: Makeup

Setpoint: 25.0 mL/min Measured Flow: 24.9 mL/min

Accuracy: 0.1 mL/min

Agilent Recommended: <= 10.0 % setpoint ( 2.5 mL/min )

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

**Setpoint Status:** Pass

Zone: Oven

Setpoint/Actual

Temperature: 230.0 230.0 °C

Accuracy: 0.0 °C

Agilent Recommended: >= -1.0 % setpoint in K ( -5.0 °C )

<= 1.0 % setpoint in K ( 5.0 °C )

**Setpoint Status:** Pass

Zone: Oven

Setpoint/Actual

Temperature: 100.0 100.0 °C

Accuracy: 0.0 °C

Agilent Recommended: >= -1.0 % setpoint in K ( -3.7 °C )

<= 1.0 % setpoint in K ( 3.7 °C )

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Setpoint/Average

Temperature: 100.0 100.0667 °C

Stability: 0.1 °C

Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1 Front SSL / Back FID

Injection Tower

Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1 Front SSL / Back FID

Name: 7890

Setpoint Status: Pass

Base Signal: 10.48 pA

ASTM Noise Drift

pA pA/h

0.06 0.07

Agilent Recommended: <= 0.10 <= 2.50

Status: Pass Pass

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination1 Front SSL / Back FID

Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD: 0.21 % Retention Time RSD: 0.20 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination1 Front SSL / Back FID

Injection Tower

Name: 7890

Setpoint Status: Pass

Signal to Noise: 1141834

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2 Back SSL / Front UECD

Manual Injection

Name: Not applicable

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2 Back SSL / Front UECD  
Name: 7890

Setpoint Status: Pass

Base Signal: 437 Hz

	ASTM Noise	Drift
	Hz	Hz/h
	1.44	4.73
Agilent Recommended:	<= 3.00	<= 15.00
Status:	Pass	Pass

Overall Noise and Drift Test Status

Pass

Signal to Noise

Tested Combination2 Back SSL / Front UECD  
Manual Injection  
Name: 7890

Setpoint Status: Pass

Signal to Noise: 15296  
Agilent Recommended: >= 1500

Overall Signal to Noise Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	CN15343147
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination1

Injection Technique	Injection Tower
Inlet	Front
Detector	Back
LTM Included?	No

Tested Combination2

Injection Technique	Manual Injection
Inlet	Back
Detector	Front
LTM Included?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN11350133
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 2	
Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN13080006
Firmware Revision	A.10.16
Vial Heater	Not installed
Sampler 3	
Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10
Mainframe 1	
Manufacturer	Agilent Technologies
Name	7890
Model Number	G3440B
Serial Number	CN15343147
Firmware Revision	B.02.03.2
Oven Type	Standard
Inlet 1	
Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Inlet 2	
Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
Detector 1	
Manufacturer	Agilent Technologies
Name	7890
Type	UECD
Serial Number	U27289
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen
Detector 2	
Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen

Electronic Signature

Purpose

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Details

Full Name of Signer: Nattapat Hengcharoen  
Logged On User Name: nattapat.hengcharoen@agilent.com  
Signature Creation Date: April 28, 2025  
Reason for Signature: Executed protocol and published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\AceSelfQualification.

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User Name: nattapat.hengcharoen

System ID: CN15343147

Report Generated by Instrument: SDS-02500110

Print Date: April 28, 2025 12:57:28 PM

Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:14:09 PM	Audit	SessionCreated	Session	Host Name: AG-5CG2350YN0, Drive Serial Number: 2A984E77
April 28, 2025 12:14:09 PM	start	Configuration	Session	None
April 28, 2025 12:14:09 PM	Audit	Entitlement	Licensing	User Is FieldEngineer and does not require an unlock code
April 28, 2025 12:14:35 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks\Gc\Configuration ions\02.55\Gc.02.55.eqp], EQP File Name: [Gc.02.55.eqp], EQP Name: [AgilentRecommended], Proto col Revision :[Gc.02.55]
April 28, 2025 12:14:37 PM	End	Configuration	Session	None
April 28, 2025 12:14:42 PM	start	Qualification	Session	OQ
April 28, 2025 12:14:43 PM	start	Execution	CDS Logon Verification - GC - 7890: - Qualitative test	None
April 28, 2025 12:15:21 PM	End	Execution	CDS Logon Verification - GC - 7890: - Qualitative test	Run Count : 1
April 28, 2025 12:16:09 PM	start	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	None
April 28, 2025 12:16:17 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	Run Count : 1

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User Name: nattpatthengcharoen      System ID: CN15343147  
Report Generated by: nattpatthengcharoen      Date: April 28, 2025 12:57 PM

Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:16:18 PM	start	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
April 28, 2025 12:16:28 PM	End	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
April 28, 2025 12:16:29 PM	start	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 28, 2025 12:16:33 PM	End	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 28, 2025 12:16:35 PM	start	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
April 28, 2025 12:16:42 PM	End	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
April 28, 2025 12:16:43 PM	start	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 28, 2025 12:16:50 PM	End	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 28, 2025 12:17:51 PM	start	Execution	Detector Flow Accuracy - Back FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None

User Name: nattpatthengcharoen      System ID: CN15343147  
Report Generated by: nattpatthengcharoen      Date: April 28, 2025 12:57 PM

Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:18:14 PM	Audit	Data	Detector Flow Accuracy - Back FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 28, 2025 12:18:17 PM	End	Execution	Detector Flow Accuracy - Back FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 28, 2025 12:18:18 PM	start	Execution	Detector Flow Accuracy - Back FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 28, 2025 12:18:37 PM	Audit	Data	Detector Flow Accuracy - Back FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 28, 2025 12:18:44 PM	End	Execution	Detector Flow Accuracy - Back FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 28, 2025 12:18:46 PM	start	Execution	Detector Flow Accuracy - Back FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 28, 2025 12:19:17 PM	Audit	Data	Detector Flow Accuracy - Back FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 28, 2025 12:19:26 PM	End	Execution	Detector Flow Accuracy - Back FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 28, 2025 12:19:35 PM	start	Execution	Detector Flow Accuracy - Front UECD: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 28, 2025 12:19:55 PM	Audit	Data	Detector Flow Accuracy - Front UECD: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

User Name: naitapal.bengcharoen

System ID: CN15343147

## Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:20:02 PM	End	Execution	Detector Flow Accuracy - Front UECD: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 28, 2025 12:20:03 PM	start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 28, 2025 12:20:43 PM	start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 28, 2025 12:21:02 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 28, 2025 12:21:03 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 28, 2025 12:21:11 PM	start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 28, 2025 12:21:27 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 28, 2025 12:21:31 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1

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Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147

User Name: naitapal.bengcharoen

System ID: CN15343147

## Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:21:33 PM	start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
April 28, 2025 12:22:25 PM	Audit	Data	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 28, 2025 12:22:27 PM	End	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 28, 2025 12:25:36 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None
April 28, 2025 12:27:08 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None
April 28, 2025 12:28:18 PM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
April 28, 2025 12:28:18 PM	Audit	TestUnlocked	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	Deviation filed for Run Count : 0
April 28, 2025 12:28:18 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None
April 28, 2025 12:29:02 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None

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Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147



User Name: natthapat.hongcharon System Id: CN15343147

Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:30:17 PM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
April 28, 2025 12:30:17 PM	Audit	TestUnlocked	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	Deviation filed for Run Count : 0
April 28, 2025 12:30:17 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None
April 28, 2025 12:30:29 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None
April 28, 2025 12:31:35 PM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\SC_FID1.D\FID2B.ch
April 28, 2025 12:32:16 PM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	Run Count : 1
April 28, 2025 12:32:22 PM	start	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None
April 28, 2025 12:33:53 PM	Audit	Data	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : D:\Secot_ECD\ND_B_01.D\FID2B.ch

User Name: natthapat.hongcharon System Id: CN15343147

Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:34:07 PM	End	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 28, 2025 12:34:15 PM	start	Execution	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_2.D\FID2B.ch
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_3.D\FID2B.ch
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_4.D\FID2B.ch
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_5.D\FID2B.ch
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_6.D\FID2B.ch

User Name: natthapal.hongcharoen

System ID: CN15343147

## Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:35:02 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_7.D\FID2B.ch
April 28, 2025 12:35:07 PM	End	Execution	Injection Precision - Injection Tower, Front SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 28, 2025 12:35:22 PM	start	Execution	Signal to Noise - Injection Tower, Front SSL, Back FID: - Detector FID - L: >= 300000	None
April 28, 2025 12:35:43 PM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Back FID: - Detector FID - L: >= 300000	Data files Path : D:\Secot_ECD\IOQ 2025-04-24 15-01-00\SN_FID_1.D\FID2B.ch
April 28, 2025 12:35:49 PM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Back FID: - Detector FID - L: >= 300000	Run Count : 1
April 28, 2025 12:35:52 PM	start	Execution	GC Scouting Run - Manual Injection, Back SSL, Front UECD: - Part of System Preparation - No limits associated	None
April 28, 2025 12:37:27 PM	Audit	Data	GC Scouting Run - Manual Injection, Back SSL, Front UECD: - Part of System Preparation - No limits associated	Data files Path : D:\Secot_ECD\SC_ECD_01.D\ECD1A.ch
April 28, 2025 12:40:25 PM	End	Execution	GC Scouting Run - Manual Injection, Back SSL, Front UECD: - Part of System Preparation - No limits associated	Run Count : 1

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Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147

User Name: natthapal.hongcharoen

System ID: CN15343147

## Secot\_CN15343147 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 28, 2025 12:40:29 PM	start	Execution	Noise and Drift - Front UECD: - Detector UECD - L (Noise): <= 3.00 Hz - L (Drift): <= 15.00 Hz/hour	None
April 28, 2025 12:40:55 PM	Audit	Data	Noise and Drift - Front UECD: - Detector UECD - L (Noise): <= 3.00 Hz - L (Drift): <= 15.00 Hz/hour	Data files Path : D:\Secot_ECD\IND_ECD_01.D\ECD1A.ch
April 28, 2025 12:41:05 PM	End	Execution	Noise and Drift - Front UECD: - Detector UECD - L (Noise): <= 3.00 Hz - L (Drift): <= 15.00 Hz/hour	Run Count : 1
April 28, 2025 12:41:09 PM	start	Execution	Signal to Noise - Manual Injection, Back SSL, Front UECD: - Detector UECD - L: >= 1500	None
April 28, 2025 12:41:25 PM	Audit	Data	Signal to Noise - Manual Injection, Back SSL, Front UECD: - Detector UECD - L: >= 1500	Data files Path : D:\Secot_ECD\IND_ECD_01.D\ECD1A.ch
April 28, 2025 12:42:31 PM	End	Execution	Signal to Noise - Manual Injection, Back SSL, Front UECD: - Detector UECD - L: >= 1500	Run Count : 1
April 28, 2025 12:42:34 PM	End	Qualification	Session	OQ
April 28, 2025 12:42:34 PM	start	Reporting	Session	None
April 28, 2025 12:58:16 PM	Audit	Reporting	Session	Report Generated : Certificate
April 28, 2025 12:58:43 PM	Audit	Reporting	Session	Report Generated : Report

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Date: April 28, 2025 12:57:27 PM  
System ID: CN15343147

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: US2509MA07  
Organization Name: Secot CO.,Ltd. (Head Office)  
Organization Location: 239 Rimklongprapa Rd., Bangsue, Bangkok 10800

Date: April 10, 2025 3:59:29 PM  
EQP Name: AgilentRecommended , AgilentRecommended

EQP Revision: GC.02.55, GCMS.02.56  
Overall Qualification Status: Pass

CDS Logon Verification - GC

Logon: No logon credentials required for customer CDS

System Inspection and Basic Safety and Operation

Name: 8890  
Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 8890  
Front SSL

Setpoint Status: Pass

	Setpoint	Actual
Inlet Pressure:	25.0 psi	24.9 psi
Accuracy:		0.1 psi
Agilent Recommended:		<= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Date: April 10, 2025 3:59:29 PM  
System ID: US2509MA07

GC Oven Temperature Accuracy

Name: 8890  
Setpoint Status: Pass  
Zone: Oven  
Setpoint/Actual  
Temperature: 230.0 230.0 °C  
Accuracy: 0.0 °C  
Agilent Recommended: >= -1.0 % setpoint in K ( -5.0 °C )  
<= 1.0 % setpoint in K ( 5.0 °C )

Setpoint Status: Pass  
Zone: Oven  
Setpoint/Actual  
Temperature: 100.0 100.0 °C  
Accuracy: 0.0 °C  
Agilent Recommended: >= -1.0 % setpoint in K ( -3.7 °C )  
<= 1.0 % setpoint in K ( 3.7 °C )

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 8890  
Setpoint Status: Pass  
Setpoint/Average  
Temperature: 100.0 100.05 °C  
Stability: 0.1 °C  
Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Date: April 10, 2025 3:59:29 PM  
System ID: US2509MA07

Tested Combination1 Front SSL / External SQ  
Name: 5977C

Setpoint Status: Pass

Overall Log Amp Test Status  
Pass

RFPA

Tested Combination1 Front SSL / External SQ  
Name: 5977C

Setpoint Status: Pass

Amu: 1050 m/z Drift After Five Minutes: RFPA Voltage:  
31 mV 510 mV  
Agilent Recommended: >= -100 and <= 100 <= 1100

Overall RFPA Test Status  
Pass

Tune EI

Tested Combination1 Front SSL / External SQ  
Name: 5977C

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status  
Pass

Scouting Run

Tested Combination1 Front SSL / External SQ  
Manual Injection

Date: April 10, 2025 3:59:29 PM  
System ID: US2509MA07

Name: Not applicable  
Source: EI - Extractor

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status  
Completed

NOTE: This test's 1 comment(s) and 1 deviation(s) are available in the Attachments section.

Signal to Noise EI

Tested Combination1 Front SSL / External SQ  
Name: 5977C

Source: EI - Extractor Filament: 1

Setpoint Status: Pass

Signal to Noise: 14338

Agilent Recommended: >= 4000

Source: EI - Extractor Filament: 2

Setpoint Status: Pass

Signal to Noise: 8988

Agilent Recommended: >= 4000

Overall Signal to Noise EI Test Status  
Pass

Date: April 10, 2025 3:59:29 PM  
System ID: US2509MA07

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	US2509MA07
Manufacturer	Agilent Technologies
Name	8890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination1

Injection Technique	Manual Injection
Inlet	Front
Detector	External
LTM Included?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10

Mainframe 1

Manufacturer	Agilent Technologies
Name	8890
Model Number	G3540A
Serial Number	CN2508A105
Firmware Revision	3.0.0.181
Oven Type	Standard

Inlet 1

Manufacturer	Agilent Technologies
Name	8890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Detector 1

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977C
Model Number	G7077C
Serial Number	US2509MA07
Firmware Revision	Not applicable
High Vacuum System	Turbo Pump
Liquid Injection Scouting Run Standard	OFN Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Extractor
Number of filaments	2

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer: Nattapat Hengcharoen  
Logged On User Name: nattapat.hengcharoen@agilent.com  
Signature Creation Date: April 10, 2025  
Reason for Signature: Executed protocol and published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\AceSelfQualification.

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Client Name: Nattapat Hengcharoen  
Report Generated by Hostname: DESKTOP-ST5F4N3  
System ID: US2509MA07  
Print Date: April 10, 2025 3:59:39 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 8:48:36 AM	Audit	SessionCreated	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842594E
April 10, 2025 8:49:38 AM	start	Configuration	Session	None
April 10, 2025 8:49:38 AM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
April 10, 2025 9:54:33 AM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks/Gc/Configurations/02.55/Gc.02.55.eqp], EQP File Name: [Gc.02.55.eqp], EQP Name: [AgilentRecommended], Protocol Revision: [Gc.02.55] EQP details for hyphenated technique [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.56/GcMs.02.56.eqp], EQP File Name: [GcMs.02.56.eqp], EQP Name: [AgilentRecommended]
April 10, 2025 9:54:45 AM	End	Configuration	Session	None
April 10, 2025 9:54:49 AM	start	Qualification	Session	IQ
April 10, 2025 9:54:49 AM	start	Qualification	Session	OQ
April 10, 2025 9:54:49 AM	start	Execution	Purchase Order Details - 8890: - None Purchase Order	
April 10, 2025 9:54:56 AM	End	Qualification	Session	IQ
April 10, 2025 9:54:56 AM	start	Qualification	Session	OQ

Here Name of Host: DESKTOP-ST5F4N3  
Report Generated by Hostname: DESKTOP-ST5F4N3  
System ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

## Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 9:54:56 AM	start	Execution	CDS Logon Verification - GC - 8890: - Qualitative test	None
April 10, 2025 9:56:08 AM	End	Execution	CDS Logon Verification - GC - 8890: - Qualitative test	Run Count : 1
April 10, 2025 9:58:10 AM	start	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	None
April 10, 2025 9:58:25 AM	End	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	Run Count : 1
April 10, 2025 9:58:27 AM	start	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 10, 2025 9:57:28 AM	End	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 10, 2025 9:57:29 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 10, 2025 9:58:03 AM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 10:00:25 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None

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Here Name of Host: DESKTOP-ST5F4N3  
Report Generated by Hostname: DESKTOP-ST5F4N3  
System ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

## Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 10:00:38 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 10, 2025 10:00:42 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 10, 2025 10:00:44 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 10, 2025 10:18:14 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 10, 2025 10:18:19 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 10, 2025 10:19:26 AM	start	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
April 10, 2025 10:48:10 AM	Audit	Data	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 10, 2025 10:48:12 AM	End	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 10, 2025 10:48:14 AM	start	Execution	Log Amp - 5977C SQ: - Source: EI - Extractor	None
April 10, 2025 10:55:30 AM	End	Execution	Log Amp - 5977C SQ: - Source: EI - Extractor	Run Count : 1

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Host Name: desktop-ST5F4N3  
Report Generated by Hostname: DESKTOP-ST5F4N3

System ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 10:55:32 AM	start	Execution	RFPA - 5977C SQ: - Source: EI - None - Extractor	None
April 10, 2025 10:57:39 AM	start	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None
April 10, 2025 11:07:38 AM	start	Execution	RFPA - 5977C SQ: - Source: EI - None - Extractor	
April 10, 2025 11:17:53 AM	End	Execution	RFPA - 5977C SQ: - Source: EI - Run Count : 1 - Extractor	
April 10, 2025 11:17:55 AM	start	Execution	Tune EI - 5977C SQ: - Source: - None EI - Extractor Filament 1 (Qualitative - No setpoints associated)	
April 10, 2025 11:18:09 AM	End	Execution	Tune EI - 5977C SQ: - Source: - Run Count : 1 EI - Extractor Filament 1 (Qualitative - No setpoints associated)	
April 10, 2025 11:19:11 AM	start	Execution	Tune EI - 5977C SQ: - Source: - None EI - Extractor Filament 2 (Qualitative - No setpoints associated)	
April 10, 2025 11:19:24 AM	End	Execution	Tune EI - 5977C SQ: - Source: - Run Count : 1 EI - Extractor Filament 2 (Qualitative - No setpoints associated)	
April 10, 2025 11:19:25 AM	start	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None

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Host Name: desktop-ST5F4N3  
Report Generated by Hostname: DESKTOP-ST5F4N3

System ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 12:10:38 PM	start	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None
April 10, 2025 12:10:59 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 12:11:04 PM	start	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None
April 10, 2025 12:11:06 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 12:14:35 PM	Audit	AceClosed	Session	None
April 10, 2025 12:15:07 PM	Audit	AceRestarted	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842594E
April 10, 2025 2:31:58 PM	Audit	SessionReloaded	Session	None
April 10, 2025 2:31:59 PM	start	Qualification	Session	IQ
April 10, 2025 2:31:59 PM	start	Qualification	Session	OQ
April 10, 2025 2:31:59 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 2:32:02 PM	start	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	None

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User Name: natallia.khramchenko

System ID: US2509MA07

Report Generated by Hostname: DESKTOP-ST5F4N3

Print Date: April 10, 2025 3:59:36 PM

## Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 2:32:42 PM	Audit	Data	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	Data files Path : D:\Projects\IQOQ2025\Data\OQ2025\Sc1.d
April 10, 2025 2:33:06 PM	End	Execution	Scouting Run - Manual Injection, Front SSL, SQ: - Source: - EI - Extractor- Part of GCMS System Preparation	Run Count : 1
April 10, 2025 2:33:09 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 2:46:56 PM	Audit	AceClosed	Session	None
April 10, 2025 3:05:56 PM	Audit	AceRestarted	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842594E
April 10, 2025 3:05:57 PM	Audit	SessionReloaded	Session	None
April 10, 2025 3:05:59 PM	start	Qualification	Session	IQ
April 10, 2025 3:05:59 PM	start	Qualification	Session	OQ
April 10, 2025 3:05:59 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 3:08:27 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	None
April 10, 2025 3:15:40 PM	Audit	Data	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	Manual Data Entry

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User Name: natallia.khramchenko

System ID: US2509MA07

Report Generated by Hostname: DESKTOP-ST5F4N3

Print Date: April 10, 2025 3:59:36 PM

## Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 3:15:42 PM	End	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 1 - L: >= 4000	Run Count : 1
April 10, 2025 3:15:44 PM	start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 2 - L: >= 4000	None
April 10, 2025 3:18:58 PM	Audit	Data	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 2 - L: >= 4000	Manual Data Entry
April 10, 2025 3:18:37 PM	End	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ: - Source: EI - Extractor using Filament 2 - L: >= 4000	Run Count : 1
April 10, 2025 3:18:39 PM	End	Qualification	Session	OQ
April 10, 2025 3:19:39 PM	start	Reporting	Session	None
April 10, 2025 3:41:22 PM	End	Reporting	Session	None
April 10, 2025 3:41:22 PM	start	Qualification	Session	IQ
April 10, 2025 3:41:22 PM	start	Execution	Purchase Order Details - 8890: - None Purchase Order	
April 10, 2025 3:44:42 PM	start	Execution	Preparation and Installation Details - 8890: - Preparation	None
April 10, 2025 3:44:43 PM	End	Execution	Purchase Order Details - 8890: - Run Count : 1 Purchase Order	
April 10, 2025 3:44:53 PM	start	Execution	Documentation - 8890: - Documentation	None
April 10, 2025 3:44:53 PM	End	Execution	Preparation and Installation Details - 8890: - Preparation	Run Count : 1

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User Name: natlapal.hengcharoen  
Report Generated by Hostname: DESKTOP-ST5F4N3

Computer ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 3:45:06 PM	start	Execution	Product Quality Assurance Details - 8890: - Quality Assurance	None
April 10, 2025 3:45:06 PM	End	Execution	Documentation - 8890: - Documentation	Run Count : 1
April 10, 2025 3:45:12 PM	start	Execution	Startup - 8890: - Startup	None
April 10, 2025 3:45:12 PM	End	Execution	Product Quality Assurance Details - 8890: - Quality Assurance	Run Count : 1
April 10, 2025 3:45:15 PM	End	Execution	Startup - 8890: - Startup	Run Count : 1
April 10, 2025 3:45:16 PM	start	Execution	Instrument Check - External Mass Spectrometer: - Instrument Check	None
April 10, 2025 3:45:32 PM	End	Execution	Instrument Check - External Mass Spectrometer: - Instrument Check	Run Count : 1
April 10, 2025 3:45:33 PM	End	Qualification	Session	IQ
April 10, 2025 3:45:33 PM	start	Qualification	Session	OQ
April 10, 2025 3:45:36 PM	End	Qualification	Session	OQ
April 10, 2025 3:45:36 PM	start	Reporting	Session	None
April 10, 2025 3:46:12 PM	Audit	Reporting	Session	Report Generated : Certificate
April 10, 2025 3:46:29 PM	Audit	Reporting	Session	Report Generated : Report

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User Name: natlapal.hengcharoen  
Report Generated by Hostname: DESKTOP-ST5F4N3

Computer ID: US2509MA07  
Print Date: April 10, 2025 3:59:30 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 3:47:30 PM	Audit	Reporting	Session	Report Signed : Certificate PDF Name: Secot_GCMSD_20250410_Certificate_1.pdf User Name: natlapal.hengcharoen@agilent.com Full Name of Signer: Natlapat Hengcharoen Reason for signature: Executed protocol and published this original version of document
April 10, 2025 3:47:58 PM	Audit	Reporting	Session	Report Signed : Report PDF Name: Secot_GCMSD_20250410_IQ Report_1.pdf User Name: natlapal.hengcharoen@agilent.com Full Name of Signer: Natlapat Hengcharoen Reason for signature: Executed protocol and published this original version of document
April 10, 2025 3:49:28 PM	Audit	AccClosed	Session	None
April 10, 2025 3:50:07 PM	Audit	AccRestarted	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842584E
April 10, 2025 3:50:08 PM	Audit	SessionReloaded	Session	None
April 10, 2025 3:50:09 PM	start	Qualification	Session	IQ
April 10, 2025 3:50:09 PM	start	Qualification	Session	OQ
April 10, 2025 3:58:09 PM	Audit	Reporting	Session	Report Generated : Certificate

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Host Name: desktop-ST5F4N3  
Report Generated by Hostname: DESKTOP-ST5F4N3  
Print Date: April 10, 2025 3:58:30 PM

Secot\_GCMSD Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 10, 2025 3:58:31 PM	Audit	Reporting	Session	Report Generated : Report

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 reliable operation and the accuracy of your results.

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 systems 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.

## 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.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- 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.

## 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/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☒ If 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 corrosion, replace 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 PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.
- ☒ Record if test passed or failed in the results table.

## 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	N/A	N/A
Back detector output	"	"
AUX detector output	"	"
Pressure decay test	Expected test result	Actual test result
Front inlet pressure decay test	Pass	Pass
Back inlet pressure decay test	Pass	N/A

## 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 60074-78109 Date service completed 13 Feb 2025

 Agilent signature Spr N. Customer signature Jutarat Jaemruen

Total number of pages in this document \_\_\_\_\_

## Agilent Preventive Maintenance Services

### Agilent GCMS Preventive Maintenance

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.

### Important notice for customers

The customer should complete the following before the Support Provider arrives on site:

- ✓ Perform an autotune and retain the printed tune report just prior to the start of the PM to verify performance of the equipment.

**Note:** it is recommended to have the customer run the autotune and tune evaluation prior to the PM and then start the vent cycle so that the instrument will be ready for the service representative.

### Important Customer Web Links

- To access Agilent training and education, visit <http://www.agilent.com/chem/training> 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.
- To access the **Agilent Resource Center** web page, visit <https://www.agilent.com/en-us/agilentresources>. The following information topics are available:
  - Sample Prep and Containment
  - Chemical Standards
  - Analysis
  - Service and Support
  - Application Workflows
- 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>
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>
- **Need to place a service call?** Flexible Repair Options | Agilent

### 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.

## Instrument Maintenance

### Select the appropriate service to be performed.

- ☐ Interim Preventive Maintenance (when available, is typically 6 months or at the request of the customer)
- ☒ Major Preventive Maintenance (Yearly)
- ☐ Enhanced Preventive Maintenance (when available, is provided "As needed")

### System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID
Instrument System Site and Location

SECOT, Bangkok

List System Component Product Numbers	List the Serial Numbers of each Component
1. G7172A	U513343B01
2.	
3.	
4.	
5.	
6.	

### 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 and implementation of Service Notes
- ☒ Check firmware version(s). Updating to the most current versions is strongly recommended. Verify with the customer before updating.

Yes/No	<input type="checkbox"/>	<input type="checkbox"/>	Wet Mechanical vacuum pumps
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent oil changes if the oil is dirty
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Don't use mist filters with Chemical Ionization.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed. Visually confirm that no oil returns up vacuum hose.

### Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Diaphragm

- ☒ Service Not Applicable

Yes/No	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Diaphragm
Yes/No	Interim/Major		Description
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum – Turbo power demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Clear air flow paths of dust.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If vacuum is poor, then replace the diaphragm pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed.

### Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Scroll

- ☒ Service Not Applicable

Yes/No	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Scroll
Yes/No	Interim/Major		Description
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the tips seal on the IDP pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum – Rough vac pressure, turbo power demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the Exhaust Filter if required.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent changes, if needed.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inform customer that pump gas ballast should be installed all the time.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed.

## Interim / Major Preventive Maintenance – System Post Check

☐ Service Not Applicable

System post-check			
Yes/No	Interim/Major	Description	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pump system back down. Wait until system stability has been achieved.	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system vacuum reading(s) via the gauge controller.	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leak Check	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system in manual tune	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Compare against previous tune file report(s)	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Change to Tune and verify that all temperatures, pressures, and gas flows reach method set points	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check manually that you have calibration peaks.	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EI Autotune Performed	

**Guidance:** If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument setup and checkout.

## Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Record the PM event in the Smart Alerts logbook, if applicable.
- ☒ 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 this service, parts replaced, and test results obtained with the customer.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☒ Complete Signature Page and attach Signature Page to Service Order.

## Test Results

Test Description	Expected Test Result	Actual Test Result
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## Parts for consumption during PM

Common Oil and MS Gas Filters – 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	Interim	Major	As Needed
Agilent AVF Platinum, 1 quart	5191-5851	✓	✓	✓
Helium gas filter* (collision cell gas) – if required	RMSH-2		✓	✓
Nitrogen gas filter* (collision cell gas) – if required	RMSN-2		✓	✓
Hydrogen gas filter* ^ (HydroInert and JetClean) – if required	RMSHY-2		✓	✓
Chemical Ionization Gas Purifier (CI systems) (Methane) – if required	5190-9071		✓	✓
Gas Clean GS/MS Filter (for He, N2 or H2) – if required	CP17973		✓	✓
# Gas Clean Filter Kit GC/MS 1/8 in (complete replacement kit - bench mounted) – if required	CP17974			✓
# Gas Clean Carrier Gas Kit for 7890 for He, N2 or H2; Bracket, Mount and Filter – if required	CP17988			✓
# Gas Clean Carrier Gas Kit for 8890 & 8860 for He, N2 or H2; Bracket, Mount and Filter – if required	CP179880			✓

Gas filters need to be changed only if required (ie indicating traps show color change, or if Big Universal Trap are approaching saturation based on time installed or number of gas cylinders changed for that trap)

\* Big Universal Trap (BUT), 1/8" fittings

^ HydroInert and JetClean Systems

# Alternate Gas Clean kit part numbers. A Gas Clean filter is included in the kits. They are only necessary if replacing carrier gas Big Universal Traps with indicating traps

MS Maintenance Supplies for 5973/5975/5977 Series

Part Description	Part Number	Interim	Major	As Needed
Diffusion pump fluid (Diffusion Pump Models)	6040-0809		✓	✓
Qty 2				
Exhaust oil mist trap (threaded) Edwards/Pfeiffer	G1099-80039	✓	✓	✓
DS42 Oil Mist Eliminator 3/4G & 3/8	SR03706556	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (IDP-3 Dry Scroll Pump Models – Includes tip seal, 60mm filter element, tools, mask and cleaning supplies)	G7077-67018	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – CSD P/N)	5190-9561	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – VPD P/N)	IDP3TS	✓	✓	✓
Filter element for IDP-3 (diameter: 60mm)	REPLSLRFILTER2	✓	✓	✓



## Common Parts Reference (Purchased by customer, not included as part of PM)

### Filaments and Calibrant Supplies 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
El High Temperature Filaments	G7005-60061 Qty 2	597X	7000x	N/A
HES El Filaments	G7002-60001	5977B/C	7010x	N/A
LE-El Filaments (7250 QTOF)	G3850-60021	N/A	N/A	7250
Cl High Temperature Filament – SQ, TQ, 7200 QTOF	G7005-60072	N/A	N/A	7200A/B
Axial Cl Filament, W/Re Straight (7250 QTOF)	G7250-60095	N/A	N/A	7250
PFTBA GCMS Tuning Standard calibrant	05971-60571	597X	70X0	72X0
PFDTD calibrant, 1 mL	8500-8510	597X	70X0	72X0
PFET, IRM calibrant for GC QTOF 0.5 mL (7200)	5190-0531	N/A	N/A	7200A/B

### Transfer line seals and springs 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Cl Interface tip seal (ceramic tip and spring combo) (non-captured Cl tip seal interface) (5973, 5975, 7000B)	G1999-60412	5973, 5975	7000B	N/A
Cl Interface tip seal (ceramic tip and spring low/non-magnetic spring combo) (non-captured Cl tip seal interface) (7010A)	G7002-60412	N/A	7010A	N/A
Cl Interface tip seal spring (spring only)	G1999-20023	597X	70X0	72X0
Cl Interface tip seal (tip only) (captured style)	G3870-20542	5977x	70X0	72X0
Transfer-Line Tip Base, Threaded (captured style)	G3870-20548	5977x	70X0	72X0
Transfer-Line Tip Cap, Threaded (captured style)	G3870-20547	5977x	70X0	72X0
RIS Xfer Tip (7200)	G7005-20542	N/A	N/A	7200A/B
RIS Xfer Tip Spring (7200)	G7005-20024	N/A	N/A	7200A/B

### MS Maintenance Supplies for Intuvo 9000 MS Series

Part Description	Part Number	SQ	TQ	QTOF
Swaged MS Tail - Packaged	G4590-60009	5977x	7000	N/A
Swaged MS Tail (HES) - Packaged	G4590-60109	5977x	7010x	N/A

### Heater/Sensor assemblies for 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Stainless Steel Heater/Sensor assembly (SST El 350)	G3870-67180	597X	N/A	N/A
Inert Heater/Sensor assembly (Inert El 350)	G3870-67179	597X	7000A/B	N/A
Extractor Heater/Sensor assembly (Xtr El 350)	G3870-67177	5977x	7000C/D/E	N/A
H2 El Heater/Sensor Assembly – HydroInert (H2 El 350)	G7078-67910	5977x	7000C/D/E	N/A
Cl 350 Heater/Sensor Assembly (Cl 350)	G3870-67415	597X	70X0x	N/A
Ring heater/sensor assembly (HES, RIS and LEEI) (ceramic ring)	G7002-60058	5977B/C	7010x	72X0

### Rough pump hoses 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Foreline Hose - imbedded spring	G7077-60119	597X	70X0x	72X0

### Common MS Maintenance Supplies

Part Description	Part Number	SQ	TQ	QTOF
Abrasive paper, 30 µm	5061-5896	597X	70X0	72X0
Alumina powder	393706201	597X	70X0	72X0
Cloths, clean (pkg of 15)	05980-60051	597X	70X0	72X0
Cloths, cleaning (pkg of 300)	9310-4828	597X	70X0	72X0
Cotton swabs (pkg of 100)	5080-5400	597X	70X0	72X0
Gloves, clean, large	8650-0030	597X	70X0	72X0
Gloves, clean, small	8650-0029	597X	70X0	72X0

## Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard



Agilent Preventive Maintenance provides factory recommended service for your analytical systems to assure reliable operation and the accuracy of your results. 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 systems operating at their peak.

For more information about Agilent Technologies services please visit our web site using the following URL, <http://www.chem.agilent.com/en-us/products/services/pages/default.aspx>

### 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 Lists 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 additional or special procedures and/or parts for the instrument service, then these must be ordered separately and charged as a repair, which may incur additional costs.

### Service Engineer's Responsibilities

- Only complete/printout pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓" in the checkbox.
- Complete Not Applicable check boxes to indicate services not delivered, as needed.
- Complete the PM service in the order of the tasks listed.
- Complete the Service Review section together with the customer.

## Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard



### Check External Supplies

- ☐ Section NOT Applicable
- ☒ Verify the gas source is supplying an input pressure of 50 - 100 psi to the ATOMX. If the customer is using a gas cylinder, verify the cylinder is at 500+ psi.
- ☒ Verify that the waste container has sufficient volume to contain the waste generated. Empty if necessary.
- ☒ Replace the DI water supply with fresh DI water.
  - Make sure the DI water supply is sufficient for sample analysis (1 Liter minimum)
- ☒ Make sure the methanol supply is sufficient for sample analysis.

### Atomx Leak and Pressure Check

- ☐ Section NOT Applicable
- ☒ Scan through the sample log to verify that the purge pressures are staying consistent throughout the daily runs.
- ☒ Use the Teklink software to check the standard pressure.
- ☒ Run a leak check to ensure that the unit is leak tight.

### Inspect ATOMX Hardware

- ☐ Section NOT Applicable
- ☒ Check the tray vial holes for foreign particles. Clean if necessary.
- ☒ Inspect the needle for particles or sample build up. Clean if necessary.
- ☒ Inspect the sparger glassware for damage and/or discoloration that could restrict flow or cause contamination. Replace if necessary.
- ☒ Inspect the drain tubing for clogging. Replace the drain line if necessary.
- ☒ Lubricate the ATOMX Carousel Drive. Refer to the diagram on page 6-25 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.
- ☒ Lubricate the ATOMX Elevator. Refer to the diagram on page 6-32 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.

### Restore Instrument

#### Guidance

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.

Teledyne Tekmar ATOMX Purge and Trap  
Preventive Maintenance Checklist - Standard



Agilent Technologies

**Service Engineer Comments (optional)**

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 in this box.

**Other Important Customer Web Links**

- ☐ How to get information on your product: Literature Library - <http://www.agilent.com/chem/library>
- ☐ Need to know more? - [www.agilent.com/chem/education](http://www.agilent.com/chem/education)
- ☐ Need technical support, FAQs? - [www.agilent.com/chem/techsupp](http://www.agilent.com/chem/techsupp)
- ☐ Need supplies? - [www.agilent.com/chem/supplies](http://www.agilent.com/chem/supplies)

**Service Completion**

Service request number 6007478109 Date service completed 13 Feb 2025

Agilent signature Sp N. Customer signature Jutarat Jaemvuen

Number of pages in this document \_\_\_\_\_

ภาคผนวก จ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
จากกรมโรงงานอุตสาหกรรม



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

## ๒ ๐ กรกฎาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ซีคอต จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๗ เมษายน ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น  
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น  
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๙ แผ่น

ตามหนังสือที่อ้างถึง บริษัท ซีคอต จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙ สถานที่ ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ซีคอต จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย ตามสิ่งที่ส่งมาด้วย ๑  
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๘ ราย ตามสิ่งที่ส่งมาด้วย ๒  
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูลหรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ พฤษภาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ส่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอต จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

ลงวันที่ ๒ ๐ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย

- ๑) นายขรรชัย เกรียงไกรอุดม
- ๒) นางสมฤดี เกรียงไกรอุดม
- ๓) นางสาวอารยา ทิพรักษ์
- ๔) นางสาวเชมชุตตา อินทร์ศรี
- ๕) นางสาวปรีดา สมใจ
- ๖) นางสาวอริญญา มาตา
- ๗) นางสาวลดาวัลย์ วงศ์เจริญ
- ๘) นางสาวณัฏฐารมย์ เกตะวันดี
- ๙) นางสาวนริสา ภูวสรเพ็ญ
- ๑๐) นางสาวศิริวรรณ ฉิมสง่า

- ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๒  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๓  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๔  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๕  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๖  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๗  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๘  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๐๙  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๑๐  
ทะเบียนเลขที่ ว-๒๓๙-ก-๐๐๑๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ชีคอฟ จำกัด

เลขทะเบียน ๖-๒๓๙

ที่ ออก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๘ ราย

- ๑) นางสาวสุดาพร สุนทร
- ๒) นางสาวสุธาทิพย์ เทียนเตี้ย
- ๓) นางสาวสุนันทา ศิริพัฒนานนท์
- ๔) นายบวร ศิษย์ยะ
- ๕) นางสาวเกศรินทร์ วรเดชวิทยา
- ๖) นายอนันต์ ภูมิวันนา
- ๗) นายชิตพล สมประสงค์
- ๘) นางสาวศศิธร พรหมประเสริฐ
- ๙) นายศิวันนที กุลพงษ์
- ๑๐) นางสาวอลิษา คณิธรานนท์
- ๑๑) นางสาวสิริวรรณ แก้วชิงดวง
- ๑๒) นางสาวปัทมวรรณ สุวรรณวิโรจน์
- ๑๓) นางสาวกนิษฐา เจริญเชื้อ
- ๑๔) นายวัชรกานต์ ประมาคเค
- ๑๕) นายทอง เฮงชวลกุล
- ๑๖) นางสาวกฤษณา จันทุม
- ๑๗) นางสาวพรนภา บุตรธรรม
- ๑๘) นางสาวธาริณี อาจปลิว
- ๑๙) นายธนโชติ ช่างล้อ
- ๒๐) นางสาวพัชรา สมานพันธ์
- ๒๑) นางสาวจุฑารัตน์ แจ่มเรือน
- ๒๒) นางสาวณิสดา กุ้ยอ่อน
- ๒๓) นายกิตติพงศ์ ณะเกิงสุข
- ๒๔) นายจิรวัฒน์ โคตรคำหาญ
- ๒๕) นายชนะพล อัครผล
- ๒๖) นางสาวทิพย์สุดา วรณการ
- ๒๗) นายสิทธิชัย สว่างวงศ์ไชย
- ๒๘) นายพิษณุ สีนามเพ็ง
- ๒๙) นายรัตนชัย ขอบทำกิจ
- ๓๐) นายธนาวุฒิ ตัวนแสง
- ๓๑) นายณัฐชัย ไชยโคตร
- ๓๒) นายณัฐดนัย กฤษณะโสม
- ๓๓) นายสุกชัย สุขใหม่
- ๓๔) นายรอมฎอน เทลิมหมาด
- ๓๕) นางสาวสุภาวดี บัวแก้ว
- ๓๖) นางสาวมารียาณี ฮาแว
- ๓๗) นางสาววิระยา ปัจฉิมบุรณ์
- ๓๘) นางสาวศลิษา อินริย์

- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๐๑๑
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๐๓๓
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๐๔๔
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- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๑๖๖
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- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๑๙๙
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- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๒๒
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๓๓
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๔๔
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๕๕
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๖๖
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๗๗
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๘๘
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๒๙๙
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๐๐
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๑๑
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๒๒
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๓๓
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๔๔
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๕๕
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๖๖
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๗๗
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๘๘
- ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๓๙๙

3/10/2566

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ชีคอฟ จำกัด

เลขทะเบียน ๖-๒๓๙

ที่ ออก ๐๓๑๐(๑)/ ๑๑ ๐๑ ๖

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๕ รายการ

น้ำเสีย จำนวน 45 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
4	α-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
5	β-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
6	δ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
7	γ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

3/10/2566

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>[4]</sup>
9	Cadmium	2) 5-Day BOD Test, Membrane Electrode Method <sup>[4]</sup> 1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
10	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method <sup>[4]</sup> 2) Closed Reflux, Colorimetric method <sup>[4]</sup> 3) Closed Reflux, Titrimetric Method <sup>[4]</sup>
11	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method <sup>[4]</sup>
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
15	Cyanide	Distillation, Colorimetric method <sup>[4]</sup>
16	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
18	4,4'-DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
19	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
20	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
21	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
22	Endosulfan Sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
23	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
24	Endrin Aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Formaldehyde	Distillation, Colorimetric Method <sup>[3]</sup>
26	Free Chlorine	1) Iodometric Method <sup>[4]</sup> 2) DPD Colorimetric Method <sup>[4]</sup>
27	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
28	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
29	Hexavalent Chromium	1) Colorimetric Method <sup>[4]</sup> 2) Extraction, Air-Acetylene Flame Method <sup>[4]</sup>
30	Lead	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
31	Manganese	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
32	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup>
33	Methoxychlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
34	Nickel	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> <i>วิธีใหม่</i>

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
35	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>[4]</sup> 2) Soxhlet Extraction Method <sup>[4]</sup>
36	pH	Electrometric Method <sup>[4]</sup>
37	Phenols	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup>
38	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
39	Sulfide	1) Iodometric method <sup>[4]</sup> 2) Methylene blue method <sup>[4]</sup>
40	Temperature	Laboratory and Field Methods <sup>[4]</sup>
41	Total Dissolved Solids	Dried at 180 °C <sup>[4]</sup>
42	Total Kjeldahl Nitrogen	1) Macro Kjeldahl Method <sup>[4]</sup> 2) Semi-Micro Kjeldahl Method <sup>[4]</sup>
43	Total Suspended Solids	Dried at 103-105 °C <sup>[4]</sup>
44	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>[4]</sup>
45	Zinc	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> <i>วิธีใหม่</i>



น้ำใต้ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
10	Benzene	Purge and Trap Gas Chromatographic/Mass spectrometric Method <sup>[4]</sup>
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup> 3m)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
20	Bromoform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup> 3m)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup>
35	Chromium (VI)	1) Colorimetric Method <sup>[4]</sup> 2) Extraction, Air-Acetylene Flame Method <sup>[4]</sup>
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
37	Cyanide	1) Distillation, Titrimetric Method <sup>[4]</sup> 2) Distillation, Colorimetric Method <sup>[4]</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid...

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
65	Endrin	2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup> 1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
66	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
73	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup> 2) Liquid-Liquid...

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	$\gamma$ -HCH	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup> 1) Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
77	Hexachlorocyclopentadiene	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup> Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup>
84	Methanol	Purge and Trap Gas Chromatographic/ Mass spectrometric Method <sup>[4]</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
86	Methyl bromide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>

87 Methylene chloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
87	Methylene chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
96	Polychlorinated Biphenyls - PCB-1016 - PCB-1221 - PCB-1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
98	pH	Electrometric method <sup>[4]</sup>

99 Phenanthrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
100	Phenol	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup> 3) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
103	Silver	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
108	TPH (C <sub>5</sub> -C <sub>8</sub> )	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[12,25]</sup>
109	TPH (C <sub>8</sub> -C <sub>16</sub> )	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,21]</sup> 2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method <sup>[9,25]</sup>
110	TPH (C <sub>16</sub> -C <sub>35</sub> )	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,21]</sup> <i>simul</i>

2) Separatory...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method <sup>[9,25]</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
112	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
113	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
114	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
115	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
116	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
118	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
119	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
120	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
121	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
122	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
123	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
124	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup> <i>simul</i>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
125	Zinc	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>

อากาศเสีย (ปล่อยระบาย) จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
5	Carbon monoxide	Instrumental Analyzer Method <sup>[5]</sup>
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
10	Cresol	Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup>
11	Dioxin/Furans	Isokinetic Sampling <sup>[5]</sup>
12	Hydrogen chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>[5]</sup>
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
16	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[5]</sup>
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Opacity	Ringelmann's Method <sup>[2]</sup>
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method <sup>[5]</sup> 2) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 3) Instrumental Analyzer Method <sup>[5]</sup>
21	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
22	Sulfur dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 2) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 3) Instrumental Analyzer Method <sup>[5]</sup>
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup>
24	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
25	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method <sup>[5]</sup> 2) Paired Train, Isokinetic Sampling, Gravimetric Method <sup>[5]</sup>
26	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
27	Xylene	1) Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup> 2) Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method <sup>[5]</sup>

สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 34 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,6,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,6,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
2	Antimony	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup>

2) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
7	Chlordane	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
8	Chromium	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup> 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion...

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation <sup>[1,6,15,17]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation <sup>[1,6,14,17]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation <sup>[7,8,15,17]</sup> 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation <sup>[7,8,14,17]</sup>
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method <sup>[1,17]</sup> 2) Alkaline Digestion, Colorimetric Method <sup>[8,17]</sup>
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 3) Digestion...

13 2,4-D...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	2,4-D	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,25]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[25]</sup>
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>

17 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup>

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Lindane	3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[1,18]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[19]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 3) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup> 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>


24 Molybdenum...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,23]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
27	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,25]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[25]</sup>
28	pH	Electrometric Method <sup>[31,32]</sup>
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[1,6,20]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,20]</sup>


4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
30	Silver	4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
32	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[1,12,26]</sup> 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[12,26]</sup>
33	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
34	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>

ดิน จำนวน 124 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup> 

2 Acetone...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
5	Antimony	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,24]</sup>
8	Barium	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup> 

14 Benzo(a)pyrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
16	Beryllium	Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation <sup>[7,8,15,17]</sup> 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>[7,8,14,17]</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>[8,17]</sup>
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
37	Cyanide	1) Extraction, Distillation, Titrimetric Method <sup>[28,29,30]</sup> 2) Extraction, Distillation, Colorimetric Method <sup>[28,29,30]</sup>
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[24]</sup>
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
47	3,3'-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>

54 1,2-Dichloropropane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>

67 Fluoranthene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
71	Hexachlorobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>

78 Hexachloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[19]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
84	Methanol	Ultrasonic Extraction, Direct Aqueous Injection, Gas Chromatographic Method <sup>[11,21]</sup>
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,27]</sup>
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>

90 Methyl tert-butyl ether...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
91	Naphthalene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
93	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
95	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
97	Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[24]</sup>
98	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,27]</sup>
100	Pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,20]</sup>

2) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
102	Silver	2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
107	TPH (C <sub>5</sub> -C <sub>8</sub> )	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
108	TPH (C <sub>8</sub> -C <sub>16</sub> )	1) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,21]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method <sup>[10,26]</sup>
109	TPH (C <sub>16</sub> -C <sub>35</sub> )	1) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,21]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method <sup>[10,26]</sup>
110	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
111	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
112	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
113	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>

114 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,27)</sup>
115	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,27)</sup>
116	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
117	Vanadium	Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup>
118	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass spectrometric Method <sup>(13,26)</sup>
119	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
120	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
121	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
122	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
123	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(13,26)</sup>
124	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> <i>สิงห์</i>

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ที่ อก ๐๓๑๐(๑)/ ๕๐ ๕๕



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๗ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๑ พฤษภาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท ซีคอฟ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙  
สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร  
ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์  
จำนวน ๒ ราย ได้แก่

- |                           |                            |
|---------------------------|----------------------------|
| ๑) นายวัชรกานต์ ประมาคะเด | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๕ |
| ๒) นายรัตนชัย ขอบทำกิจ    | ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๐ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นายพรยศ กลั่นกรอง)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

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โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

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ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๑ พฤศจิกายน ๒๕๖๗

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๕ พฤศจิกายน ๒๕๖๗

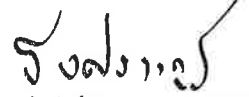
ตามคำขอที่อ้างถึง บริษัท ซีคอฟ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙  
สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ขอยกเลิกบุคลากร  
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กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์  
จำนวน ๓ ราย ได้แก่

- |                          |                            |
|--------------------------|----------------------------|
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จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

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ภาคผนวก ช

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ใบรับรองความสามารถห้องปฏิบัติการและขอบข่ายการรับรอง  
ห้องปฏิบัติการทดสอบ ตามมาตรฐาน ISO/IEC 17025  
จากสำนักงานมาตรฐานอุตสาหกรรม (สมอ.)



แบบ กมท./สมอ.๒  
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ใบรับรองเลขที่ 24-LB0026  
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(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม  
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้  
(Issues this certificate to)

บริษัท ซีคอบ จำกัด ฝ่ายห้องปฏิบัติการทดสอบด้านสิ่งแวดล้อม  
(Secot Company Limited, Environmental Laboratory Division)

ตั้งอยู่เลขที่  
(Address)

๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร  
(239 Rimklongprapa Road, Bangsue, Bangsue, Bangkok)

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 ๐๓๙๔  
(Accreditation No., Testing 0394)

โดยมีรายละเอียดสาขาและขอบข่ายที่ใบรับรอง แสดงไว้ใน QR CODE และ [www.tisi.go.th](http://www.tisi.go.th)  
(Details of the scheme and scope of the certificate are shown in QR CODE and [www.tisi.go.th](http://www.tisi.go.th))

ออกให้ ณ วันที่ ๖ ธันวาคม พ.ศ. ๒๕๖๖  
(Issue date : 6 December B.E. 2566 (2023))

(นายวีระศักดิ์ เพ็งหล่ง)

ผู้อำนวยการสำนักงานคณะกรรมการการมาตรฐานแห่งชาติ

ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



Signed by สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม (สมอ.)  
Thai Industrial Standards Institute (TISI)  
Date: 2023-12-06T08:49:04.476+07:00

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม  
(Ministry of Industry, Thai Industrial Standards Institute)



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
(Scope of Accreditation for Testing)  
ใบรับรองเลขที่ 24-LB0026  
(Certification No. 24-LB0026)



ชื่อห้องปฏิบัติการ  
(Laboratory Name)

หมายเลขการรับรองที่  
(Accreditation No.)

ฉบับที่ 02  
(Issue No.02)

สถานภาพห้องปฏิบัติการ  
(Laboratory status)

บริษัท ซีคอบ จำกัด ฝ่ายห้องปฏิบัติการทดสอบด้านสิ่งแวดล้อม  
(Secot Company Limited, Environmental Laboratory Division)

ทดสอบ 0394  
(Testing 0394)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E. 2566 (2023))

☒ถาวร  
(Permanent)

☐นอกสถานที่  
(Site)

☐ชั่วคราว  
(Temporary)

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E. 2571 (2028))

☐เคลื่อนที่  
(Mobile)

☐หลายสถานที่  
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (environmental field)		
1. น้ำและน้ำเสีย (water and wastewater)	<ul style="list-style-type: none"><li>โลหะหนัก (heavy metals)</li><li>สารหนู (Arsenic, As) 0.000 5 mg/L ถึง 0.090 0 mg/L</li><li>สารหนู (Arsenic, As) 0.05 mg/L ถึง 4.50 mg/L</li><li>แบเรียม (Barium, Ba) 0.02 mg/L ถึง 4.50 mg/L</li><li>แคดเมียม (Cadmium, Cd) 0.01 mg/L ถึง 4.50 mg/L</li><li>โครเมียม (Chromium, Cr) 0.01 mg/L ถึง 4.50 mg/L</li></ul>	<ul style="list-style-type: none"><li>Standard Methods for the Examination of Water and Wastewater, APHA , AWWA, WEF, 23<sup>rd</sup> edition , 2017, Part 3030 F and Part 3114 C</li><li>Standard Methods for the Examination of Water and Wastewater, APHA , AWWA, WEF, 23<sup>rd</sup> edition , 2017, Part 3030 E and Part 3120 B</li></ul>

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม  
(Ministry of Industry, Thai Industrial Standards Institute)

หน้า 1/9

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
(Scope of Accreditation for Testing)  
ใบรับรองเลขที่ 24-LB0026  
(Certification No. 24-LB0026)



ฉบับที่ 02  
(Issue No.02)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E.2566 (2023))

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
(Laboratory status)

☒ ถาวร  
(Permanent)

☐ นอกสถานที่  
(Site)

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(Temporary)

☐เคลื่อนที่  
(Mobile)

☐หลายสถานที่  
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (environmental field)</p> <p>1. น้ำและน้ำเสีย (ต่อ) (water and wastewater) (cont.)</p>	<p>- โลหะหนัก (heavy metals)</p> <ul style="list-style-type: none"> <li>ทองแดง (Copper, Cu) 0.02 mg/L ถึง 4.50 mg/L</li> <li>เหล็ก (Iron, Fe) 0.05 mg/L ถึง 9.00 mg/L</li> <li>ตะกั่ว (Lead, Pb) 0.03 mg/L ถึง 4.50 mg/L</li> <li>แมงกานีส (Manganese, Mn) 0.01 mg/L ถึง 9.00 mg/L</li> <li>นิกเกิล (Nickel, Ni) 0.01 mg/L ถึง 4.50 mg/L</li> <li>สังกะสี (Zinc, Zn) 0.02 mg/L ถึง 9.00 mg/L</li> </ul>	<p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, Part 3030 E and Part 3120 B</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
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ฉบับที่ 02  
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ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
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ถึงวันที่ 8 กันยายน พ.ศ. 2571  
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สถานภาพห้องปฏิบัติการ  
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สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (environmental field)</p> <p>1. น้ำและน้ำเสีย (ต่อ) (water and wastewater) (cont.)</p>	<p>- ซีโอดี (Chemical oxygen demand, COD) 100 mg/L ถึง 4 000 mg/L</p>	<p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, Part 5220 D</p>
<p>2. บริเวณทำงาน (workplace)</p>	<p>- ฝุ่นละอองรวม (Total dust) 0.10 mg/filter ถึง 2.00 mg/filter</p> <p>- ฝุ่นละอองขนาดเล็ก (Respirable dust) 0.10 mg/filter ถึง 2.00 mg/filter</p>	<p>- NIOSH Manual of Analytical Methods (NMAM), method 0500, 4<sup>th</sup> edition, 15<sup>th</sup> August 1994 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM), method 0600, 4<sup>th</sup> edition, 15<sup>th</sup> January 1998 (Exclude Sampling)</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

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ฉบับที่ 02  
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ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
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ถึงวันที่ 8 กันยายน พ.ศ. 2571  
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สถานภาพห้องปฏิบัติการ  
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สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสีสิ่งแวดล้อม (environmental field)</p> <p>2. บริเวณทำงาน (ต่อ) (workplace) (cont.)</p>	<ul style="list-style-type: none"> <li>เบนซีน (Benzene) 1.10 µg/tube ถึง 420 µg/tube</li> <li>โทลูอีน (Toluene) 1.10 µg/tube ถึง 420 µg/tube</li> <li>โทไทรไซลีน (Total xylenes) 2.20 µg/tube ถึง 840 µg/tube</li> <li>เมตา, พารา-ไซลีน (m, p- Xylene) 1.10 µg/tube ถึง 420 µg/tube</li> <li>ออร์โธ-ไซลีน (o- Xylene) 1.10 µg/tube ถึง 420 µg/tube</li> </ul>	<ul style="list-style-type: none"> <li>- NIOSH Manual of Analytical Methods (NMAM) , method 1501, 4<sup>th</sup> edition , 15<sup>th</sup> March 2003 (Exclude Sampling)</li> </ul>
<p>3. ปล่องระบายอากาศ (stack)</p>	<ul style="list-style-type: none"> <li>ซัลเฟอร์ไดออกไซด์ (Sulfur dioxide ) 1.00 mg/L ถึง 16 000 mg/L (solution)</li> </ul>	<ul style="list-style-type: none"> <li>- US.EPA , Code of Federal Regulations , 40 CFR 60 appendix A , method 6 , July 2019 (Exclude Sampling)</li> </ul>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

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ใบรับรองเลขที่ 24-LB0026

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ฉบับที่ 02  
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ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
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ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสีสิ่งแวดล้อม (environmental field)</p> <p>3. ปล่องระบายอากาศ (ต่อ) (stack) (cont.)</p>	<ul style="list-style-type: none"> <li>ไฮโดรเจนฟลูออไรด์ (Hydrogen fluoride) 5 µg/sample ถึง 400 µg/sample</li> <li>ไฮโดรเจนคลอไรด์ (Hydrogen chloride) 5 µg/sample ถึง 400 µg/sample</li> </ul>	<ul style="list-style-type: none"> <li>- WI-7.2-1-22 based on US.EPA , Code of Federal Regulations , 40 CFR 60 appendix A , method 26 , 2019 (Exclude Sampling)</li> </ul>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
(Scope of Accreditation for Testing)  
ใบรับรองเลขที่ 24-LB0026  
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ฉบับที่ 02  
(Issue No.02)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E.2566 (2023))

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (environmental field)		
4. บรรยากาศทั่วไป (ambient air)	<ul style="list-style-type: none"> <li>สารอินทรีย์ระเหยง่าย (Volatile organic compounds, VOCs)</li> <li>คลอโรอีเทน (Chloroethene) 0.05 <math>\mu\text{g}/\text{m}^3</math> ถึง 51.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>1,3-บิวทาไดเอน (1,3-butadiene) 0.04 <math>\mu\text{g}/\text{m}^3</math> ถึง 44.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>โบรมอมีเทน (Bromomethane) 0.08 <math>\mu\text{g}/\text{m}^3</math> ถึง 77.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>อะครอลีน (Acrolein) 0.05 <math>\mu\text{g}/\text{m}^3</math> ถึง 45.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> </ul>	WI-7.2-1-24 based on US EPA , Compendium Method TO-15 , EPA/625/R-96/010b, Second edition, January 1999 

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
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ฉบับที่ 02  
(Issue No.02)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E.2566 (2023))

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
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☒ถาวร  
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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (environmental field)		
4. บรรยากาศทั่วไป (ต่อ) (ambient air) (cont.)	<ul style="list-style-type: none"> <li>สารอินทรีย์ระเหยง่าย (Volatile organic compounds, VOCs)</li> <li>อะครีโลไนไตรล์ (Acrylonitrile) 0.04 <math>\mu\text{g}/\text{m}^3</math> ถึง 43.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>ไดคลอโรมีเทน (Dichloromethane) 0.14 <math>\mu\text{g}/\text{m}^3</math> to 69.00 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>คาร์บอนไดซัลไฟด์ (Carbon disulfide) 0.06 <math>\mu\text{g}/\text{m}^3</math> ถึง 62.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>ไตรคลอโรมีเทน (Trichloromethane) 0.20 <math>\mu\text{g}/\text{m}^3</math> ถึง 97.00 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>1,2-ไดคลอโรอีเทน (1,2-dichloroethane) 0.08 <math>\mu\text{g}/\text{m}^3</math> ถึง 80.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> </ul>	WI-7.2-1-24 based on US EPA , Compendium Method TO-15 , EPA/625/R-96/010b, Second edition, January 1999 

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
(Scope of Accreditation for Testing)  
ใบรับรองเลขที่ 24-LB0026  
(Certification No. 24-LB0026)



ฉบับที่ 02  
(Issue No.02)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E.2566 (2023))

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
(Laboratory status)

☒ถาวร  
(Permanent)

☒นอกสถานที่  
(Site)

☐ชั่วคราว  
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(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสิ่งแวดล้อม (environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (ambient air) (cont.)</p>	<p>- สารอินทรีย์ระเหยง่าย (Volatile organic compounds, VOCs)</p> <ul style="list-style-type: none"> <li>• เบนซีน (Benzene) 0.06 <math>\mu\text{g}/\text{m}^3</math> ถึง 63.00 <math>\mu\text{g}/\text{m}^3</math> (0.02 ppbv ถึง 20.00 ppbv)</li> <li>• คาร์บอนเตตระคลอไรด์ (Carbon tetrachloride) 0.25 <math>\mu\text{g}/\text{m}^3</math> ถึง 125 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>• ไตรคลอโรเอทิลีน (Trichloroethylene) 0.21 <math>\mu\text{g}/\text{m}^3</math> ถึง 107 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>• 1,2-ไดคลอโรโพรเพน (1,2-dichloropropane) 0.18 <math>\mu\text{g}/\text{m}^3</math> ถึง 92.00 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>• เตตระคลอโรเอทิลีน (Tetrachloroethylene) 0.27 <math>\mu\text{g}/\text{m}^3</math> ถึง 135 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> </ul>	<p>- WI-7.2-1-24 based on US EPA , Compendium Method TO-15 , EPA/625/R-96/010b, Second edition, January 1999</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ  
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ฉบับที่ 02  
(Issue No.02)

ออกให้ตั้งแต่วันที่ 30 ตุลาคม พ.ศ. 2566  
(Valid from) (30 October B.E.2566 (2023))

ถึงวันที่ 8 กันยายน พ.ศ. 2571  
(Until) (8 September B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ  
(Laboratory status)

☒ถาวร  
(Permanent)

☒นอกสถานที่  
(Site)

☐ชั่วคราว  
(Temporary)

☐เคลื่อนที่  
(Mobile)

☐หลายสถานที่  
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาสิ่งแวดล้อม (environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (ambient air) (cont.)</p>	<p>- สารอินทรีย์ระเหยง่าย (Volatile organic compounds ,VOCs)</p> <ul style="list-style-type: none"> <li>• 1,2-ไดโบรมีเอเทน (1,2-dibromoethane) 0.31 <math>\mu\text{g}/\text{m}^3</math> ถึง 153 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> <li>• 1,1,2,2-เตตระคลอโรเอทิลีน (1,1,2,2-tetrachloroethane) 0.69 <math>\mu\text{g}/\text{m}^3</math> ถึง 137 <math>\mu\text{g}/\text{m}^3</math> (0.10 ppbv ถึง 20.00 ppbv)</li> <li>• เบนซิลคลอไรด์ (Benzyl chloride) 0.52 <math>\mu\text{g}/\text{m}^3</math> ถึง 103 <math>\mu\text{g}/\text{m}^3</math> (0.10 ppbv ถึง 20.00 ppbv)</li> <li>• 1,4-ไดคลอโรเบนซีน (1,4-dichlorobenzene) 0.24 <math>\mu\text{g}/\text{m}^3</math> ถึง 120 <math>\mu\text{g}/\text{m}^3</math> (0.04 ppbv ถึง 20.00 ppbv)</li> </ul>	<p>- WI-7.2-1-24 based on US EPA , Compendium Method TO-15 , EPA/625/R-96/010b, Second edition, January 1999</p>



ภาคผนวก ซ

ใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์การทำงาน  
จากกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บญ  
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๔๙

อนุญาตให้ บริษัท ซีคอน จำกัด

เลขทะเบียนนิติบุคคล ๐๑๐๕๕๓๖๐๐๐๙๗๖

ตั้งอยู่ เลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง  
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการตรวจวัดระดับความเข้มข้น  
ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับ  
กฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน  
พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑๔ ราย ดังรายชื่อแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม

ข-๑๑-๐๒๐๑-๐๔๙-๐๑-๖๕

(ลงนาม)

(นายทะเบียน)

(นายศักดิ์ศิลป์ ตูลาธร)

ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน  
และสถานที่เก็บรักษาสารเคมีอันตราย  
ของบริษัท ซีคอท จำกัด

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๔๙

๑. นายชิตพล	สมประสงค์
๒. นายอนิวัฒน์	พิมพ์นนา
๓. นายศิวนนท์	กุลวงษ์
๔. นายวัชรกานต์	ประมาคะเด
๕. นายธนโชติ	ช่างลือ
๖. นายกิตติพงศ์	ทะเกิงสุข
๗. นายจิรวัฒน์	โคตรคำหาญ
๘. นายศุภกิจ	ดีมุภา
๙. นางสาวธัญลักษณ์	โยธา
๑๐. นางสาวทิพย์สุดา	วรรณการ
๑๑. นางสาวสายธาร	ภูเขียว
๑๒. นายภาคภูมิ	แทนไทย
๑๓. นายธนาวุฒิ	ด่วนแสง
๑๔. นายรัตนชัย	ชอบทำกิจ

ทั้งนี้ ตั้งแต่วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บญ  
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๕-๐๐๓๔

อนุญาตให้ บริษัท ซีคอน จำกัด

เลขทะเบียนนิติบุคคล ๐๑๐๕๕๓๖๐๐๐๗๗๖

ตั้งอยู่ เลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง  
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการวิเคราะห์ระดับความเข้มข้น  
ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับ  
กฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน  
พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑๔ ราย ดังรายชื่อแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๕

(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม

ข-๑๑-๐๒๐๒-๐๓๔-๐๑-๖๕

(ลงนาม)

(นายทะเบียน)

(นายศักดิ์ศิลป์ ตูลาธร)

ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน  
และสถานที่เก็บรักษาสารเคมีอันตราย  
ของบริษัท ซีคอท จำกัด  
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๕-๐๐๓๔

- |                      |               |
|----------------------|---------------|
| ๑. นางสาวนริสา       | ภูสรพีชญ์     |
| ๒. นางสาวอารยา       | ทิพรัักษ์     |
| ๓. นางสาวศิริวรรณ    | นิมสง่า       |
| ๔. นางสาวสุธาทิพย์   | เทียนเตี้ย    |
| ๕. นางสาวพรณา        | บุตรธรรม      |
| ๖. นางสาวธารินี      | อาจปลิว       |
| ๗. นางสาวกฤษณา       | จันทุม        |
| ๘. นางสาวพัชรา       | สมานฉันท์     |
| ๙. นางสาวจนิสตา      | ก้อยอ่อน      |
| ๑๐. นางสาวศศิภา      | ใจดี          |
| ๑๑. นางสาวจุฑารัตน์  | แจ่มเรือน     |
| ๑๒. นางสาวณัฐศิริ    | เลิศธีรพัฒน์  |
| ๑๓. นางสาวสิญญลักษณ์ | อินทประสิทธิ์ |
| ๑๔. นางสาวสุตาพร     | สุนทร         |

ทั้งนี้ ตั้งแต่วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๕ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กภ.บญ  
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

อนุญาตให้.....บริษัท ซีคอน จำกัด.....

เลขทะเบียนนิติบุคคล ๐๑๐๕๕๓๖๐๐๐๙๗๖.....

ตั้งอยู่ เลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร.....

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริม ความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๕ ราย ดังรายชื่อแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕

(นายสมพงษ์ กวาทแก้ว)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม

ป-๑๑-๐๔๐๓-๐๔๘-๐๑-๖๕

(ลงนาม)..... (นายทะเบียน)

(นายศักดิ์ศิลป์ ตูลาธร)

ตำแหน่ง ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง  
ของบริษัท ซีคอท จำกัด

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

- |                   |               |
|-------------------|---------------|
| ๑. นางสาวสุนันทา  | ศิริวัฒนานนท์ |
| ๒. นางสาวกนิษฐา   | เจริญเชื้อ    |
| ๓. นางสาวปัทมวรรณ | สุวรรณวิโรจน์ |
| ๔. นางสาวอลิษา    | คณิธรานนท์    |
| ๕. นางสาวชนิตา    | หล้าสาย       |

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๕



(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

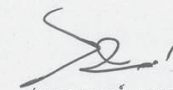
รายชื่อบุคลากร (เพิ่มเติม)  
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง  
ของบริษัท ซีคอท จำกัด

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

- |                   |             |
|-------------------|-------------|
| ๑. นางสาวศลิษา    | อินริย์     |
| ๒. นางสาวมาริยาณี | ฮานว        |
| ๓. นางสาววิระยา   | ปัจฉิมบุรณ์ |

ทั้งนี้ ตั้งแต่วันที่ ๑๓ มกราคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๘

ให้ไว้ ณ วันที่ ๑๓ มกราคม พ.ศ. ๒๕๖๖




(นายสมพจน์ กวางแก้ว)

รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

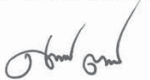


รายชื่อบุคลากร (เพิ่มเติม)  
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง  
ของบริษัท ซีคอท จำกัด  
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

๑. นายพงศ์ศิริ จักรแก้ว  
ทั้งนี้ ตั้งแต่วันที่ ๒๐ มีนาคม พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๘  
ให้ไว้ ณ วันที่ ๒๐ มีนาคม พ.ศ. ๒๕๖๘  
  
(นายศักดิ์ศิลป์ ตูลาธร)  
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง (เพิ่มเติม)  
ของบริษัท ซีคอท จำกัด  
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องวัดเสียง และ เครื่องวัดเสียงกระทบหรือเสียง กระแทก	ยี่ห้อ	SCARLET TECH รุ่น ST-21D	๕
		Serial No.	821078	
			821079	
			821080	
			821081	
			821082	
		มาตรฐาน	IEC 61672	

ทั้งนี้ ตั้งแต่วันที่ ๒๐ มีนาคม พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๘  
ให้ไว้ ณ วันที่ ๒๐ มีนาคม พ.ศ. ๒๕๖๘  
  
(นายศักดิ์ศิลป์ ตูลาธร)  
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน